FEDERAL-AID STEWARDSHIP AGREEMENT

This Federal-aid Stewardship Agreement between the Oregon Department of Transportation (ODOT) and the Oregon Division of the Federal Highway Administration (FHWA), and the accompanying Oregon Federal-aid Stewardship Plan which is hereby incorporated by reference and made a part of this agreement, are intended to fulfill the requirements of Section 1305 of the 1998 Transportation Equity Act for the 21st Century (TEA-21). More specifically, this agreement sets forth the roles and responsibilities of each partner in the process of stewardship over Federal-aid Highway Program activities in the State of Oregon. It is a modification to the 1993 agreement which was prepared in order to implement the program efficiencies of Section 1016 of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA).

By signing this agreement, the ODOT and the FHWA desire to revise the 1993 election of options under ISTEA Section 1016, and to identify the laws, regulations, policies, standards, and procedures which govern Federal-aid projects.

Nothing in this agreement shall be construed to relieve the ODOT from ultimate accountability for compliance with Federal laws and regulations with respect to the expenditure of Federal-aid highway funds in the State of Oregon, including those funds made available to local public agencies (LPAs).

This agreement may be canceled or modified at any time by mutual agreement of the ODOT and the FHWA.

Oregon Department of Transportation:	Federal Highway Administration:
Tom Lulay Executive Deputy Director	Hank Honeywell Division Administrator
Date	Date

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I. INTRODUCTION

This Stewardship Plan is a revision to the original Stewardship Agreement and Plan, which were signed by ODOT and FHWA management in October 1993. Although the basic concepts remain unchanged, there are numerous revisions and updates throughout the plan.

Stewardship, as used in this plan, is the process of providing oversight and accountability for all resources used in carrying out the Federal-aid Highway Program in the State of Oregon. It has three components: (1) ensuring compliance with laws, regulations, and other applicable requirements; (2) ensuring that the expenditure of resources results in high quality, cost effective products for the taxpayer; and (3) providing appropriate technical assistance to all involved personnel and agencies to assist the accomplishment of items (1) and (2). All three components are addressed in this plan; however, the emphasis is on the first.

With the passage of ISTEA, a new era began with respect to stewardship. Section 1016 of the Act, entitled AProgram Efficiencies,@ provided for several significant changes. First, it allowed the ODOT to approve plans, specifications, and estimates (PS&E=s) for 3R projects on the National Highway System (NHS) if it certified that all work will meet or exceed standards approved by the FHWA. Second, it allowed the ODOT to request that the FHWA no longer review and approve PS&E=s for NHS projects with an estimated construction cost of less than $1,000,000 and non-NHS projects regardless of size. Third, it made FHWA- approved AASHTO design and construction standards applicable to all new construction and reconstruction projects on the NHS, and to all 3R projects on multi-lane limited access highways on the NHS. And, fourth, it made State laws, regulations, directives, safety standards, design standards, and construction standards applicable to the design, construction, operation, and maintenance of non-NHS Federal-aid projects in lieu of comparable Federal requirements.

Section 1305 of TEA-21 requires that FHWA and each State enter into an agreement documenting the types of projects for which the State will assume responsibility under Title 23. While TEA-21 made no significant changes that would require FHWA to modify its post-ISTEA approach to stewardship, it is also recognized that FHWA has an interest in the NHS, particularly the Interstate System, to the extent that FHWA should modify its role in the design and construction of major projects on the NHS. This modified role is consistent with the FHWA mission to Acontinually improve the quality of our Nation=s highway system.@ In this modified role, the Oregon Division of FHWA will carry out this mission by providing resources, technical assistance, and facilitating new technology deployment on major projects on the NHS. This

modified role is shown in Table 1, Oversight Options.

Even before the ISTEA, the FHWA was undergoing an evolution in its approach to stewardship. That evolution continues today. Driving the change is a desire to make better use of limited resources. Through the use of risk assessment and other techniques, the FHWA is attempting to focus its oversight activities where the most good can be accomplished, and where the Federal interest is greatest. FHWA continues its policy of shifting oversight responsibility and accountability for programs with lesser Federal interest to the ODOT. This change in philosophy also involves a shift from project level oversight, the principal method used by the FHWA in the past, to a mix of project level/program level oversight and process reviews.

A significant development since the 1993 plan was the development of local public agency (LPA) certification. In late 1996, a joint ODOT, FHWA and LPA team was formed with the purpose of developing a process by which LPAs could be certified to administer Federal-aid projects. The team was charged with preparing a procedural manual in which ODOT delegated authority to LPAs to make various approvals on non-NHS projects, beginning with the advertisement for bids on the project. The September 17, 1997 ODOT manual, which also included procedures to be followed by a LPA to become certified, was approved by FHWA on September 30, 1997. This certification program was envisioned as an eighteen month pilot program to include three LPAs and six projects. FHWA approval was contingent on ODOT development of an effective technical assistance and oversight program for the participating LPAs. This technical assistance and oversight program was never fully developed and, as a result, little progress has been made toward a LPA certification program.

Both ODOT and FHWA are committed to the implementation of a successful LPA certification program. It is the intent that this program be responsive to the needs of a wide range of LPAs. (ODOT and FHWA are also determined to improve technical assistance and project delivery to those LPAs choosing not to participate in the certification program).

This Stewardship Plan is intended to guide the stewardship activities of both the FHWA and the ODOT. In the sections which follow, it first sets forth the options selected by the ODOT with respect to review and approval of PS&E=s, and discusses in more detail the effects of those selections. Next, it identifies the laws, regulations, and other requirements, both Federal and State, which apply to each type of project or activity.

This plan, together with the Stewardship Agreement of which it is a part, continues implementation of the program efficiencies intended by the Congress in the passage of ISTEA and TEA-21.

II. ODOT ELECTION OF OVERSIGHT OPTIONS

Section 1016(b) of the ISTEA amended 23 USC 106 by inserting a new subsection (b) ASpecial Rules@. The section stated in part:

> *"(1) 3R Projects on the NHS - Notwithstanding any other provision of this title, a State highway department may approve, on a project-by-project basis, plans, specifications, and estimates for projects to resurface, restore, and rehabilitate highways on the National Highway System if the State certifies that all work will meet or exceed standards approved by the Secretary under section 109(c).*
>
> *(2) Non-NHS Projects and Low - Cost NHS Projects-Any State may request that the Secretary no longer review and approve plans, specifications, and estimates for any project (including any highway project on the National Highway System with an estimated construction cost of less than $1,000,000 but excluding any other highway project on the National Highway System). After receiving such notification, the Secretary shall undertake project review only as requested by the State.@*

This was a significant change to FHWA=s longstanding policy of direct involvement in and oversight of all Federal-aid projects. The ODOT, by letter dated November 17, 1992, notified the FHWA of its decision to exempt PS&E=s from FHWA review and approval to the maximum

extent allowable under 23 USC 106(b).

TEA-21, Section 1305, further modified the oversight options available. It deleted the above provisions of 23 USC 106(b) and replaced them with the following language, as 23 USC 106(c):

> *"(1) NON-INTERSTATE NHS PROJECTS - For projects under this title that are on the National Highway System but not on the Interstate System, the State may assume the responsibilities of the Secretary under this title for design, plans, specifications, estimates, contract awards, and inspections of projects unless the State or the Secretary determines that such assumption is not appropriate.*
>
> *(2) NON- NHS PROJECTS - For projects under this title that are not on the National Highway System, the State shall assume the responsibilities of the Secretary under this title for design, plans, specifications, estimates, contract awards, and inspection of projects, unless the State determines that such assumption is not appropriate.@*

While the ISTEA referred only to review and approval of PS&E=s, the FHWA has broadly interpreted this to include several activities and actions in addition to simply reviewing and approving the PS&E documents as is done prior to advertising. Specifically, it includes all review activities and approval actions associated with preliminary engineering and design work (including right-of-way), PS&E preparation, award of contracts, and construction, except for the following which are reserved by the FHWA:

- X Programming approval and determination of project eligibility for the category of funds proposed
- X Obligation of Federal funds and other financial management actions
- X Environmental clearance
- X Exemption of bridges from U.S. Coast Guard permit requirements
- X Approval of hardship and protective buying of right-of-way
- X Waiver of Buy America provisions
- X Experimental features, including innovative contracting such as Design/Build, under SEP-14

As a result of ODOT taking full advantage of the flexibilities available under ISTEA, FHWA review and approval actions were substantially reduced. During the time period these flexibilities were in effect, this approach was beneficial to both ODOT and FHWA. However, with the number of modernization and reconstruction projects decreasing and the number of large preservation projects increasing, FHWA has found it more difficult to fulfill its mission to

continually improve the quality of the NHS. As a result, it was agreed to modify FHWA=s role to include project development activities on NHS 3R projects costing more than $5,000,000 and to retain FHWA=s role on new or reconstruction NHS projects costing more than $1,000,000. This change will be implemented by joint ODOT-FHWA approval of this Stewardship Plan.

