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DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

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MANUAL TRANSMITTAL SHEET

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Subject

9100 – ENGINEERING

1. Explanation of Material Transmitted: This release revises the Bureau of Land Management's (BLM) ENGINEERING Policy with current standards and codes. It provides procedural guidance to the field organization for addressing Engineering facilities throughout the BLM.
2. Reports Required: None.
3. Materials Superseded: The material superseded by this release is listed under "Remove" below. No other directives are superseded.
4. Filing Instruction: File as directed below.

REMOVE:
All of 9100 (Rel. 9-312)

INSERT:
All of 9100
(Total 45 Sheets)

/s/ Michael A. Ferguson
Assistant Director, Business and Fiscal Resources

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.01 **Purpose.**

This Manual Section contains the responsibilities, policies, and procedures for facility planning, design, construction, and maintenance support used within the BLM to manage the public lands.

.02 **Objectives.** The objectives are to:

A. Identify the role each organizational unit plays in providing engineering expertise for the management of BLM programs.

B. Provide direction for the use of facility planning, design, construction, and maintenance skills throughout the BLM.

.03 **Authority.** The authority for providing facility planning, design, construction, and maintenance support to the BLM programs is inherent in the Director's authority for carrying on the program functions of the BLM derived from the following (see Appendix A for abstract of authorities cited):

A. Taylor Grazing Act of 1934, as amended, P.L. 73-482; 48 Stat. 1269; 43 U.S.C. 315, et seq., June 28, 1934.

B. Oregon and California Revested Land Act of 1937, as amended, P.L. 75-405; 50 Stat. 874; 43 U.S.C. 1181a, et seq., August 28, 1937.

C. Federal Land Policy and Management Act of 1976, as amended, P.L. 94-579; 90 Stat. 2743; 42 U.S.C. 1701, et seq., October 21, 1976.

D. Public Rangelands Improvement Act of 1978, P.L. 95-514; 92 Stat. 1803; 43 U.S.C. 1901, et seq., October 25, 1978.

E. OMB Circular No. A-18, Policies on Construction of Family Housing.

F. Federal Property and Administrative Services Act of 1949 (41 U.S.C. 254b), and as amended in 1972 (63 Stat. 378).

G. Brooks Act (86 Stat. 1278, 16 U.S.C. 541–544, and 40 U.S.C. 541).

H. Public Buildings Amendments Act of 1988, P.L. 100-678; November 17, 1988.

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I. Executive Order E.O. 12699, Seismic Safety of Federal and federally assisted or regulated new Building Construction, January 1990.

J. 23 U.S.C. 144 and 151, and 23 CFR 650.

K. Departmental Manual: Parts 135 and 235.

L. Annual Appropriations Act of the Department of the Interior and Related Agencies.

M. Executive Order 13327, Asset and Construction Management System.

.04 **Responsibility.** The responsibilities described below are commensurate with those identified in approved functional statements.

A. The Director, Bureau of Land Management, is responsible for the overall engineering support needed for the BLM total resource management effort. This responsibility is exercised through the Assistant Directors.

B. The Assistant Director, Business and Fiscal Resources, is responsible for policy interpretations, program direction, and leadership of architecture and engineering support necessary for the BLM facility planning, design, construction, and maintenance programs. This responsibility is exercised through the Division Chief, Division of Business Services (WO-850).

C. Chief, Division of Business Services (WO-850), is responsible for:

1. Providing BLM-wide leadership and guidance in establishing goals, objectives, policies, systems, and procedures for architecture and engineering activities.

2. Evaluating engineering performance and providing advice and counsel on unusual problems.

3. Coordinating activities with other Washington Office divisions and offices.

4. Providing architecture and engineering staff support to Washington Office divisions.

5. Overseeing the writing and updating of the BLM Manual Section for the engineering program.

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6. Coordinating with NTC, National Operations Center, (NOC), State, and Field Offices to determine BLM-wide training needs for architecture and engineering activities.

D. The Director, NOC, is responsible for providing leadership and direction for the technical architecture and engineering support required for the BLM engineering program through the Chief, Branch of Architecture and Engineering.

E. The Chief, Branch of Architecture and Engineering, Division of Science and Resource Services, NOC, is responsible for:

1. Maintaining an adequately balanced staff of architects and engineers qualified in planning, design and construction of dams, bridges, roads, trails, buildings; recreation sites and support utilities; and technical assistance in facility operation, inspection, and maintenance to meet the demands and requirements of the State and Field Offices.

2. Providing designs of major structures and facilities upon request.

3. Providing construction contract administration assistance on major structures and facilities upon request.

4. Providing development and administrative assistance for architect-engineer (A&E) contracts when time or expertise is not available at the State Office.

5. Recommending and, upon request, providing engineering assistance for BLM-wide training for engineering activities identified in the BLM Annual Work Plan.

6. Providing expertise, coordination, and oversight of BLM-wide engineering programs, including Bridge Safety, Seismic Safety, Accessibility, Energy and Water Conservation (Sustainability), Value Engineering, Cost Estimating, Guide Specifications and other engineering operational program responsibilities as designated in the Annual Work Plan.

F. State Directors are responsible for providing the engineering services needed for the State's programs. This responsibility is exercised through the designated Deputy State Director. The State Director is responsible for designating an engineer program to fulfill the roles and responsibilities of the State Engineer.

G. The Deputy State Director is responsible for providing the State with engineering services. This responsibility is exercised through the State Engineer.

.04H

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H. The State Engineer is responsible for:

1. Developing, directing, and coordinating the statewide engineering program.
2. Providing leadership, guidance, and support to the District or Field Offices requiring engineering skills.
3. Providing assistance to District or Field Offices when requested.
4. Providing a comprehensive, independent engineering review of all proposed solicitations for construction, maintenance, and land treatment projects to be issued through the State Office or to be issued through the NOC.
5. Providing assistance to District or Field Offices as requested in the review of position descriptions for District or Field professional and engineering technician positions.
6. Participating in the interdisciplinary review of the various support actions and recommendations identified in the BLM Planning System.
7. Identifying and requesting necessary architecture and engineering assistance.
8. Issuing supplemental guidelines and technical procedures for engineering activities for use within the State as needed.
9. Developing, implementing, and administering statewide training for engineering activities.
10. Maintaining and ensuring the currency of the data in the BLM's Facility Asset Management System (FAMS) or other Department or Bureauwide facility inventory system. The State Engineer is responsible for ensuring that the District or Field Offices within the State keep the inventory system current and that the data in it reasonably reflect the maintenance needs within the State.

I. The District or Field Office Manager, or their designated representative, is responsible for providing engineering services. This responsibility is exercised through an engineer designated to fulfill the responsibilities of the District, Field or Zone Engineer. The above managers also have the responsibility of ensuring that data in the FAMS are current.

J. The District, Field or Zone Engineer, or their designated representative (as applicable), has the responsibility to:

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1. Develop, direct, and coordinate the engineering programs of the assigned office.
2. Provide engineering guidance and support.
3. Develop engineering technical stipulations for contracts, leases, and permits.
4. Participate in the interdisciplinary analysis of the various engineering proposals.
5. Provide engineering input into the preparation of Environmental Assessments and Environmental Impact Statements.
6. Provide engineering input into the BLM Programming and Budgeting System.
7. Identify and request necessary engineering assistance to develop, implement, and administer training for engineering activities.
8. Develop supplemental guidelines and technical procedures for the office as necessary for engineering activities.