The revised options agreed to by ODOT and FHWA are shown in Table 1.

TABLE 1
OVERSIGHT OPTIONS

TYPE OF PROJECT	RESPONSIBILITY FOR PS&E[1] APPROVAL
NHS B new construction and reconstruction projects with construction cost of $1,000,000 or more.	FHWA
NHS - 3R projects with construction cost of more than $5,000,000	FHWA (2)
NHS - 3R projects with construction cost of $1,000,000 to $5,000,000.	ODOT (3)
NHS - all projects with construction cost less than $1,000,000.	ODOT
Non-NHS - all projects	ODOT (4)

Footnotes:
Includes approval actions associated with preliminary engineering and design (including right-of- way), PS&E, award of contracts, and construction.
After PS&E approval by FHWA, ODOT assumes all approval actions
Unless specifically requested by ODOT, all 3R projects meeting this criteria will be exempt from FHWA approval of the PS&E.
(4) ODOT retains most approvals on all LPA projects, including projects developed by certified LPAs.

For purposes of determining applicability of the exemption, a 3R project is any project for which the principal work type is resurfacing, restoration, or rehabilitation of a major component of the highway system such as pavement, bridge, signs, etc.

The estimated construction cost, as used in Table 1, is the estimated cost of all contract and force account work, including incidental work and construction engineering, but excluding preliminary engineering, at the time of initial Federal-aid programming.

Because there may be questionable cases, the ODOT will consult with the FHWA at the time of each Statewide Transportation Improvement Program (STIP) update and modification for the purpose of reaching agreement on the status of any NHS project for which Federal-aid funding is anticipated. Should a project be identified in the STIP for use of other than Federal-aid funds, and later be changed to Federal-aid funding, the ODOT will consult with the FHWA at the time of such change.

Exemption from FHWA review and approval of PS&E=s applies to non-conventional projects such as transportation enhancement, high priority and other projects which involve design and construction in the normal sense. However, this exemption from FHWA review and approval of PS&E=s does not apply to other projects such as transit, ridesharing, planning, research, NBIS bridge inspection, supportive services, etc., which do not involve typical design and construction activities or which are not system related. Such projects will continue to be reviewed and approved by the FHWA on a project-by-project or item-by-item basis. However, programmatic approvals and abbreviated review procedures will be used to the maximum extent possible. ODOT and FHWA will consult to determine the applicability of FHWA review and approval of the PS&E for a specific project whenever necessary.

Exemption from FHWA review and approval also does not alter the applicability of Federal laws, regulations, or requirements. By exempting projects from FHWA review and approvals, the ODOT accepts responsibility for those FHWA review and approval actions, including those LPA projects, to the extent such review and approval is required by Federal laws and regulations. ODOT can delegate authority for approvals on LPA projects, but they cannot delegate their responsibility.

Ill. APPLICABLE LAWS, REGULATIONS, AND STANDARDS

In general, prior to the ISTEA, Federal laws and regulations and the accompanying policies and procedures applied to all Federal-aid projects on all Federal-aid systems. AASHTO standards were applicable to new construction and reconstruction on all systems, and to resurfacing, restoration and rehabilitation work on the Interstate system. FHWA approved ODOT 3R standards were applicable to non-Interstate 3R work.

The ISTEA eliminated all systems except for the NHS. The Interstate System continues to exist as a subsystem of the NHS. As a general rule, Federal-aid funds other than those designated specifically for the Interstate and NHS, can be used on any street or highway, including the NHS, which is open to public travel, except those functionally classified as local streets and rural minor collectors. This group of roadways eligible for Federal funding is referred to as AFederal-aid Highways.@

With the change in systems, the ISTEA also shifted responsibility to the states for many activities on non-NHS projects. Applicable laws, regulations, and standards were changed accordingly. The changes are delineated in Sections 1016(c) and 1016(d) of the Act.

TEA-21 made no modifications to the significant changes that resulted from ISTEA in the areas of laws, regulations and standards.

ISTEA and TEA-21 both allow federal funding of many non-traditional transportation projects. These types of projects (e.g., bicycle paths, overlooks, information centers, interpretive signing, etc.) often require the application of industry or national standards rather that AASHTO standards. ODOT and FHWA recognize that many of these projects require a non-traditional approach, including flexibility in the determination of the appropriate sampling and testing frequency to be used.

STANDARDS

Section 1016(c) of the ISTEA, which amends 23 USC 109(c) Astandards,@ stated:

> *"Design and construction standards to be adopted for new construction on the National Highway System, for reconstruction on the National Highway System, and for resurfacing, restoring, and rehabilitating multi-lane limited access highways on the National Highway System shall be those approved by the Secretary in cooperation with the State highway departments. All eligible work for such projects shall meet or exceed such standards.@*

This change made it clear that all NHS projects, except 3R projects on highways other than freeways, must, as a minimum, be designed and constructed to AASHTO standards. The AASHTO standards referred to are those applicable standards, policies and standard specifications listed in 23 CFR *625.4.*

For non-freeway NHS 3R projects, the ISTEA made no change in the applicable standards. Title 23 CFR, Section *625.4(a)(3),* which requires the use of FHWA approved ODOT 3R standards, continues to apply. Section 1016(d) amended 23 USC 109 by adding a new section (p), ACompliance with State Laws for Non-NHS Projects.@ The new section stated:

> *AProjects (other than highway projects on the National Highway System) shall be designed, constructed, operated, and maintained in accordance with State laws, regulations, directives, safety standards, design standards, and construction standards.@*

This section made it clear that ODOT standards, which need not be approved by the FHWA, apply to all non-NHS projects.

Appendix A is an excerpt from the 1996 ODOT *Highway Design Manual* which addresses the applicable design standards for all types of projects and funding situations on both State and local jurisdiction routes. It is important to note that AODOT Standards,@ as the term is used in the Appendix, are generally higher than the AASHTO standards, or have a smaller range of acceptable values which is within the AASHTO range. For freeways, including non-Interstate system freeways, the ODOT 3-R

standards incorporate AASHTO Interstate standards. Thus the ODOT standards are fully consistent with the AASHTO standards in meeting the ISTEA requirement.

Because the *Highway Design Manual* addresses the applicability of design standards in terms different than the ISTEA, the information in the Appendix has been reorganized and presented in a more consistent form in Table 2.

TABLE 2
APPLICABLE STANDARDS

HIGHWAY (FUNCTIONAL CLASS)	**JURISDICTION**	**APPLICABLE STANDARDS**	
		NEW CONSTRUCTION/ RECONSTRUCTION	**3-R**
NHS (freeway)	State Local	ODOT[(1)] AASHTO	ODOT 3-R[(1)]
NHS (non-freeway)	State Local	ODOT[(1)] AASHTO	ODOT 3-R[(3)]
Non-NHS (all)	State	ODOT[(1)]	ODOT 3-R

	Local	AASHTO[2]	

Footnotes:
(1) The ISTEA requires that AASHTO standards be met. ODOT standards are consistent with AASHTO standards in all respects.
(2) The ODOT has adopted AASHTO standards for all projects under local jurisdiction.
(3) ODOT 3-R standards are approved by the FHWA Division Office for application to non-freeway NHS projects.

By executing the Stewardship Agreement, the FHWA reaffirms its 1998 approval of the ODOT 3-R standards (See Appendix A) for use on all NHS projects. The ODOT agrees to obtain FHWA approval of all changes to the ODOT 3-R standards prior to their use on NHS projects. The ODOT further agrees to keep the FHWA advised of changes in all standards applicable to non-NHS Federal-aid projects.

Regardless of which standards apply, case by case design exceptions will continue to be allowed where justified and documented for all types of projects. The ODOT=s procedures for processing design exceptions are contained in the Highway Design Manual.

LAWS AND REGULATIONS

Section 1016(d) also addressed the applicability of laws, regulations, and other requirements in addition to standards. Three aspects are important to note. First, the section applies only to non-NHS projects. There is no effect on projects located on the NHS. All Federal laws, regulations, and other requirements continue to apply to projects on the NHS just as they did prior to the ISTEA. Second, the applicability of Federal laws and regulations is not related to the type of funding involved in the project nor to the agency (ODOT or FHWA) which is responsible for PS&E approval. The applicability of Federal requirements depends only on whether the project is on the NHS. Third, the provision applies only to the activities of design, construction, operation and maintenance of conventional highway projects. It does not affect other activities on these projects such as planning, programming, financial management, civil rights, and right-of-way acquisition. The provision also has no effect on non-conventional projects such as research, ridesharing, NBIS inspection, supportive services, etc. which do not involve design, construction, operation, or maintenance in their usual sense nor does it have an effect on non-project (program) related activities.

Section 1016(d) has been further interpreted to exclude design, construction, operation, and maintenance of non-NHS projects only from requirements of Title 23 USC and CFR, and in general, only to the extent that the requirements are based in Title 23 (highway) legislation. Where requirements are based in other than highway law, they remain applicable. The following Federal laws, regulations and other requirements remain applicable to non-NHS projects:

All non-Title 23 requirements such as:

X The National Environmental Policy Act (NEPA), and other environmental laws and requirements,

X The Uniform Relocation Assistance Act,
X The Civil Rights Act of 1964 and other Civil Rights laws and requirements including the DBE Program,
X The Davis Bacon Act and other labor laws and requirements,
X The Common Rule (49 CFR 18) with respect to procurement
X The Brooks Act

Selected Title 23 requirements:
X Competitive bidding requirements
X Buy American
X MUTCD

Prior to the ISTEA, variances from Federally prescribed requirements were available to the ODOT for certain activities on Federal-aid projects. Specifically, Aalternate procedures@ for consultant services procurement, utility adjustment and relocation, and some railroad work could have been used in lieu of prescribed Federal procedures subject to FHWA approval. The ODOT did not exercise those options prior to ISTEA.

However, in 1994 a joint ODOT-FHWA team developed APersonal Service Contracting Procedures,@ a group of procedures to use in obtaining engineering and design related services from private sources. ODOT=s December 1994 manual of procedures was approved by FHWA on December 15, 1994. The Aalternate procedures@ have been used successfully since that time. ODOT has yet to exercise the availability of optional procedures for utility or railroad work.

Table 3 summarizes the laws and regulations applicable to Federal-aid projects in Oregon.

TABLE 3
APPLICABLE LAWS AND REGULATIONS

FEDERAL-AID PROJECT CLASSIFICATION	APPLICABLE LAWS AND REGULATIONS
All NHS projects regardless of work type	All Federal laws and regulations(1)
All non-NHS projects regardless of work type	State statutes and administrative rules and All Federal non-Title 23 laws and regulations, and Selected Federal Title 23 law and regulations(2)

Footnotes:

(1) State statutes and administrative rules also apply to the extent that they do not conflict with Federal laws and regulations.

(2) Title 23 law and regulations apply to activities other than design, construction, operation, and maintenance. Selected provisions of Title 23 also apply to design, construction, operation, and maintenance.

Appendix B lists numerous approvals that may be made on conventional projects and whether ODOT or FHWA is responsible for the approval actions.

IV. TECHNICAL ASSISTANCE

As noted in Section I, all stewardship activities have as an objective, improving the quality of the product and the efficiency and cost effectiveness of the processes by which programs are carried out. Technical assistance in accomplishing this objective will be given through the same means as are used for compliance monitoring: day-to-day contact between FHWA, ODOT, and LPA staff, review of documents associated with individual approval actions, project level reviews and inspections, participation on advisory groups and committees, and program level reviews (PR/PE=s). Both ODOT and FHWA will also arrange for training courses and demonstrations, and facilitate visits by technical experts as requested. Training for LPAs will be a high priority.

Nothing in this plan is intended to preclude the ODOT from requesting technical assistance with respect to any program or project, regardless of the responsibility for PS&E review and approval identified in Section II.

APPENDIX A

Design Standards

(including 3R Project Design Process, 3R Design Standards and Project Exception Process)

4.0 DESIGN STANDARDS

4.1 POLICY

In March of 1993 ODOT management approved a proposal to simplify the use and selection of design standards. This proposal brought ODOT to closer alignment with AASHTO policy. The decision also involved limiting the design standards to be used, to only three. They are ODOT, ODOT 3-R, and 1990 AASHTO. The three key elements of this proposal are outlined below:

1. Adopts the 1990 AASHTO policy of Geometric Design (Green Book) as the ODOT Standard for New Construction and Reconstruction on all state routes. As modifications to AASHTO, this adopted ODOT standard will retain ODOT spirals, superelevation runoffs, specific design speeds, vertical clearances, and specific design recommendations which are within the ranges specified by AASHTO.

   This new ODOT Standard replaced the current OSHD and OSHD-Mod Standards. (Dir. HWY DES 9-1, August 1989.)

2. Adopts the 1990 AASHTO Policy on Geometric Design as the ODOT Standard for New construction and Reconstruction with no modifications on local jurisdiction routes.

3. Continues current ODOT 3-R standards for 3-R type projects on all routes.

   The standards selected for design of all projects are presented in one of the following references:

   - *1993 ODOT Highway Design Manual*
   - *A Policy on Geometric Design of Highways and Streets - 1994.*
   - *A Policy on Design Standards-Interstate System.* (AASHTO 1991)
   - *TRB Special Report #214*

The 1996 revision of this manual continues to reflect the preceding policy. Changes have been made in this manual in order to comply with revisions to current AASHTO policy, as given in the 1994 AASHTO Design Guidelines. This AASHTO policy has been accepted by FHWA.

When the use of the ODOT standard is indicated by the selection matrix (table 4-1) then specific criteria given in the *1996 ODOT Highway Design Manual* shall govern over any range of values given in the AASHTO & TRB Guidelines.

4.2 DESIGN STANDARD IDENTIFICATION

• General

Following are brief descriptions of each of the three design standards currently in use. These standards give design criteria for both state and local jurisdiction highways. These standards are dependent on the highways functional classification (See appendix) and project type.

It is important to note that in addition to the standards described below, considerable reference information is available in other publications. A listing of these references is given in this chapter in subsection 4.3.2. and is considered to be supplemental to the design criteria given elsewhere in this manual.

• ODOT Standard

Generally these standards are found in the *ODOT Highway Design Manual*, starting in Sec. 4.5 with the standards for design as general design criteria for new construction, or major reconstruction (4-R). This includes information from Sec. 6.0 dealing with all 4-R type projects, through Section 8.0 which deals primarily with more specific design features. The ODOT standard gives specific values for use in all areas of design. It is intended that all design values given in the ODOT standard are to be within values or ranges given in the AASHTO Publication; *A Policy on Geometric Design of Highways and Streets - 1994.* (AASHTO Green Book). That publication is to be referenced, when a particular design detail is not covered in the ODOT standards.

The ODOT standards also contain the following four specific requirements which are not included within *A Policy on Geometric Design of Highways and Streets - 1994.* (AASHTO Green Book).

1) Use spirals on all curves with a radius of 2000 m or sharper, and use ODOT spiral lengths given in the ODOT Highway Design Manual.
2) Superelevation runoffs shall match the ODOT spiral length.
3) ODOT minimum vertical clearance on state system shall be 5.2 m.
4) Use ODOT specific design speeds based on traffic volumes and terrain type.

• AASHTO

These standards are contained in the AASHTO Publication; *A Policy on Geometric Design of Highways and Streets - 1994.* (AASHTO Green Book). AASHTO standards are specifically for use in the design of new construction and reconstruction projects, when the project is located on a local route. They are not a 3-R standard, the foreword of the book states this and refers the reader to *TRB Special Report #214*, and related

references, for guidance in the design of 3-R jobs.

AASHTO policy is organized in a system so the highways functional classification determines which part of the policy applies to that highway. The AASHTO policy includes chapters in which general design controls and elements are discussed as they apply to all types of functional classifications and provide a groundwork to understanding basic design concepts. These chapters cover Highway Functions, Design Controls and Criteria, Elements of Design, and Cross Section Elements. The policy also gives specific design information for at grade intersections, grade separations and interchanges.