K. The Director of the National Interagency Fire Center (NIFC) is responsible for providing the engineering services needed in NIFC. This responsibility includes:

1. Developing, directing, and coordinating the NIFC engineering program.
2. Ensuring that engineering assistance is provided to NIFC personnel when needed.
3. Ensuring that a comprehensive independent engineering review is conducted for all proposed solicitations for construction and maintenance to be issued through NIFC.
4. Identifying and requesting necessary engineering assistance.
5. Issuing supplemental guidelines and technical procedures for engineering activities for use within NIFC as needed.

.05 **Policy.** It is BLM policy that architectural and engineering expertise is applied during the inventory, planning, programming, design, construction, and maintenance of resource facilities and buildings and that architectural and engineering services required to carry out the goals and objectives of the resource management program are provided.

.06

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.06 **Files and Records Maintenance.** See Manual Section 9100.43 – “Project File” for establishing, maintaining, and disposing of files.

.07 **Standards of Conduct.** The BLM architects and engineers should act in accordance with the Code of Ethics for Architects and Engineers adopted by the National Society of Professional Engineers (see Appendix A).

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.1 Position Management of Architecture and Engineering Skills. Optimal use of architectural and engineering skills is essential for successful completion of BLM programs. Architects, engineers, and technicians are encouraged to join and actively participate in professional and technical societies. They are also encouraged to continue their education. Professional registration of architects and engineers and certification of technicians are desirable.

.11 Location of Architecture and Engineering Skills. Architecture and engineering skills needed for all BLM programs are located at the organizational level closest to the work, consistent with sound workforce utilization. If a continuing architecture and engineering workload is justified, each organizational level of the BLM should assign a full-time architect or engineer to provide technical program direction. If special skills are needed that cannot be justified on a full-time basis at the operating level, these skills are located at the higher level (or Center) where full-time employments are justified.

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.2 Architect's and Engineer's Role in the Land Use Planning System. Land Use Planning is one of the major management systems used to direct activities. The BLM land use planning is designed to fulfill statutory and regulatory requirements for comprehensive land use plans. The resource management planning process prescribed in the planning regulations is central to the BLM multiple-use management mandate. Architects and engineers, to varying degrees, should be involved in the Land Use Planning System at all levels. The BLM Land Use Planning System is described in Manual Section 1601 – “Land Use Planning.” The Land Use Planning System is subdivided into two distinct tiers (Resource Management Plan and Implementation Plan) for operational purposes.

.21 Resource Management Plan. The Resource Management Plan (RMP) establishes, in a plan, the combination of land and resource uses; related levels of investment and production, or protection, to be maintained; and general management practices and constraints for the various public land resources covered by the plan. These are set forth as the terms, conditions, and decisions that apply to BLM management activities and operations and are presented in the form of multiple-use prescriptions and plan elements. The RMP may propose construction and maintenance of on-the-ground projects, land treatments, and improvements. Such projects may be described in the plan in one of the following two ways, resulting in varying degrees of engineering involvement.

A. Project Identification. Projects, including location and functional requirements, will be identified at the implementation planning level. Minimal engineering involvement is required.

B. Projects Proposed by Functional Requirement. Projects may be proposed by functional requirement. Specific locations or methods of accomplishment are not identified in the RMP. Consultation with engineering is required.

.22 Implementation Plan. This, which is more detailed and site-specific, provides for the development of plans more limited in scope. Implementation plans describe more fully capital improvements, investment schedules or priorities, and similar items, and set forth management actions to accomplish program activity goals and objectives. Detailed descriptions of proposed facilities or land treatments are generally provided at this level. Engineering involvement in this tier is extensive.

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.3 Use of the Directives System. The directives system provides the central instructions needed to comply with laws, regulations, and administrative policy; ensures program effectiveness; and provides a reasonable consistency of approach and results among Field Offices while allowing flexibility to respond to local circumstances.

.31 Manuals. The BLM Manual System contains permanent written policy and procedural instruction. The BLM Manual is mandatory, unless the text states otherwise. (See Manual Section 1221 – “Directives.”) The Manual consist of the Manual Sections and related Handbooks. Handbooks are intended to transmit detailed technical or procedural instructions. Both the Manual Sections and the Handbooks have equal force and effect.

A. Organization of Engineering Systems Manual Sections. The Manual Section 9100 provides general policy and not detailed technical guidance. Manual Sections covering broad subjects are issued under the numbers 9101, 9102, 9103, and so forth. Other Manual Sections covering material common to a system or grouping of subjects are issued under the numbers 9110, 9120, 9130, and so forth. Specific subject matter is issued under subsidiary numbers such as 9112, 9121, 9131, or 9151.

B. Interrelationship of Manual Sections. The interrelationship with other activities such as range management, wildlife habitat management, forest management, recreation management, and watershed management is significant. Such interrelationships result in additional specialized guidance being provided in other appropriate Manual Sections. Cross-references to other Manual Sections must be carefully noted.

C. Maintenance of Manual Sections and Handbooks. Maintenance of the Manual Section 9100 is a continuing effort. Appropriate executive orders, new laws, and policy changes are included in the appropriate Manual Section. The Chief, Division of Business Services, or the Manager’s designated representative, must conduct annual reviews to assess the need for preparation or revision of Manual Section 9100 to meet the BLM needs for effective engineering support to the BLM programs.

.32 Instruction Memorandums and Information Bulletins. These controlled directives are of a short-term, temporary nature. Instruction Memorandums provide new mandatory instructions that must reach BLM employees quickly to assist in interpreting existing regulations, policies, or instructions. Information Bulletins are used to disseminate information of interest to BLM employees and do not contain policy, directive, or instructional material.

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.4 Facilities Management. Development of a BLM facility usually involves a continuing sequence of events spanning several years. Planning, design, construction, and maintenance programs shall reflect the continuous nature of the facility development process starting with the inventory of existing facilities followed by the determination of a need and funding of the facility through the BLM Programming–Budgeting System.

.41 Project Name. Each project developed or funded through the BLM’s system is given a name at the time it is initially programmed for funding. Names generally contain the site name. Avoid duplication or close approximation of names to reduce confusion in tracking funding.

.42 Project Number. Each defined project shall have its own project number, including those receiving funding from outside sources. Each project developed and funded through the Bureau Programming–Budget System is given its own numerical identifier. A Renewable Resource Project Number is given for construction work accomplished in support of Soil, Water, and Air Management; Range Management; Wildlife Management; and Forest Management Development. Fire Rehabilitation subactivities are also assigned a project number. Numbers are assigned in sequential order.

.43 Project File. Establish a permanent, concise file at the office having administrative jurisdiction for each BLM-owned or controlled facility. This file may be for a project such as a fence, a recreation site, a road, or any other construction project. This file must be readily available to any interested, authorized person. Files are arranged, maintained, and disposed of in compliance with the records management system described in Manual Section 1271 – “BLM Information Access Center.”

A. Composition. The file includes copies of all documents that present a historical record of the facility. Material is arranged and secured in a logical order to facilitate review and audit. The file must be complete and contain all pertinent papers, including contract information. Bulky material, such as specifications and drawings, need not be physically kept in the file if cross-referenced to the project file. The file also includes data such as the feasibility analysis, environmental analysis documents, design rationale, condition assessments, project data sheets, technical inspection and appraisal reports, shop drawings, “as-built” drawings, and a record of maintenance performed.

B. Maintenance. Keep the file current. Be alert to the acquisition of new condition assessment data to ensure that the data are placed in the file. Regularly review the information to ensure that it reflects the latest data. Document every action taken on the facility and place the documentation in the file. Ensure that the data are input into the FAMS correctly.