The remainder of the book covers design details as they relate to specific functional classifications. AASHTO policy provides design direction for the following classifications

- Rural and Urban Freeways
- Rural and Urban Arterials
- Rural & Urban Collector Roads and Streets
- Local Roads and Streets including Special Purpose Roads

It is imperative that any user of this manual study and understand the concept of functional classification. The AASHTO policy gives an explanation of this in Chapter One (Highway Functions). See Section 8.6 of this manual for further information dealing with traffic studies and functional class in urban areas and how it relates to design.

Functional Classifications have been established for all State Highways by the Transportation Development Branch. A directory covering these routes is included in the appendix. Design specifics cannot be accurately selected from the AASHTO policy without the correct functional class being known.

• ODOT 3-R

ODOT 3-R Standards are found in the *ODOT Highway Design Manual*, Sec. 4.4. It contains information dealing with pavement widths, horizontal curvature, superelevation, and other references specific to this type of work. Table 4-2 is essentially the same table used in *TRB Special Report #214*, and found on page 7 of that publication. It is the minimum acceptable standard for 3-R projects with federal funding. When ODOT 3-R guidelines refer to AASHTO criteria, this reference is to *TRB Special Report #214*, in the case of general 3-R construction; or *A Policy on Design Standards-Interstate System (*AASHTO 1991) for 3-R work on the freeway system.

4.3 PROJECT TYPES

• General

The standards used to develop roadway geometric and nongeometric details generally have a major effect on the overall project cost. Factors which must be taken into consideration when making that selection are type of work to be done, location and type of roadway.

For purposes of determining the appropriate design standard for use in project development, the project types can be divided into 4 general categories. They are:

- Maintenance,
- Resurfacing, Restoration, and Rehabilitation (3-R),
- Reconstruction (4-R)
- New Construction

• Maintenance

These are projects which preserve and extend the service life of existing highways and structures. Existing width of lanes and shoulders are almost always maintained. Improvement to horizontal and vertical alignments, superelevation, slopes and removal of roadside hazards will only be considered where accident records indicate serious problems. When improvements are deemed appropriate, they will be made in conformance to applicable state standards and acceptable construction practices.

This category includes, but is not limited to the following types of work: minor non-structural overlays without widening, chip seals, recycle in place, LMC overlays, crack sealing, bridge and rockfall screening, detector loop repairs, and drainage enhancements.

Most inlay and overlay preservation projects, whether structural or not, will be considered and developed as a 3-R project. This will allow proper consideration for improving safety and providing flexibility in the use of federal funds.

• Resurfacing, Restoration, and Rehabilitation. (3-R)

These are projects which preserve and extend the service life of existing highways and enhance safety, using cost-effective solutions. Improvements include extending pavement life for at least 8 years, safety enhancements, minor widening, improvements in vertical and horizontal alignment, improvement in superelevation, flattening of sideslopes and removal of roadside hazards. The scope is influenced by factors such as: roadside conditions, funding constraints, environmental concerns, changing traffic and land use patterns, surfacing deterioration and accident type and rate. 3-R projects are not constructed with the intent of improving level of service, however it is sometimes an automatic benefit derived as a result of improving the riding surface and improving safety.

This category includes, but is not limited to the following types of work: overlay projects with or without minor widening to shoulder or travel lanes, widening for curb, guard rail, adding flares, extending tapers, rockfall benches and fallout areas, and constructing SMV turnouts. Also included in this class are projects with site specific vertical or horizontal curve correction, and left turn channelizations, when included in an overlay project for safety purposes. Scarifying existing surfacing, rebasing and repaving is considered as 3-R if the scope of the job does not require the original subgrade to be altered. All project widening in this category is limited to less than a full lane width except when channelization is incorporated.

• Reconstruction (4-R)

These projects upgrade the facility to acceptable geometric standards and as a result, provide a greater roadway width. The improvements may be in the form of additional lanes and/or wider shoulders and produce an improvement in the level of service. Projects are usually associated with rural highway sections with service levels from D to F, and in urban sections with E to F service levels.

Reconstruction projects normally include the following types of work: Projects which alter the original subgrade, by constructing major widenings that result in the addition of a new continuous lane, addition of passing lanes or climbing lanes, channelization for signals or left turn refuges when not part of a overlay project, structure replacement, and similar projects.

• New Construction

New construction projects are projects constructed in a new location, new alignments, major additions such as an interchange, or rebuilding an existing facility with major vertical or horizontal alignment changes.

4.3.1 DESIGN STANDARD SELECTION

The matrix below shows which design standards are applicable for certain projects based on project type, and if the project involves a state route or not. These design standards when used with an appropriate design speed are the criteria for whether an exception shall be required for a project.

There are two levels of exceptions for projects. The first level is an exception to the ODOT specific standards for all projects located on a state highway

The second level of exceptions apply to all projects which are federally funded. This would be either an exception to AASHTO Design Standards in the case of certain New/Reconstruction projects, or exceptions to *A Policy on Design Standards-Interstate System* for 3-R projects.

See Section 5.0 for further information concerning design exceptions.

TABLE 4-1

DESIGN STANDARDS SELECTION MATRIX

Highway	Type of Work	
	New/Reconstruction	3-R
State Routes Includes Interstate Primary & Secondary	ODOT	ODOT 3-R
Local Agency Routes City County or Other Responsibility	AASHTO See Note Below:	ODOT 3-R See Note Below:

NOTE:

For projects on a local jurisdiction route, the local authority may at its option use, either the appropriate AASHTO Standard or select a standard of their own choice. This discretion is given by ORS 368.036.

4.3.2 ADDITIONAL REFERENCES

• AASHTO References

The following policies are helpful when developing transportation projects, and are currently available by order from AASHTO:

1. *A Policy on Geometric Design of Highways and Streets - 1994*
2. *1996 AASHTO Roadside Design Guide*
3. *A Policy on Design Standards-Interstate System.* (AASHTO 1991)
4. *Guide for Development of New Bicycle Facilities - 1991*
5. *Traffic Engineering Metric Conversion Factors* - 1993
6. *Guide to Metric Conversion* - 1993

• Other References (available from other sources)

1. *Federal Aviation Regulations,* Part 77. (D.O.T., F.A.A.)
2. *ODOT Standard Drawings for Design and Construction.*
3. *ODOT Policy and Procedure Memos.*
4. *ODOT Standard Specifications for Highway Construction - 1996*
5. *Manual on Uniform Traffic Control Devices and Oregon Supplemental*.
6. *Oregon Highway Laws,* compiled by Oregon State Transportation Commission (current edition).
7. *ODOT Traffic Volume Tables*.
8. *ODOT Standard Highway Spiral*.
9. *Functional Requirements of Highway Safety Features, Participants Notebook* (D.O.T., FHWA, N.H.I.)
10. *Highway Capacity Manual*, special report 209, T.R.B. 1985.
11. *Debris-Control Structures,* Hydraulic Engineering Circular No. 9.
12. *The Oregon Highway Plan*.
13 *State of Oregon, Bicycle and Pedestrian Plan, 1995*.
14. *FHWA Checklist and Guidelines for Review of Geotechnical Reports and Preliminary Plans and Specifications,* - October, 1985.
15. *TRB Special Report #214,* Practices for Resurfacing, Restoration and Rehabilitation.
16. *ODOT Soil and Rock Classification Manual, 1987.*
17. *ODOT Hydraulics Manual*
18. *ODOT Metric Alignment Guide*, 1995
19. *ODOT Metric Basics* - 1995
20. *ODOT Roadway Section Memos to Designers*

V. 3R PROJECT DESIGN PROCESS

The Safety Investment Program rates the safety of segments of state highways based on fatal and serious injury accidents within the last three years, updated annually. The segments are five miles in length and are rated based on the following criteria and shown on the Safety Investment Program map:

Category 1	0 Accidents	Light Green
Category 2	1-2 Accidents	Dark Green
Category 3	3-5 Accidents	Orange
Category 4	6-9 Accidents	Magenta
Category 5	10+ Accidents	Purple

Due to the lack of accidents, projects located on Category 1 and 2 Safety Sections don't require the level of scrutiny in project development required of higher accident sections of highways. Therefore, **project development for 3R projects on Category 1 and 2 Safety Sections has been simplified**. Projects located on the Interstate System and Category 3, 4, and 5 Safety Sections will continue to require full 3R Traffic and Inventory Analysis.

• Non-Freeway 3-R Projects (Category 1 & 2 Safety Sections)

Accident/Traffic Analysis

Even low accident sections of highways need to have their accident histories reviewed. Accident listings should be pulled for the last five years and analyzed by the Region Traffic Engineer (or equivalent). The intent of this review is to look for trends, locations with a high number of non-fatal/injury accidents, and other situations, which may, in the judgement of the Region Traffic Engineer, justify further investigation. This review, when coupled with the on-site visit, may identify some low cost mitigation alternatives, which could generate a significant reduction in accidents or potential.

There may be cases when a SPIS (Safety Priority Index System) site is located within the project limits. Full analysis is needed of these locations to determine the appropriate solution to the problem creating the accidents. Funding for SPIS solutions will come from the Safety Investment Program but a decision to include the work in the 3-R project or leave it as a stand alone project must be made by the Project Team.

Project Scoping

Scoping Teams should consist of the critical few individuals required to give quality input for the decisions required. The Project Leader, Roadway Designer and/or Roadway Region Liaison, and Area Maintenance Manager should be the minimum. Depending on the outcome of the Accident/Traffic Analysis and known Structural Needs, the Region Traffic Engineer (or equivalent) and/or a Bridge Designer may be added.

To assist in the analysis and scoping trip, Roadside Inventory Items 3, 4, and 5 (see below) should be completed prior to the site visit. They can then be reviewed on site by the team and compared with the accident history. Major improvements dealing with deficiencies identified in items 3, 4, and 5 will rarely be incorporated on this category of project. These will incorporate more low cost mitigation to address these items, as an accident history will probably not be present that will generate a good benefit/cost for the more substantial improvements.

The scoping team should determine the level of effort that will be required by the survey crew. Very definite parameters should be set as to which roadside obstacles need to be inventoried. The intent of the inventory for Category 1 and 2 projects is not to survey every fixed object or culvert throughout the project. Only those objects near the roadway that constitute a substantial hazard should be inventoried. Continuous runs of utility poles or trees at the R/W line generally don't need to be inventoried. However, if there is a location with a number of run-off-the-road accidents (outside of a curve), then the effort and the area covered in the inventory should be increased.

Other than roadside features, the field work on these projects should be limited to the amount needed for quantity calculations, in particular leveling for crown and super correction. By their nature, urban projects may require some additional work but every effort should be made to limit the survey work to the minimum needed for the particular project.

During scoping, the need for exceptions to design standards should be identified. Design exception requests shall be submitted as soon as the need is identified. This will minimize the need for redesign should the exception request be denied. For further information on design exceptions, see Chapter 5.

Roadside Inventory

By their nature, 3-R Projects on sections of highway having low accident history place special emphasis on pavement preservation recognizing that certain cost effective safety improvements may be necessary and desirable. Due to their good safety performance and limited scope, 3-R Roadside Inventories on these sections should be limited to the following areas:

1. Roadside Obstacles Within Clear Zone or R/W
   - Trees
   - ***Luminaires***
   - ***Utility Poles***
   - ***Misc. Fixed Objects***
2. Existing Guardrail Including Bridge Rail Connections
3. Public Road Intersections With Stopping Sight Distance Less Than ODOT New Construction Standards
4. Horizontal Curves More Than 25 km/h Below ODOT New Construction Standards
5. Vertical Curves More Than 30 km/h Below ODOT New Construction Standards Hiding Intersections, Sharp Horizontal Curves, or Narrow Bridges
6. ADA Deficiencies

Following is a further explanation of the above inventory items and some thoughts on appropriate mitigation measures that may be incorporated on this type of project.

(1) **Roadside Obstacles -** With the emphasis on pavement preservation, the inventory of roadside obstacles is limited under most circumstances to R/W or clear zone, whichever is less. Inventories wider than clear zone are not considered a good expenditure of engineering budgets as only under unusual circumstances will substantial widening or realignment be included in the project. The survey crew should rely on the scoping report from the project team for guidance on the level of effort to be expended on the inventory of roadside obstacles.

(2) **Existing Guardrail -** All existing guardrail including bridge connections and end treatments should be inventoried. Bridge connections that consist of properly installed Type 3 Guardrail as well as flared ends with properly installed Type 1 Anchors and Type 'C' End Pieces do not necessarily need to be upgraded with new Guardrail Transitions and current design end terminals, unless there is a record of accidents involving either the bridge connections or the end terminals. During the inventory/analysis process, the project team should also be looking for opportunities to modify existing installations that do not adequately protect obstacles either by extending or burying ends in cuts. Once any portion of the guardrail installation is modified, even for height, the entire run must be brought to new construction standards or concurrence must be obtained from the Roadway Engineering Manager.

(3) **Intersection Sight Distance -** Most of this analysis can be done in the office from As-Constructed Plans. Many times those intersections with deficient sight distance will also show up during the accident analysis. The Safety Investment Program may consider those intersections with accident histories for improvement, but even those without a history have a potential. These intersections will probably have opportunities to incorporate low cost mitigation elements with the project to diminish accident potential. Deficient intersections should be reviewed on-site with the Region Traffic Engineer to aid in identifying mitigation measures.

(4) **Horizontal Alignment -** Horizontal curve deficiencies can best be identified by a review of As-Constructed plans, but superelevation rates need to be measured in the field. As a minimum, superelevation is to be corrected with the 3-R project. Additional mitigation (delineation, signing, etc.) may also be appropriate due to site-specific conditions. Again, the Region Traffic Engineer should be consulted for input.

(5) **Vertical Alignment -** As-Constructed Plans should be used as a starting point for identifying vertical alignment deficiencies. Field verification is needed to determine if major driveways or intersections are hidden by the vertical curves. If an accident history exists at these locations or horizontal curve locations, it may be appropriate to include major safety improvements with the project funded from the Safety Investment Program. This need should be identified early, during project scoping, so funding can be procured.

(6) **Americans with Disabilities Act -** ADA deficiencies are predominantly limited to urban 3-R

projects. ADA accommodation is more than a standard; it is a legal requirement. Intersection accommodation by installation of sidewalk ramps is an absolute minimum regardless of jurisdictional ownership of the sidewalks. Driveways and sidewalk obstacles should be carefully reviewed for candidate improvements and may provide good opportunities to partner with local jurisdictions for a better overall facility.

Roadside Inventory/Analysis Process & Concurrence

See Chapter 5 of the Highway Design Manual for the detailed steps in obtaining concurrence for those nonconforming roadside features that were identified in the Roadside Inventory that will not be corrected or mitigated with the project. Mitigation on these projects will normally be limited to low-cost measures as shown in Table 4-5. The formal concurrence document should consist of a cover letter accompanying the Roadside Inventory forms that exhibits the thought process used in making decisions.

Design Exception Process

Refer to Chapter 5 of the Highway Design Manual for the formal approval process for design exceptions. Justification of design exceptions on Category 1 and 2 projects will rely heavily on accident history and the exercise of good judgement of benefits to be derived from different sorts of investments/mitigation. The intent is to rely on rough cost estimates for the justification section shown in Chapter 5. It is not the intent that the Project Team go to great lengths to do in-depth engineering analysis of different alternatives in order to obtain highly accurate cost figures. Much of the early analysis is done from As-Constructed Plans to minimize field work and the analysis to justify design exceptions should not require additional field work.

Approval of design exceptions will be facilitated and expedited by the inclusion of low-cost mitigation into the project, where appropriate, for geometric deficiencies. This will provide some opportunities for proactive improvements while recognizing these highway segments have a good safety performance record.

4.4 OREGON 3-R DESIGN STANDARDS

4.4.1 3-R DESIGN CRITERIA

• General

In 1988, the Oregon Transportation Commission adopted the 3-R Geometric Design Standard and modified it in 1998 for development of 3-R projects. These standards do not cover 4-R projects or Freeway 3R projects.

In 1991 the AASHTO task force on Geometric Design, of the AASHTO Highway Subcommittee on Design, prepared a design policy for Interstate freeways. This publication, *A Policy on Design Standards-Interstate System* (AASHTO 1991) gives 3-R and 4-R standards for work on the Interstate system. These standards are to be interpreted as supplemental to the ODOT Design Standards. ODOT Design Standards are to be used for all 3-R freeway construction projects, with the exception of specific details, which are given in subsection 4.4.3. The development of a freeway 3-R project should be responsive to the considerations given in subsection 4.4.1 concerning purpose, applicability, scope, determination, and design process.

• Purpose

These standards apply to resurfacing, rehabilitation, restoration (3-R) projects to preserve and extend the service life of the existing highways. While the primary focus of these projects is pavement preservation, consideration of improvement of safety features is an essential design element. All 3-R projects will be developed and accomplished in a manner that considers and includes appropriate safety improvements. Improvements may include minor widening, flattening side slopes, removal of roadside hazards, delineation, etc.