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.44 Project Leader. All major construction projects requiring input from several organizations within the BLM or requiring input from other agencies or entities must have a formally designated project leader. The project leader's responsibility is to ensure that all planning, coordination, design, construction, maintenance, and operation phases of the facility are adequately considered at all times. The project leader is designated by the management official having line authority for the operation of the facility.

.45 Inventory. The inventory of existing facilities and stewardship assets, using FAMS criteria, is necessary and vital to the asset management process. Condition Assessments shall be conducted on cyclical bases as described in the various discipline manuals. Condition Assessment data input is the responsibility of the State FAMS data steward.

A. Categories. The inventory categories are: Roads, Trails, Dams, Bridges and Major Culverts, Buildings, and Recreation and Administration Facilities.

B. Records and Summary. All facilities selected for retention should have a copy of the inventory records placed in FAMS.

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.5 Technical Assistance. The NOC is staffed to provide, as needed, specialized architectural and engineering services not available within the various State organizations. Technical assistance includes such items as building site studies, accessibility assessments, dam condition assessments, bridge condition assessments and load ratings, building condition assessments, recreation and administration facility condition assessments, health and pollution control facility condition assessments or technical inspections; preparation of operation and maintenance plans for BLM facilities; and design assistance for the maintenance of buildings dams, bridges, recreation, and transportation.

.51 Timing. To develop an Annual Work Plan, the Chief, Branch of Architecture and Engineering, must be aware of the technical assistance requirements that may be requested by the States. The Chief, Branch of Architecture and Engineering, requests that the engineering technical assistance needs from the State Offices' State Directors and NIFC's Center Director be sent to NOC by September 30 of each year. Requests should be listed in priority order and signed by the State Director.

.52 Procedure. Upon receipt of the requests for engineering technical assistance, the NOC screens those requests for planning, design, and construction assistance for projects identified. The Division Chief then develops a listing in priority order of technical assistance planned for the year after consultation with the Chief, Division of Engineering and Environmental Services.

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.6 Construction Specifications and Standards. The following constitutes the Construction Specifications, Guide Specifications, and Standard Construction Drawings and Details used by the BLM .

.61 BLM Construction Specifications. The BLM uses the Construction Specification Institute's (CSI) MasterFormat for specifications used on BLM construction work. Roads and bridges specifications may be written using the format of the current edition of the "Standard Specifications for Construction of Roads and Bridges on Federal Highways."

.62 BLM Guide Specifications. The BLM utilizes MASTERSPEC specification sections (with the exception of Division 1) as the basis for the BLM Guide Specifications. The NOC maintains the BLM Guide Specifications by incorporating MASTERSPEC updates. Division 1 specification sections and unique specification sections, developed by the BLM, continue to be edited and included as part of the BLM Guide Specifications. The Guide Specifications are posted on the BLM Intranet for access by BLM Offices (State, District, and Field). The BLM will continue to use the current edition of the "Standard Specifications for Construction of Roads and Bridges on Federal Highways." Copies of the construction Specification Guides and editing software are available electronically on the BLM's NOC website.

.63 BLM Standard Construction Drawings and Details. In conjunction with the use of the CSI format, the BLM has developed Standard Construction Drawings and Details. The purpose of Standard Drawings and Details is to standardize drawing format and content. The BLM-wide Standard Construction Drawings and Details are not to be altered. If changes or modifications are necessary, a new drawing should be created and a new or modified drawing number assigned to the new or modified drawing. These Standard Construction Drawings and Details are available electronically on the BLM's NOC website.

.64 Development and Maintenance. The BLM Guide Specifications and BLM Standard Construction Drawings and Details are maintained by NOC Branch of Architecture and Engineering and available electronically on the BLM's NOC website. Additionally, the NOC maintains an "archive" of older BLM Standard Guide Specifications. These older specifications are available on the NOC website for reference only, as they are not maintained.

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Appendix A. Glossary of Terms

Name	Definition
Abutment–Dam	A substructure supporting the ends of a single span or the extreme ends of a multi-span superstructure and, in general, retaining the approach embankment; also, the natural valley or canyon wall against which a dam is constructed. Accuracy degree of conformity with a standard or accepted value.
Abutment–Bridge	A bridge typically has two abutments—one at each end. A bridge abutment is a substructure unit that supports the extreme end of a single-span or multi-span superstructure.
Acre-Feet (AF)	A measurement of volume; the amount of water that will cover 1 acre to a depth of 1 foot (1 acre-foot = 43,560 cubic feet).
Administrative Sites	Any building or group of buildings or land used or set aside for administrative purposes, including office and storage buildings, government-furnished employee housing, fire control stations, seed orchards, maintenance facilities, undeveloped land reserved for future administrative purposes, etc.
Approving	As used herein, the signing by the appropriate engineer in the “approved” space in the title block of the drawing prepared for projects within the engineering area of responsibility indicating that the design is complete, adheres to good engineering practices, meets management requirements, and meets public health and safety requirements.
Arch	A typical, single-span bridge has two arches. An arch is a curved structural element primarily in compression, producing at its supports reactions having both vertical and horizontal components.
As-Built Drawings	Reproducibles of the original tracings, which have been corrected to as-built conditions. The corrections are accomplished by posting all design modifications, field changes, and corrections or deviations during construction. Without such posting, the original drawings would be in error when compared to actual construction in the field. Shop drawings, construction drawings, and mechanical and electrical layout drawings are not a part of as-built drawings unless they change the correctness of design drawings.
Assets	Terms utilized to describe roads, primitive roads, and trails that compose the transportation system. Also, the general term used to describe all BLM “assets” contained within the Facility Asset Management System (FAMS).

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Average Daily Traffic	For BLM purposes, the average daily traffic (ADT) is defined as the annual traffic divided either 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 direction of traffic.
Back Country Byways	The BLM's scenic byways program. Scenic corridors along many of the agency's roads that have significant scenic, historical, cultural, or recreational qualities.
Bent	A type of intermediate multi-span bridge support comprised of walls, columns, or piles that are supported by individual footings. In contrast, a pier is a type of intermediate multi-span bridge support comprised of walls, columns, or piles that are supported by a common footing.
BLM-Controlled	Facilities constructed by BLM initiative, acquired through acquisition processes or constructed by others under a right-of-way grant or permit, which allows the BLM to control the type and period of use.
Bridge	A crossing structure, including supports erected over a depression or an obstruction, such as water, highway, railway and having a track or passageway for carrying traffic or other moving loads (i.e., pedestrian, equestrian, vehicular). Major bridges are those that have 20 feet or more between abutments.
Bridge Inventory Rating	The maximum gross weight (in tons) of designated loads that the bridge can safely carry at unlimited frequency and for an indefinite period.
Bridge Operating Rating	The absolute maximum gross weight (in tons) that the bridge can be permitted to carry. (This is normally limited to infrequent use of heavy logging or mining equipment.)
Building	Any structure with a roof and more or less completely enclosed by walls, designed for storage, human occupancy, shelter for animals, or other useful structure distinguished from structures not designed for occupancy (such as fences or bridges) and from structures not intended for use in one place (such as boats or trailers) even though subject to occupancy.
Camping Unit	An area in a recreation site providing overnight camping and usually consisting of table, fire ring, parking spur, and tent pad.
Collector Road	Roads that normally provide primary access to large blocks of land and connect with or are extensions of a public road system. They accommodate mixed traffic and serve many uses. They generally receive the highest volume of traffic of all the roads in the BLM road system.

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Communication Site	A structure designed to house telecommunications equipment, usually located in remote areas.
Communication System	External systems that support building infrastructure requirements for communications, radio, two-way radio, telephone, radiotelephone, or other telecommunication systems that are permanently installed.
Comprehensive Independent Engineering Review	A review performed by an engineer not involved in the design of the facility, possessing qualifications and design experience in the specific area of that design to determine whether professional techniques and procedures were applied. These include the accuracy of the plans (drawings), specifications, and estimates.
Condition Survey	An inspection of a facility, which identifies and documents conditions, deficiencies, and physical problems using established maintenance condition standards as a reference.
Construction	The initial installation, expansion, or replacement of any facility.
Crest of Dam	The top of the embankment of a dam; usually, the elevation of the crest is taken at the highest point on the human-made embankment.
Crest of Spillway	The top or the highest point at the inlet or intake portion of the spillway.
Cross-Section	A vertical section of the ground or structure at right angles to the centerline or baseline of the roadway.
Cubic Feet Per Second (CFS)	A measurement of volume over time; the amount of water passing a location at one point in time. “Second-feet” (1 cfs = 448.8 gallons per minute).
Culvert	A conduit or passageway, not classified as a bridge, under a road, trail, or other facility usually consisting of a round pipe, a pipe-arch, or an open or closed bottom box or arch.
Curb	A curb is a constructed feature paralleling the side limit of the roadway to guide the movement of vehicle wheels and to safeguard a facility and pedestrians.

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Dam	Any artificial barrier, including appurtenant works, used to impound or divert water. All artificial barriers greater than or equal to 6 feet in hydraulic height, regardless of impoundment capacity, or with a water impoundment capacity greater than or equal to 15 acre-feet, are considered to be dams.
Deck	Supported roadway on a bridge. It includes the bridge decking and wearing surface and railings.
Degree of Curve	The number of degrees at the center of a circle subtended by a cord of 100 feet at its rim; in highway surveying, it is defined as the central angle subtended by an arc of 100 feet.
Design	Development of a project by performing engineering calculations and analysis and the preparation of plans, specifications, and estimates.
Design Flood or Design Storm	The peak discharge, volume (if appropriate), and the stage or wave crest elevation of the flood associated with the recurrence interval selected for the design of a facility. Design floods are usually expressed in terms of return interval (100-year flood) or ratio to probable maximum event (1/2 PMF); design storms are usually expressed in terms of return interval plus duration (100-year, 6-hour storm).
Design Narrative	A detailed description of the project to be designed, the extent of required services, and a preliminary cost estimate.
Detention Dam	A dam designed to slow or mitigate the force of flowing water or to stop sediment transport to downstream areas. Detention dams store little or no water except during and immediately after a flood event.
District Engineer	A BLM engineer designated by the responsible line manager to fulfill all manual requirements of a District Engineer.
Diversion Dam	A dam designed to modify the direction of flow of water, but generally not designed to retain a permanent pool of water.
Downstream Tow	The junction of the downstream face of the dam with the ground or streambed. Generally, if the word “toe” is used without any qualifiers, it refers to the downstream toe.
Drawing	Graphic representation of an existing condition, the work to be done, or product to be furnished.
Drop Structure	A dam designed to dissipate the force of flowing or falling water; usually, a drop structure stores no water except for a brief period of time during a flood event.

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Easement	A vested or acquired right to use land other than as a tenant for a specific purpose, such right being held by someone other than the owner who holds the title to the land.
Embankment	A structure of soil, aggregate, or rock material placed on the prepared ground surface and constructed to subgrade.
Embankment (or earth-fill) Dam	A human-made barrier 6 feet high or higher erected to divert, retain, or detain 15 acre-feet or more of water that is constructed with more than 50 percent of the volume of the embankment of compacted, fine-grained material.
Emergency Spillway	A spillway or outlet built with its crest higher than the customarily used principal spillway, designed as additional relief for the structure in case of abnormally large flows. If there is only one spillway for a structure, it is usually an emergency spillway.
Encroachment	A facility within the limits of a floodplain.
Engineer	A person who is trained in or follows, as a calling or profession, a branch of engineering (as civil, electrical, mining, structural, or sanitary engineering), who has completed a prescribed course of study and complied with requirements concerning registration or licensing.
Engineering Program	Refers to all engineering-related work, including architectural services, landscape architectural design services, electronic engineering services, and all other types of engineering services—except mining and petroleum engineering services, which are provided elsewhere in the organization.
Estimate	Detailed written evaluation of the reasonable costs for the article, service, or work required, including contingency, engineering cost, etc.
Face of Dam	The upstream or downstream sloped surface of the dam.
Facility	Any physical development, including land treatments and improvements, constructed on land or water, to aid the management of the public lands.
Flashboard	Lengths of timber, sheet metal, or other materials that are placed on the crest of a spillway or a dam to increase retention capacity, but that are moveable rather than permanent features of the dam.

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Flood Frequency	A measure of how often a hydrologic event of given magnitude may, on the average, be equaled or exceeded; usually expressed in terms of yearly return interval (50-year flood equals the flood that has a 2 percent probability of occurrence in any given year; 100-year flood equals the flood that has a 1 percent probability of occurrence in any given year.
Floodplain	The lowland and relatively flat areas adjoining inland and coastal waters, including flood prone areas of offshore islands, including at a minimum that area subject to a 1 percent or greater chance of flooding in any given year.
Flood Routing	A study of the changes that occur in the characteristics and magnitude of a flood wave as it moves through space and time.
Force Account	A method by which the BLM accomplishes work by using its own employees and facilities instead of the services of private contractors or other agencies.
Fracture Critical Member	A member in tension or with a tension element whose failure would probably cause a portion of or the entire bridge to fail.
Freeboard	The vertical distance between the controlled water level and the crest of the dam. Net or flood freeboard is the vertical distance between the top of the dam and the maximum water level behind the dam.
Functional Requirements	Detailed descriptions of management needs that the proposed facility must meet.
Gabion	A gabion is a rock-filled wire basket used to retain earth or to provide erosion control. Inventory gabions used as a near-vertical retaining structure as “Retaining Wall” and inventory gabions used for erosion control as “Gabion.”
Gage	The term “gage,” when used in connection with the measurement of plates, means the U.S. Standard Gage, except when referring to the measurement of metal plate culverts and arches, and metal cribbing; then, the term means the “gage” or “thickness,” specified in AASHTO M 36, M 167, M 196, and M 219, as applicable. When the term “gage” refers to the measurement of wire, it means the wire gage specified in AASHTO M 32.

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Government Furnished Property (GFP)	Government-owned property furnished to a contractor for the performance of a contract, defined as industrial facilities, material, special tooling, special test equipment, or military property; also designated Government Furnished Material (GFM) and Government Furnished Equipment (GFE).
Guardrail	A low, fence-like or barrier-like structure designed to absorb vehicular loads and deflect errant vehicles traveling at prudent speeds away from obstacles and/or hazardous areas.
Guideline	A recommendation that should be followed.
Guide Specification	Specifications developed for a particular type of work and used as a guide to the designer in preparation of the project specifications. A guide specification contains phrases that are used on all projects, but has others that allow the designer choices to fit particular projects.
Headwall	Material placed at the inlet or outlet of a culvert or dam to protect the embankment slopes, increase hydraulic efficiency, divert flow, provide anchorage, prevent undercutting, or to serve as a retaining wall.
Helipad	An area of land or water that is used for the landing and takeoff of helicopters, with or without heliport structures.
Heliport	A tract of land or water that is maintained for the landing and takeoff of vertical-takeoff aircraft for receiving and discharging passengers and cargo and that usually has facilities for the shelter, supply, and repair of vertical-takeoff aircraft.
High Water Mark	The point marking the highest stage reached by a flood of a river or stream as evidenced by physical marks on the bank, floodplain, or building.
Horizontal Curve	A curve in plan.
Hydraulic Height	Elevation difference between the lowest point of the natural streambed and the maximum controllable water surface.
Interstate and Primary System	Those State highways constructed in accordance with, and as official portions of, the National System of Interstate and Primary Highways approved by the Secretary of Transportation pursuant to Title 23 of the United States Code.