By their purpose and definition, 3-R projects emphasize the economic management of the existing highway system in order to protect the investment and get the maximum economic benefit from available funds. Economic considerations are a major factor in determining the priority and scope of 3-R projects. The scope is influenced by factors such as: roadside conditions, cost of correction, environmental concerns, changing traffic and land use patterns, surface deterioration, and accident type and rate. Special emphasis is placed on pavement preservation recognizing, however, that certain cost-effective improvements for safety and operational purposes may be necessary and desirable.

Major improvements dealing with bridge widening, horizontal and vertical alignments, side slopes and accident reduction at high accident locations, including public road intersections, will normally be funded through the Bridge Management and Safety Investment Programs. The needs should continue to be identified and addressed during project development and it may be most cost effective to include this work with the 3-R Project. When it is deemed not cost effective to improve design features to current standards or correct a safety deficiency, a design exception must be requested and low-cost safety mitigation as listed in Table 4-4 shall be considered.

• Applicability

These standards apply to geometric design features such as lane and shoulder widths, horizontal curvature and superelevation, vertical curvature and stopping sight distances, bridge width, cross and side slopes, and horizontal and vertical clearances.

These standards do not apply to other features such as traffic control devices, pavement markings, roadway lighting, construction materials and methods, etc. These features will be handled in accordance with current policies and practices.

These standards also do not apply to reconstruction projects (the 4th R) which shall meet new construction standards. However, design features not specifically addressed in these 3-R Standards will generally meet ODOT New Construction Standards.

• Scope

As noted, 3-R projects primarily preserve and extend the service life of existing highways and enhance safety. 3-R projects generally do not increase the level of service of the overall section. To that end, 3-R projects include such items as placement of additional surface material and/or other work necessary to return an existing roadway, including shoulders, bridges, roadside features and appurtenances to a condition of structural and functional adequacy. 3-R projects may also include reworking or strengthening of base materials and minor upgrading of geometric features and appurtenances for safety purposes.

An active project in development provides an opportunity to provide more mitigation of minor roadside features than would normally be done under the Safety Investment Program alone, particularly if a desirable improvement can be made at a minimal cost. The design life of an individual project should be a major factor in the evaluation for determination of appropriate safety investments. 3-R work may also require small amounts of right of way in order to address the reasonable and desirable geometric and safety needs.

When upgrading of geometric features becomes a major factor resulting in substantial capacity improvements (adding lanes, extensive curve realignments, and modification of original subgrade), the project is "reconstruction" (4th R). Applicable new construction standards will apply to reconstruction projects. The project prospectus will identify the applicable standards, 3-R or 4-R to be used on individual projects.

• Determination

The scope of a 3-R project is determined by many factors. The following shall be considered and discussed as appropriate in the Project Prospectus.

1. Pavement Condition - The existing pavement condition and the scope of needed pavement improvements dictate, to a large extent, those improvements that are feasible, prudent, or practical. Significant geometric upgrading might be appropriate if the pavement improvements are substantial, but may not be appropriate or economical if the needed pavement improvements are relatively minor.

2. Physical Characteristics - The physical characteristics of a highway and its general location often determine those improvements that are necessary, desirable, possible, practical, or cost effective. Topography, climate, adjacent development, existing alignment (horizontal and vertical), cross-section (lane width, shoulder width, cross slope, side slopes, superelevation, etc.) and similar characteristics along with intersection evaluation should be considered in determining the scope of geometric or safety improvements to be made in conjunction with pavement-type 3-R work. Route continuity is a major determining factor in the overall scope of 3-R projects.

3. Traffic Volumes - Traffic data, including the percentage trucks, is needed in the design of all highway improvements, including 3-R. It is an important consideration both in the determination of the appropriate level of improvement (i.e., reconstruction vs. 3-R) and in the selection of actual design values for the various geometric elements. For 3-R, the need for a formal forecast of future traffic is greatest when the current traffic is approaching the capacity of the highway, and decisions must be made regarding the timing of major improvements such as additional lanes. On the other hand, formal forecasts are not normally necessary on very low volume roads where even high percentage increases in traffic do not significantly impact design decisions.

4. Accident Records - Evaluation of accident records often reveals problems requiring special attention. In addition, relative accident rates can be an important factor in establishing both the priority and the scope of 3-R projects. A review of accident records is an integral part of the 3-R project development process. Therefore, traffic accident evaluation shall be made on all 3-R projects.

5. Potential Impacts of Various Types of Improvements - Quite often, the scope of geometric improvements made by 3-R projects is influenced by potential impacts on the surrounding land

and development. Typically, social, environmental, and economic impacts severely limit the scope of 3-R projects, particularly where the existing right of way is narrow and there is considerable adjacent development. The need for additional right of way may determine the upper limit of practical geometric improvements.

6. Speed - Evaluation of design features generally requires the determination of the appropriate design speed based upon the highway type, terrain and adjacent land use or regulatory speed. It is important that the design speed selected for a project realistically reflect the speeds at which vehicles can be expected to operate or are actually operating on the highway. On 3-R projects determination of the 85^{th} percentile speed is the preferred method for establishment of the design speed for use in evaluation of geometric improvements. This is particularly true in evaluating roadway widths and horizontal and vertical curvature.

4.4.2 NON FREEWAY 3-R GEOMETRIC DESIGN STANDARDS

• Geometric Design Standards

The following are minimums for lane and shoulder width, with consideration and improvement to horizontal and vertical curvature, bridge width and side slopes as appropriate. A feature not meeting the standards as specifically noted in the following areas: roadway width; bridge width; horizontal curvature (Criteria B); vertical curvature and stopping sight distance; pavement cross slope; superelevation; vertical clearance; ADA; or pavement design life must be upgraded or a design exception must be documented and approved. For more information on these criteria and other safety-conscious design considerations, the designer should become acquainted with *TRB Special Report #214.*

Once the decision is made to upgrade a roadway feature, the designer should use the *ODOT Highway Design Manual, A Policy on Geometric Design of Highways and Streets - 1994,* the*1996 AASHTO Roadside Design Guide* or *TRB Special Report #214* whichever gives guidance in the particular area of need. When evaluating intersections within a 3-R project, turning radius to facilitate truck movements should also be considered as well as intersection sight distance.

• Roadway Widths

See table 4-2 (next page) for minimum 3-R roadway widths.

TABLE 4-2

MINIMUM 3-R LANE AND SHOULDER WIDTHS

		Less Than 10% Trucks **		More Than 10% Trucks **	
Design Yr. Volume (ADT)	Average Running Speed	Lane Width *	Shoulder Width	Lane Width	Shoulder Width *
Less Than 750 Vehicles	Under 80 km/h	2.7 m	0.6 m	3.0 m	0.6 m
	80 km/h or Over	3.0 m	0.6 m	3.0 m	0.6 m
750 to 2000 Vehicles	Under 80 km/h	3.0 m	0.6 m	3.3 m	0.6 m
	80 km/h or Over	3.3 m	0.9 m	3.6 m	0.9 m
2001 to 4000 Vehicles	All Speeds	3.3 m	1.2 m	3.6 m	1.2 m
Over 4000	All Speeds	3.3 m	1.8 m	3.6 m	1.8 m

* The shoulder width may be reduced 0.3 m in mountainous terrain, with approval of the Roadway Engineering Manager.
** Trucks are defined as heavy vehicles, single unit configuration or larger (six or more tires).

NOTE: A minimum 3.6 m lane is required on nationally recognized truck routes. (See Current Route Map #7.)

• Horizontal Curvature and Superelevation

Criteria A: Improve horizontal curves by correction of superelevation to conform to ODOT New Construction Standards if the design speed of the existing curve is less than 25 km/h below the ODOT New Construction Standards.

Criteria B: Evaluate reconstruction of curvature when the design speed of the existing curve is more than 25 km/h below the running speed of approaching vehicles, and the current year ADT is 2000 or greater. (Careful evaluation of the appropriate value to be used for the approach speed of vehicles must be made, taking into account transitioning from tangent alignments to more mountainous curving alignments. The appropriate approach speed for an individual curve is directly dependent on the rest of the alignment approaching the curve potentially generating an approach speed far less than the 85th percentile for the overall project.)

When curve reconstruction is not justified, appropriate mitigation measures such as those listed in Table 4-4 should be applied.