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Job	An individual or specific work practice to be accomplished as a unit within a specified time period. A job can be a component of a project or a phase of a project. Jobs may be wholly or partly financed with appropriated funds.
Low Water Crossing	A roll in the grade at a stream where normal-stage water flows over the road surface.
Low Water Mark	A mark indicating the stage to which a river or other inland body of water recedes under ordinary conditions, at its lowest stage or elevation.
Maintenance	The work required keeping a facility in such a condition that it may be continuously utilized at its original or designed capacity and efficiency and for its intended purposes.
Maintenance Levels— Roads & Trails	Maintenance levels 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.
Major Culvert	A culvert having a clear opening of more than 35 square feet or multiple installations of culverts placed adjacent or contiguous as units and having a combined clear opening of more than 35 square feet.
Monument	An object erected or dedicated to remember a person or event or to identify a landmark.
Mountain Bike	Non-motorized bicycle with balloon tires designed for trail use.
Multidisciplinary Team	A group of individuals with different training assembled to do a project. The project is broken into pieces and each specialist works on a portion of the project. These portions of the project are then linked together to provide the final recommendation.
Municipal or Community Waste	Any garbage, refuse, sludge, or any other waste material, including solid, liquid, semisolid, or contained gaseous material resulting from household, community, commercial, industrial, or agricultural activities which is being discarded. The term specifically excludes mining associated wastes and overburden and all hazardous wastes as defined in 40 CFR 261.3.
National Recreation Trails	Trails in, or reasonably accessible to, urban areas and trails within parks, forests, and other recreation areas as described in the National Trails System Act of 1968 (Public Law 90-543) and designated as such by either the Secretary of the Interior or the Secretary of Agriculture.

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National Scenic Trails	Extended trails established by Public Law 90-543, located to provide for maximum outdoor recreation opportunities and for the conservation and enjoyment of nationally significant scenic, historical, natural, or cultural qualities of the area through which such trails may pass. Such trails must be authorized and designated by Act of Congress.
National Trails System	Certain trails, designated in Public Law 90-543, and subsequent actions, to promote public access to, travel within, and enjoyment and appreciation of the open air, outdoor areas of the Nation.
Non-Potable Water System	A system designed to distribute gray water or other water that is not safe for human consumption.
Nonstructural Improvements	A practice or treatment that improves resource condition or production for multiple use. Such improvements may include seeding; plant control through chemical, mechanical, or biological means; prescribed burning; water spreaders; pitting; chiseling; contour furrowing; and others.
Normal Water Level	The elevation of the water surface during the times when no runoff or flooding occurs.
Off-Road Vehicle	Any vehicle designed for or capable of travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other natural terrain. It includes, but is not limited to, four-wheel-drive or low-pressure-tire vehicles, motorcycles and related two-wheel drive vehicles, snowmobiles, amphibious machines, ground-effect or air-cushion vehicles, recreation vehicle campers, and any other means of transportation deriving motive power from any source other than muscle, except that such terms exclude motorboats.
Permanent Storage	A water supply that is available on a year-long basis. The water supply must meet all demand without depletion below a predetermined amount and may have the ability to maintain requirements necessary to sustain a fish population.
Pier	A type of intermediate multi-span bridge support composed of walls, columns, or piles that are supported by a common footing. In contrast, a bent is a type of intermediate multi-span bridge support composed of walls, columns, or piles that are supported by individual footings.
Piping	The progressive development of internal erosion in an embankment from the downstream to the upstream side of the dam.

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Plans	Composite drawings that show the location, character, and dimensions of the article, service, or work, providing layouts, profiles, cross-sections, and other details.
Policy	A guiding principle upon which a specific decision or set of decisions is based.
Potable Water System	A system designed to distribute water that is safe for human consumption and meets the requirements of the Safe Drinking Water Act.
Primitive Roads	A linear route managed for use by four-wheel-drive or high-clearance vehicles. These routes do not normally meet any BLM road design standards.
Principle Spillway	A chute or conduit designed to convey a certain predetermined maximum amount of water over or through a dam without damage to the dam. In some instances, a dam may have both a principal and an emergency spillway.
Profile Grade	The trace of a vertical plane, as shown on the drawings, intersecting the top surface at the centerline of the proposed facility construction. Profile grade means either elevation or gradient of the trace according to the contract.
Project	A planned undertaking that may encompass phases of work, including preparation of plans, specifications, estimates, acquisition, and actual construction, treatment, rehabilitation, or maintenance. See also Resource Management Facility.
Project Inspector (BLM Force Account)	The BLM employee designated to provide immediate contact with the force account crew to inspect the work for compliance with design and BLM requirements.
Project Inspector (Contract)	The representative designated by the COR to provide an immediate contact with the contractor to inspect the work and enforce the terms of the contract. Like the COR, the inspector does not have authority to change the written terms of the contract.
Public Lands	All lands under the jurisdiction of the BLM, except the lands held for the benefit of Indians, Aleuts, and Eskimos.
Public Lands Development Roads and Trails	As defined in the Federal-Aid Highway Act of 1962, those roads or trails that the Secretary of the Interior determines are of primary importance for the development, protection, administration, and use of public lands and resources under the Secretary's control.

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Public road	Part of a public agency road system. A public road is not within the BLM’s jurisdiction, does not receive support from BLM construction or maintenance funds, and is not subject to BLM regulations. This differs from a road built to serve a BLM facility, which the public is allowed to use, such as a road to a recreation site. A BLM road remains under BLM control, even though it serves the general public. The BLM presently administers no “legal” public roads. A public road must meet the criteria for public roads as established by the Secretary of Transportation (23 U.S.C. 101 and 104).
Range Improvement	A structure, development, practice, or treatment used in concert with management to rehabilitate, protect, or improve the public land and its resources to arrest range deterioration and to improve forage conditions, fish and wildlife habitat, watershed protection, and livestock production—all consistent with land-use plans.
Recreation Site	A site developed primarily to accommodate specific intensive use activities or groupings of activities, such as camping, picnicking, boating, swimming, winter sports, and others. These sites include permanent facilities, such as roads, trails, and toilets needed to accommodate recreation use over the long term and require continuing management commitment and regular maintenance.
Registration	As used herein, current registration as a professional engineer by any State, Guam, Puerto Rico, the Virgin Islands, American Samoa, the District of Columbia, or the Canal Zone.
Reservoir	An artificial lake or pond in which water is collected and stored to supply the needs of a watershed, domestic livestock, wildlife, or for other beneficial use. Reservoirs are further separated into two categories—temporary (detention) storage and permanent (retention) storage.
Reservoir Routing	Flood routing through a reservoir to study the changes in the characteristics of a flood wave due to the hypothetical or actual presence of a dam, reservoir, or detention pool and appurtenant structures.
Resource Management Facility	Any physical development, including transportation facilities, structures, developments, practices, treatments, or improvements used to aid in the management, rehabilitation, and protection of the public lands and waters.