• Vertical Curvature and Stopping Sight Distance

Evaluate reconstruction of crest vertical curves if the crest hides from view major hazards such as intersections, sharp horizontal curves, or narrow bridges; the design speed based on the existing Safe Stopping Distance is more than 30 km/h below the ODOT New Construction Standards; and the current year ADT is greater than 2000.

If vertical curve reconstruction is not justified/cost effective, or the curve is not reconstructed to new construction standards, appropriate mitigation measures should be applied (See Table 4-4).

• Vertical Clearance

The clear height of structures shall not be degraded to less than 4.9 m over the entire roadway width, including the usable width of shoulder. Existing clearances of less than 4.9 m but greater than 4.3 m shall not be degraded. The clear height shall not be less than 4.3 m in any case.

• Bridge Width

A decision must be made to retain, widen or replace any bridge within the limits of a 3-R project. Widening vs. replacement should be evaluated to determine the most cost-effective treatment. Consider AASHTO standards for bridges to remain in place and Table 4-3 whichever is less, for minimum width. Additionally, consideration should be given to the accident history and the cost of widening when determining if widening is cost effective. If the decision is made to replace an existing structure, new construction standards

will apply to the bridge replacement portion of the project only, not to the roadway portion. Replacing structures does not change the remainder of a 3R Project to 4R.

When a decision is made to retain a bridge, the bridge rail should be evaluated to determine if it can adequately contain and redirect vehicles without snagging, penetrating or vaulting. Consideration should be given to upgrading structurally inadequate or functionally obsolete bridge rail. Consideration should be given to design standard exceptions for railing upgrades, roadway widths, etc., when the structure is listed on or determined eligible for the National Register of Historic Places. Appropriate traffic control devices should be installed where the clear roadway width on the structure is less than the approach roadway width.

TABLE 4-3

MINIMUM USEABLE BRIDGE WIDTHS

Design Year Volume(ADT)	Useable Bridge Width (Meters)
0 - 750	Width of approach lanes
751 - 2000	Width of approach lanes, plus 0.6 m
2001 - 4000	Width of approach lanes, plus 1.2 m
OVER 4000	Width of approach lanes, plus 1.8 m

- **Pavement Design and Cross Slope**

Pavement design for 3-R projects requires a minimum of 8 years of service life.

Appropriate leveling quantities should be included in the project to correct cross slope to 2% and correct curve superelevation to new construction standards.

• Sideslopes and Clear Zone

As discussed earlier, a roadside inventory shall be provided on all 3-R projects. This inventory along with the accident summary and analysis gives the designer the information necessary to make good design decisions regarding safety improvements. Evaluation and improvement considerations of roadside features should be consistent with the following:

1. Flatten sideslopes of 1:3 or steeper at locations where run-off-road accidents are likely to occur (e.g., on the outside of horizontal curves).

2. Retain current slope ratios, do not steepen sideslopes, when widening lanes and shoulders unless

warranted by special circumstances.

3. Remove, relocate or shield isolated roadside obstacles.

4. Remove vertical drop-offs at the edge of pavement after paving.

- **Mandatory 3-R Design Features**

Following is a list of mandatory design elements that must be incorporated with 3-R projects:

TABLE 4-4	
MANDATORY DESIGN FEATURES	
GEOMETRIC DEFICIENCY	*MANDATORY CORRECTIVE MEASURE*
ADA/Sidewalk Ramps	• Ramps shall be added where absent
Narrow Bridges/Deficient Rails	• Bridge rail retrofit or new bridge rails, approach guardrail, bridge connections and transitions to current standards unless bridge is scheduled for replacement • Install Type 3 object markers and post delineators
Existing Guardrail	• All blunt ends, including non-flared terminals shall be upgraded to current standards • Runs less than 450 mm from top of pavement to guardrail post bolt shall be adjusted or replaced to current standards • Guardrail bridge connections shall be upgraded if appropriate or added if absent.

- **Low-Cost Safety Mitigation Measures**

Following is a list of low cost safety measures that should be considered on all 3-R projects as a minimum to mitigate existing safety deficiencies and can be used as mitigation in justification for design exceptions:

TABLE 4-5	
LOW-COST SAFETY MEASURES	
GEOMETRIC DEFICIENCY	**LOW-COST SAFETY MEASURE**
Narrow Lanes and/or Shoulders	• Pavement edge lines • Raised pavement markers • Post delineators • Rumble strips
Steep Sideslopes/Roadside Obstacles	• Roadside hazard markings • Round ditches • Install guardrail • Remove or relocate obstacle • Slope flattening • Breakaway hardware
Narrow Bridges/Deficient Rails	• Install traffic control devices • Hazard and pavement markings
Sharp Horizontal Curve	• Install traffic control devices • Shoulder widening • Correct superelevation • Gradual sideslopes • Pavement antiskid treatment • Obstacle removal or shielding • Install post delineators
Poor Sight Distance At Hill Crest	• Install traffic control devices • Fixed-hazard removal • Shoulder widening • Driveway relocation • Illumination
Hazardous Intersection	• Install traffic control devices • Signalization • Illumination • Pavement antiskid treatment • Speed control

• Definitions

1. Resurfacing (3-R). The placement of additional pavement layers (including protective systems

for bridge decks) over the existing (or restored or rehabilitated) roadway or bridge deck surface to provide additional strength or to improve serviceability.

2. Restoration and Rehabilitation (3-R). Returning the existing structure (roadway pavement or bridge deck) to a suitable condition for resurfacing in order to perform satisfactorily for a substantial 8 year minimum time period.

   Restoration may include replacement of malfunctioning joints, repair of spalled joints, substantial pavement undersealing when essential for stabilizing for resurfacing, grinding/grooving faulted rigid pavements to restore smoothness (where adequate structural thickness remains), adding underdrains and removal and replacement of contaminated or deteriorated materials.

   Rehabilitation may include reworking or strengthening of bases or subbases, recycling or reworking existing materials to improve their structural integrity, adding underdrains, or improving shoulders.

3. Reconstruction (4-R). The 4th "R" is work beyond what is defined under any one of the 3-R's above. It may include, but not be limited to, the addition of travel lanes, reconstruction of entire sections of roadway, elimination of hazards at railway grade crossings, or channelization of traffic (if stand alone project) and bridge replacement.

4. Roadside Inventories. Field inventories of roadside objects and other features that do not conform to ODOT Geometric Design Standards or geometric design guidelines. They are to be submitted with all projects (except purely maintenance projects such as chip seals, rock falls etc.). Roadway Engineering is responsible to check their conformance to applicable policies, standards, and guidelines.

4.4.3 FREEWAY 3-R DESIGN STANDARDS

• General

When a project on the freeway system has been classified as 3-R, the appropriate design standard to use is the ODOT Standard. This standard is normally considered to be the "full" design standard and is given in subsection 4.5 and other parts of this manual. There are a few areas where the ODOT Standards, and the standards given in *A Policy on Design Standards-Interstate System* (AASHTO 1991) differ. The following design criteria can be considered as allowable minimums, and can be used when design constraints don't allow full use of the ODOT Standard.

• Design Speed

A design speed of 110 km/h should be used for rural areas. Where terrain is mountainous, a design speed of 100 km/h or 80 km/h, which is consistent with driver expectancy may be used. A design speed of 100 km/h is acceptable for rolling terrain. In urban areas, the design speed shall be at least 80 km/h.

• Sight Distance

Stopping Sight distance should be in conformance with the values shown in Figure 4-9 (page 91) for the appropriate design speed.

• Curvature and Superelevation

These elements and allied features, such as transition curves, shall be correlated with the design speed in accordance with *A Policy on Geometric Design of Streets and Highways - 1994*

• Shoulders

On the left of traffic on a four lane section, the paved width of shoulder shall be at least 1.2 m. On six or more lane sections, a 3 m paved width should be provided.

NOTE: There are, in this state, a few remaining segments of Interstate freeway which still have the 1.2 m shoulder on the left side. It is in the best interests of the traveling public to eliminate this feature and widen these to the 1.8 m standard currently required for New/Reconstruction. This practice is in keeping with the basic design rules of maintaining route continuity, meeting driver expectations, and providing a safe area for emergency parking.

• Medians

Medians in rural areas in level or rolling topography shall be at least 11 m wide. Medians in urban and mountainous areas shall be at least
3 m wide. Consideration should be given to decking median openings between parallel bridges when the

opening is less than 9 m wide.