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Resource Roads	These roads are normally 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.
Retention Dam	A dam designed to retain a permanent pool or reservoir of water.
Retention Ponds	A structure that impounds bodies of relatively shallow water or protects facilities from flood runoff. Storage is generally temporary in nature.
Reviewing	The act of checking for compliance with established BLM standards, including the accuracy of the plans, specifications, and estimates.
Right-of-Way	A general term denoting (1) the privilege to pass over landing of some particular line (including easement, lease, permit, or license to occupy, use, or traverse public or private lands) or (2) land, appurtenances thereto, or interest therein, usually in a strip acquired for public or private passageway.
Road	A linear route declared a road by the owner, managed for use by low-clearance vehicles having four or more wheels, and maintained for regular and continuous use.
Roadway	The portion of a road within the limits of excavation and embankment. In general, the portion of the roadway, including shoulders, for vehicular use. A divided highway has two or more roadways.
Sanitary Landfill	A method of disposing of solid waste by spreading the waste in thin layers, compacting to reduce volume, and covering with soil to prevent environmental pollution.
Seismic Zone	For purposes of assessing relative seismic risk, the UN has been divided into seismic risk zones ranging from 0 (no known earthquake potential) to 4 (high potential for earthquakes of large magnitude).
Septic System	System used to collect sewage from sanitary facilities, transport it to a septic tank, and then on to a tile field.
Sewer System	Refers to any pipes, manholes, vaults, septic tanks, pumps, and other works necessary for the collection, treatment, and disposal of sewage (liquid waste other than storm water). Typically, the “building drain” empties into the “building sewer” (at a place 2 feet outside of the building wall), which empties into a public or private “sewer” (such as a sub-terrain conduit serving multiple buildings) or into a “disposal system” (such as a septic tank and drain field).

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Shop Drawings	Drawings diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished to explain in detail specific portions of the work required.
Shoulder	The portion of the roadway contiguous to the travel-way for accommodation of stopped vehicles, for emergency use, and for lateral support of pavement structure, or the edge of the travel-way if no shoulder width exists.
Sight Distance	The minimum distance required for passing vehicles to see each other on the roadway.
Sign	An inscribed board (or placard) bearing a message or symbol indicating direction, information, or instruction. Bulletin boards, kiosks, and the information posted on them are typically NOT signs.
Specifications	Detailed description of the article, service, or work required and the minimum standards that must be met in its creation or performance.
Spillway	A dam outlet where the crest elevation is higher than the principal spillway and is designed as an additional means for water release.
Standard	A principle that must be followed or a condition that must be met.
Storage Tank	A tank that is used for the storage—pressurized or unpressurized—of liquids or gases.
Storm Sewer	A system of water inlet structures and underground pipes and outlets to convey surface runoff from rainfall and snow melt.
Substructure (bridge)	All of that part of the structure below the bearings of simple and continuous spans, skewbacks of arches, and tops of footings or rigid frames, together with the back-walls, wing walls, and wing protection railings. Superstructure (bridge) is the entire structure except the substructure.
Suitable Material	Rock or earth material that will provide stable foundations, embankments, or roadbeds, and is free of organic matter, roots, muck, sod, and other detrimental material.
Superelevation	Exaggerated tilt of roadway on a curve to counteract centrifugal force on vehicles.
Superstructure	The entire portion of a bridge structure, which primarily supports traffic loads and transfers these loads to the bridge substructure.
Surface resource facility	A facility, which benefits the traditional resource programs such as wildlife, watershed, and range.
Temporary Building	A building designed for use for a period of less than 10 years.

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Temporary Water Storage	Seasonal water or water which, because of use and climatic factors, is not available on a year-long basis.
Trail	A linear route managed for human-powered, stock, or off-highway vehicle (OHV) forms of transportation or for historical or heritage values. Trail are not generally managed for use by four-wheel-drive or high-clearance vehicles
Transportation System	The transportation systems represent the sum of the BLM’s recognized inventory of linear features (roads, primitive roads, and trails) formally recognized and approved as part of the BLM’s transportation network.
Trash-Rack	A screen or grating positioned in front of a water intake to prevent floating or submerged debris from entering the intake.
Travel-Way	The portion of the roadway for the movement of vehicles, exclusive of shoulders and auxiliary lanes.
Turnout	A widening in a road to allow vehicles to pass. A short auxiliary lane on a one-lane road provided for the passing of meeting vehicles.
Underground Storage Tank (UST)	Any underground containment vessel regardless of material. For the storage of hazardous materials, an UST is defined as having 10 or more of the UST, piping, and ancillary equipment underground (see 40 CFR 280.12).
Upstream Tow	The junction of the upstream face of the dam with the ground or streambed surface.
Utilities	The facilities for transporting or distributing communications, power, electricity, light, heat, gas, oil, water, steam, sewage, propane, etc.
Value Engineering	The well-organized process of evaluating an item, project, process, or system for the purpose of achieving the required function at the optimum cost. Value engineering is not a simple cost-cutting technique where performance, reliability, quality, maintainability, or safety of the project is sacrificed.
Wastewater Treatment Plant	A facility where wastewater is processed (clarified) before being discharged. The plant may include clarification units.
Weir	A structure erected across a stream or channel to measure the flow of water.

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Appendix B. Abstract of Authorities Cited

A listing of the Office of Management and Budget Circulars is provided in 381 DM 3.

A. Statutes—By Title

Antiquities Act of 1906, as amended.

Alaska Livestock Grazing Act.

Taylor Grazing Act, as amended.

Soil Conservation and Domestic Allotment Act, as amended.

Historic Sites, Buildings, and Antiquities Act, as amended.

Bankhead–Jones Farm Tenant Act, as amended.

Oregon and California Revested Land Act, as amended.

Federal Property and Administrative Services Act of 1949, as amended.

Watershed Protection and Flood Prevention Act, as amended.

Fish and Wildlife Coordination Act, as amended.

Title 23, United States Code, as codified by Act of August 27, 1958.

Reservoir Salvage Act of 1960, as amended.

Sikes Act of 1960, as amended.

Federal Aid Highway Act of 1962, as amended.

Federal Metal and Nonmetallic Mine Safety Act.

National Historic Preservation Act, as amended.

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Department of Transportation Act.

Architectural Barriers Act of 1968, as amended.

Wild and Scenic Rivers Act, as amended.

National Trails Systems Act, as amended.

Intergovernmental Cooperation Act of 1968.

National Environmental Policy Act of 1969, as amended.

Occupational Safety and Health Act of 1970, as amended.

Lead-Based Paint Poisoning Prevention Act, as amended.

Public Building Amendments of 1972.

The National Dam Inspection Act of 1972.

Rural Development Act of 1972.

Coastal Zone Management Act of 1972.

Federal Aid Highway Act of 1973, as amended.

Archaeological and Historic Preservation Act of 1974, as amended.

Safe Drinking Water Act of 1974, as amended.

Energy Policy and Conservation Act, as amended.

Metric Conversion Act of 1975.

Energy Conservation Standards for New Buildings Act of 1976.

Public Buildings Cooperative Use Act of 1976.

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Department of Energy Act.

Clean Water Act of 1977, as amended.

Public Rangelands Improvements Act of 1978.

Surface Transportation Assistance Act of 1978, as amended.

National Energy Conservation Policy Act.

Archaeological Resources Protection Act of 1979.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980.

Surface Transportation Assistance Act of 1982, as amended.

Omnibus Trade and Competitiveness Act of 1988.

Annual Appropriation Act of the Department of the Interior and Related Agencies.

B. Executive Orders—By Reference

E.O. 10584, as amended, Rules and Regulations Relating to the Administration of the Watershed Protection and Flood Prevention Act.

E.O. 11490, as amended, Assigning Emergency Preparedness Functions to Federal Departments and Agencies.

E.O. 11514, as amended, Protection and Enhancement of Environmental Quality.

E.O. 11593, Protection and Enhancement of the Cultural Environment.

E.O. 11738, Providing for Administration of the Clean Air Act and the Federal Water Pollution Control Act with Respect to Federal Contracts, Grants, or Loans.

E.O. 11912, as amended, Delegation of Authority Relating to Energy Policy and Conservation.

E.O. 11988, as amended, Floodplain Management.

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E.O. 11990, Protection of Wetlands.

E.O. 12003, Relating to Energy Policy and Conservation.

E.O. 12072, Federal Space Management.

E.O.12088, Federal Emergency Management Agency.

E.O. 12148, as amended, Federal Emergency Management.

E.O. 12196, as amended, Occupational Safety and Health Programs for Federal Employees.

E.O. 12286 and 12316, Responses to Environmental Damage.

E.O. 12381, Delegation of Emergency Management Functions.

E.O. 12411, Government Work Space Management Reforms.

E.O. 12580, Superfund Implementation.

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Appendix C. Description of BLM 9100 Manual Series Sections

Sections marked with an asterisk have not yet been developed, but are reserved for future use.

A. 9100—ENGINEERING: The functions and responsibilities of the total engineering program.

1. 9101—Facility Planning.
2. 9102—Facility Design: General information on the design policies and practices for any facility constructed.
 - H-9102-1. Metric Handbook
 - H-9102-2. Land Status Handbook
3. 9103—Facility Construction: General information on the upkeep and maintenance stages for any facility constructed regardless of funding material on maintenance records, maintenance schedules, and maintenance plans; housekeeping activities; and condition assessments for facilities.
4. 9104—Facility Maintenance: General information on the upkeep and maintenance stages for any facility constructed.
5. 9105—Reserved.
6. 9107—Facility Asset Management System.
7. 9108—Facility Inventory and Condition Assessments or Inspections.

B. 9110—Transportation Facilities: Information on transportation planning and the preparation and maintenance of the transportation plan; information applicable to all transportation facilities, regardless of mode.

H-9110-1—Transportation Planning.

1. 9111—Aviation Facilities: Information on air facilities, such as airports, heliports, and helipads.

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2. 9112—Bridges and Major Culverts.

H-9112-1—Bridge Design and Maintenance Handbook for Field Use.

H-9112-2—Protocols for Bridge Condition Assessments.

H-9112-3—Checklist for Bridge Condition Assessments.

H-9112-4—Protocols for Major Culvert Condition Assessments.

H-9112-5—Checklist for Major Culvert Condition Assessments.

3. 9113—Roads: Information on roads and road-related items.

H-9113-1—Road Design Handbook.

H-9113-2—Handbook for Guidance and Instructions for Roadway Condition Assessment Teams.

H-9113-3—Field Assessment Forms.

4. 9114—Trails: Information on trails and specific information for hiking, horseback riding, bicycling, snowmobiling, skiing, and using all-terrain vehicles.

H-9114-1—Condition Assessment or Inspection of Trails.

C. 9120—Reserved.

D. 9130—Reserved.

E. 9150—Buildings and Recreation Facilities: Material and other information on the total facility, which applies to both building and recreation facilities.

1. 9151—Buildings.

H-9151-1—Condition Assessment or Inspection of Buildings.

2. 9152—Recreation Facilities: Information, directions, and other reference material concerning recreation facilities.

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H-9152-1—Condition Assessment or Inspection of Recreation Facilities.

3. 9153*—Heating, Ventilation, and Air Conditioning Systems: Information, directions, and other reference material concerning heating, ventilation, and air conditioning system design and installation.
4. 9154*—Electrical Systems: Information, directions, and other reference material concerning electrical system design and installation.

F. 9160—Reserved.

G. 9170—Surface Resource Facilities: Information on design and technical aspects of those facilities that benefit the traditional resource programs, such as wildlife, watershed, and range.

1. 9172—Water Control Structures: Technical information on detention dams, dikes, diversions, water-spreaders, drop structures, and retention dams.
2. 9177—Maintenance and Safety of Dams: Information for maintaining and ensuring the safety of dams on BLM-administered lands.

9177-1—Dam Condition Assessment Guidelines for Embankment Dams.

9177-2—Dam Condition Assessment Checklist.

9177-3—Reporting Dam Failures.

H. 9180*—Health and Pollution Control Facilities: Information, procedures, and activities in the field of public health and safety and pollution control applicable to all Sections in the 9180 Series.

1. 9182—Wastewater Treatment: Information pertaining to the field of water pollution control permits and wastewater treatment.
2. 9184—Drinking Water Supply: Engineering and operational aspects of the drinking water program.

I. 9190—Reserved.

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Code of Ethics****Preamble**

Engineering is an important and learned profession. As members of this profession, engineers are expected to exhibit the highest standards of honesty and integrity. Engineering has a direct and vital impact on the quality of life for all people. Accordingly, the services provided by engineers require honesty, impartiality, fairness, and equity, and must be dedicated to the protection of the public health, safety, and welfare. Engineers must perform under a standard of professional behavior that requires adherence to the highest principles of ethical conduct.

I. Fundamental Canons

Engineers, in the fulfillment of their professional duties, shall:

1. Hold paramount the safety, health, and welfare of the public.
2. Perform services only in areas of their competence.
3. Issue public statements only in an objective and truthful manner.
4. Act for each employer or client as faithful agents or trustees.
5. Avoid deceptive acts.
6. Conduct themselves honorably, responsibly, ethically, and lawfully so as to enhance the honor, reputation, and usefulness of the profession.

II. Rules of Practice

1. Engineers shall hold paramount the safety, health, and welfare of the public.
 - a. If engineers' judgments are overruled under circumstances that endanger life or property, they shall notify their employer or client and such other authority as may be appropriate.
 - b. Engineers shall approve only those engineering documents that are in conformity with applicable standards.
 - c. Engineers shall not reveal facts, data, or information without the prior consent of the client or employer except as authorized or required by law or this Code.
 - d. Engineers shall not permit the use of their names or associates in business ventures with any person or firm that they believe is engaged in fraudulent or dishonest enterprise.
 - e. Engineers shall not aid or abet the unlawful practice of engineering by a person or firm.

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- f. Engineers having knowledge of any alleged violation of this Code shall report thereon to appropriate professional bodies and, when relevant, also to public authorities, and cooperate with the proper authorities in furnishing such information or assistance as may be required.
2. Engineers shall perform services only in the areas of their competence.
 - a. Engineers shall undertake assignments only when qualified by education or experience in the specific technical fields involved.
 - b. Engineers shall not affix their signatures to any plans or documents dealing with subject matter in which they lack competence, nor to any plan or document not prepared under their direction and control.
 - c. Engineers may accept assignments and assume responsibility for coordination of an entire project and sign and seal the engineering documents for the entire project, provided that each technical segment is signed and sealed only by the qualified engineers who prepared the segment.
 3. Engineers shall issue public statements only in an objective and truthful manner.
 - a. Engineers shall be objective and truthful in professional reports, statements, or testimony. They shall include all relevant and pertinent information in such reports, statements, or testimony, which should bear the date indicating when it was current.
 - b. Engineers may express publicly technical opinions that are founded upon knowledge of the facts and competence in the subject matter.
 - c. Engineers shall issue no statements, criticisms, or arguments on technical matters that are inspired or paid for by interested parties, unless they have prefaced their comments by explicitly identifying the interested parties on whose behalf they are speaking and by revealing the existence of any interest the engineers may have in the matters.
 4. Engineers shall act for each employer or client as faithful agents or trustees.
 - a. Engineers shall disclose all known or potential conflicts of interest that could influence or appear to influence their judgment or the quality of their services.
 - b. Engineers shall not accept compensation, financial or otherwise, from more than one party for services on the same project or for services pertaining to the same project, unless the circumstances are fully disclosed and agreed to by all interested parties.

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- c. Engineers shall not solicit or accept financial or other valuable consideration, directly or indirectly, from outside agents in connection with the work for which they are responsible.
 - d. Engineers in public service as members, advisors, or employees of a governmental or quasi-governmental body or department shall not participate in decisions with respect to services solicited or provided by them or their organizations in private or public engineering practice.
 - e. Engineers shall not solicit or accept a contract from a governmental body on which a principal or officer of their organization serves as a member.
5. Engineers shall avoid deceptive acts.
- a. Engineers shall not falsify their qualifications or permit misrepresentation of their or their associates' qualifications. They shall not misrepresent or exaggerate their responsibility in or for the subject matter of prior assignments. Brochures or other presentations incident to the solicitation of employment shall not misrepresent pertinent facts concerning employers, employees, associates, joint venturers, or past accomplishments.
 - b. Engineers shall not offer, give, solicit, or receive, either directly or indirectly, any contribution to influence the award of a contract by public authority or which may be reasonably construed by the public as having the effect or intent of influencing the awarding of a contract. They shall not offer any gift or other valuable consideration in order to secure work. They shall not pay a commission, percentage, or brokerage fee in order to secure work, except to a bona fide employee or bona fide established commercial or marketing agencies retained by them.

III. Professional Obligations

- 1. Engineers shall be guided in all their relations by the highest standards of honesty and integrity.
 - a. Engineers shall acknowledge their errors and shall not distort or alter the facts.
 - b. Engineers shall advise their clients or employers when they believe a project will not be successful.
 - c. Engineers shall not accept outside employment to the detriment of their regular work or interest. Before accepting any outside engineering employment, they will notify their employers.

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- d. Engineers shall not attempt to attract an engineer from another employer by false or misleading pretenses.
 - e. Engineers shall not promote their own interest at the expense of the dignity and integrity of the profession.
2. Engineers shall at all times strive to serve the public interest.
 - a. Engineers shall seek opportunities to participate in civic affairs; career guidance for youths; and work for the advancement of the safety, health, and well-being of their community.
 - b. Engineers shall not complete, sign, or seal plans and/or specifications that are not in conformity with applicable engineering standards. If the client or employer insists on such unprofessional conduct, they shall notify the proper authorities and withdraw from further service on the project.
 - c. Engineers shall endeavor to extend public knowledge and appreciation of engineering and its achievements.
 - d. Engineers shall strive to adhere to the principles of sustainable development¹ in order to protect the environment for future generations.
 3. Engineers shall avoid all conduct or practice that deceives the public.
 - a. Engineers shall avoid the use of statements containing a material misrepresentation of fact or omitting a material fact.
 - b. Consistent with the foregoing, engineers may advertise for recruitment of personnel.
 - c. Consistent with the foregoing, engineers may prepare articles for the lay or technical press, but such articles shall not imply credit to the author for work performed by others.
 4. Engineers shall not disclose, without consent, confidential information concerning the business affairs or technical processes of any present or former client or employer or public body on which they serve.
 - a. Engineers shall not, without the consent of all interested parties, promote or arrange for new employment or practice in connection with a specific project for which the engineer has gained particular and specialized knowledge.
 - b. Engineers shall not, without the consent of all interested parties, participate in or represent an adversary interest in connection with a specific project or proceeding in which the engineer has gained particular specialized knowledge on behalf of a former client or employer.

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5. Engineers shall not be influenced in their professional duties by conflicting interests.
 - a. Engineers shall not accept financial or other considerations, including free engineering designs, from material or equipment suppliers for specifying their product.
 - b. Engineers shall not accept commissions or allowances, directly or indirectly, from contractors or other parties dealing with clients or employers of the engineer in connection with work for which the engineer is responsible.
6. Engineers shall not attempt to obtain employment or advancement or professional engagements by untruthfully criticizing other engineers or by other improper or questionable methods.
 - a. Engineers shall not request, propose, or accept a commission on a contingent basis under circumstances in which their judgment may be compromised.
 - b. Engineers in salaried positions shall accept part-time engineering work only to the extent consistent with policies of the employer and in accordance with ethical considerations.
 - c. Engineers shall not, without consent, use equipment, supplies, laboratory, or office facilities of an employer to carry on outside private practice.
7. Engineers shall not attempt to injure, maliciously or falsely, directly or indirectly, the professional reputation, prospects, practice, or employment of other engineers. Engineers who believe others are guilty of unethical or illegal practice shall present such information to the proper authority for action.
 - a. Engineers in private practice shall not review the work of another engineer for the same client, except with the knowledge of such engineer, or unless the connection of such engineer with the work has been terminated.
 - b. Engineers in governmental, industrial, or educational employ are entitled to review and evaluate the work of other engineers when so required by their employment duties.
 - c. Engineers in sales or industrial employ are entitled to make engineering comparisons of represented products with products of other suppliers.
8. Engineers shall accept personal responsibility for their professional activities, provided, however, that engineers may seek indemnification for services arising out of their practice for other than gross negligence where the engineer's interests cannot otherwise be protected.

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- a. Engineers shall conform with state registration laws in the practice of engineering.
 - b. Engineers shall not use association with a non-engineer, a corporation, or partnership as a “cloak” for unethical acts.
9. Engineers shall give credit for engineering work to those to whom credit is due, and will recognize the proprietary interests of others.
- a. Engineers shall, whenever possible, name the person or persons who may be individually responsible for designs, inventions, writings, or other accomplishments.
 - b. Engineers using designs supplied by a client recognize that the designs remain the property of the client and may not be duplicated by the engineer for others without express permission.
 - c. Engineers, before undertaking work for others in connection with which the engineer may make improvements, plans, designs, inventions, or other records that may justify copyrights or patents should enter into a positive agreement regarding ownership.
 - d. Engineers’ designs, data, records, and notes referring exclusively to an employer’s work are the employer’s property. The employer should indemnify the engineer for use of the information for any purpose other than the original purpose.
 - e. Engineers shall continue their professional development throughout their careers and should keep current in their specialty fields by engaging in professional practice, participating in continuing education courses, reading in the technical literature, and attending professional meetings and seminars.

Footnote 1 “Sustainable development” is the challenge of meeting human needs for natural resources, industrial products, energy, food, transportation, shelter, and effective waste management while conserving and protecting environmental quality and the natural resource base essential for future development.

—As Revised January 2006

“By order of the United States District Court for the District of Columbia, former Section 11(c) of the NSPE Code of Ethics prohibiting competitive bidding, and all policy statements, opinions, rulings or other guidelines interpreting its scope, have been rescinded as unlawfully interfering with the legal right of engineers, protected under the antitrust laws, to provide price information to prospective clients; accordingly, nothing contained in the NSPE Code of Ethics, policy statements, opinions, rulings or other guidelines prohibits the submission of price quotations or competitive bids for engineering services at any time or in any amount.”

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Statement by NSPE Executive Committee

In order to correct misunderstandings which have been indicated in some instances since the issuance of the Supreme Court decision and the entry of the Final Judgment, it is noted that in its decision of April 25, 1978, the Supreme Court of the United States declared: "The Sherman Act does not require competitive bidding."