• Maximum Grades

Grade shall correlate to the following table:

TABLE 4-4

MAXIMUM GRADIENT

Type of Terrain	Design Speed (km/h)		
	80	100	110
Level	4%	3%	3%
Rolling	5%	4%	4%
Mountainous	6%	6%	5%

Grades 1% steeper than the value shown may be used for extreme cases in urban areas where development precludes the use of flatter grades and for one way downgrades, except in mountainous terrain.

• Vertical Clearance

On all rural sections, the clear height of structures shall not be less than 4.9 m over the entire roadway width, including the usable width of shoulder. In urban areas, the 4.9 m clearance shall apply to a single routing. On other urban routes, the clear height shall not be less than 4.3 m. Allowance should be made for future resurfacing. The vertical clearance to sign trusses and pedestrian overpasses shall be 5.2 m. The vertical clearance from the deck to the cross bracing on through truss structures shall also be a minimum of 5.2 m.

• Structure Cross Section

The width of all bridges, including grade separation structures, measured between rails, parapets, or barriers shall equal the full paved width of the approach roadways. The approach roadway includes the paved width of usable shoulders. Long bridges, defined as bridges having an overall length of 60 m or more, may have a lesser width. Such bridges shall be analyzed individually. On long bridges, offsets to parapet, rail, or barrier shall be at least 1.2 m measured from the edge of the nearest traffic lane on both the left and the right.

• Bridges to Remain in Place

Mainline bridges on the interstate system may remain in place if, as a minimum, they meet the following values. The bridge cross section consists of 3.6 m lanes, 3.0 m shoulder on the right, and a 1.0 m shoulder on the left. For long bridges, the offset to the face of parapet or bridge rail on both the left and the right is 1.0 m

measured from the edge of the nearest traveled lane. Bridge railing shall meet or be upgraded to current standards.

• Tunnels

The vertical clearance for tunnels shall be at least 4.9 m except where as alternative routing providing the 4.9 m is available. For those lesser situations, at least 4.3 m plus an allowance for resurfacing may be provided.

The desirable width for tunnels is at least 13.3 m. This width consists of two 3.6 m lanes, a 3.0 m right shoulder, a 1.5 m left shoulder, and a 0.8 m safety walk on each side. However, because of the high cost, a reduced tunnel width can be accepted, but it must be at least 9.1 m wide, including at least a 0.5 m safety walk on each side.

4.5 ODOT STANDARDS

The Tables and Figures on the following pages provide standards for the design of reconstruction and new construction projects. They are referred to in various parts of this Section, as well as other Sections in the manual. (Note: This excerpt from the Highway Manual does not include all of the tables and figures listed below. See the current Highway Design Manual for those not included in this appendix)

Minimum Standards for New/Reconstruction; Rural
TABLE 4-5(R)

Minimum Standards for New/Reconstruction; Urban
TABLE 4-5(U)

Standard Sections for Highways other than Freeways
FIGURE 4-1

Minimum Standards for Freeway Construction
TABLE 4-6

Standard Sections for Freeways
FIGURE 4-2

Standard Sections For Urban Freeways
FIGURE 4-3

Standard Superelevations
FIGURE 4-4

Spirals on Highway Curves
TABLE 4-7

Develop 2 Lane Superelevations
FIGURE 4-5

Develop 4 Lane Superelevations
FIGURE 4-6

Crest Vertical Curves SSD
FIGURE 4-7

Sag Vertical Curve SSD
FIGURE 4-8

Desirable Stopping Sight Distance
FIGURE 4-9

Minimum Stopping Sight Distance
FIGURE 4-10

Safe Speed Chart
FIGURE 4-11

TABLE 4-5 (R)

ODOT STANDARDS FOR NEW / RECONSTRUCTION PROJECTS

For Non-Freeway **RURAL** Functional Classifications Including Arterials, Collectors and Local Classifications.

For Design of Rural Projects: 1) Determine ADT / DHV. 2) Determine terrain. 3) Values beneath terrain will be the project design speed and related features based on functional classification.

DESIGN FEATURE / FUNCTIONAL CLASS	TWO LANE												FOUR LANE		
	ADT under 400			ADT 400 – 1500			ADT 1500 - 2000			ADT over 2000			DHV over 700		
Terrain (Flat, Rolling, Mountainous)	F	R	M	F	R	M	F	R	M	F	R	M	F	R	M
Design Speed (km/h)	100	70	60	110	100	70	110	100	80	110	100	80	110	100	80
Width of Traveled Way (m)															
• Rural Arterials	7.2	6.6	6.6	7.2	7.2	6.6	7.2	7.2	6.6	7.2	7.2	7.2		2 X 7.2	
• Rural Collectors	6.6	6.0	6.0	6.6	6.6	6.6	7.2	7.2	6.6	7.2	7.2	7.2		2 X 7.2	
• Rural Local Routes	6.6	6.0	5.4	6.6	6.6	6.6	7.2	7.2	6.6	7.2	7.2	7.2		2 X 7.2	
Shoulder Width (m)															
• Rural Arterials	1.2	1.2	1.2	1.8	1.8	1.8	1.8	1.8	1.8	2.4	2.4	2.4	2.4	2.4	2.4
• Rural Collector	0.6	0.6	0.6	1.5	1.5	1.5	1.8	1.8	1.8	2.4	2.4	2.4	2.4	2.4	2.4
• Rural Local Routes	0.6	0.6	0.6	1.5	1.5	1.5	1.8	1.8	1.8	2.4	2.4	2.4	2.4	2.4	2.4
(See 1994 AASHTO pages 422, 465 and 488 for allowable roadway width exceptions).															
Recommended Max Grades%															
• Rural Arterials	3	5 (6)[a]	6 (8)[a]	3	4	6	3	4	5	3	4	5	3	4	5
• Rural Collector / Local	5	6 (8)[a]	6 (9)[a]	4	6	6	4	5	5	4	5	5	4	5	5
[a] Recommended Maximum Grades for ADT under 250															
Minimum Radius (m)	385	185	115	580	385	185	580	385	215	580	385	215	580	385	215
Stopping Sight Distance															
• Desirable (m)	205	115	85	250	205	115	250	205	140	250	205	140	250	205	140
• Minimum (m)	160	95	75	180	160	95	180	160	115	180	160	115	180	160	115
(See 1994 AASHTO pg. 120 for assumed speed ranges)															
Passing Sight Distance	--------- As Available - ---------- 730 m for 110 km/h or less ----------														
Surface Type	---------- As determined by Pavements Engineer ----------														
Type of Shoulder Surface	---------- Same as Traveled Way ----------														
Width of Structures	---------- Width of future approach roadway and shoulders, as determined above plus offset to barrier, where applicable														
Width of Major Long Span Bridges	---------- Special study may be required ----------														
Vertical Clearance	---------- 5.2 m ----------														
Loading	---------- MS-18 Design Truck ----------														

- **Climbing or Passing Lanes** shall be considered where combinations of horizontal and vertical alignment prevent passing opportunities. Use 0.6 m median when 3 or 4 lane sections result. Desirable shoulder width is 1.8 m (minimum 1.2 m). Except minimum shoulder width is 1.5 m if a bikeway.
- **Four lane construction standards** should be utilized wherever the traffic is likely to approach or exceed capacity. Refer to median table 7-1 for four lane median width.
- **Where roadside barriers are used**, the shoulder width shall be increased by 0.6 m to provide barrier clearance and lateral support. (See Section 6.3 “shoulders” and Std. Drg. No. RD420 or RD425).
- **To convert ADT’s** and DHV’s, contact Transportation Planning Analysis Unit.

EXCEPTIONS TO ABOVE STANDARDS SHALL BE APPROVED AS DESCRIBED IN SECTION 5.0

TABLE 4-5 (U)

ODOT STANDARDS FOR NEW / RECONSTRUCTION PROJECTS

For Non-Freeway **URBAN** Functional Classifications including
Arterials, Collectors and Local Classifications

For Design of Urban Projects:

1) Select lane and shoulder widths based on ADT / DHV and terrain.
2) Determine urban design speed using guidelines on page 106 of the Highway Design manual.
3) Select SSD and curve radius based on design speed.
4) Select maximum grades based on design speed and terrain.

DESIGN FEATURE / FUNCTIONAL CLASS	TWO LANE												FOUR LANE		
	ADT under 400			ADT 400 – 1500			ADT 1500 - 2000			ADT over 2000			DHV over 700		
Terrain (Flat, Rolling, Mountainous)	F	R	M	F	R	M	F	R	M	F	R	M	F	R	M
Width of Traveled Way (m)															
• Urban Arterials	7.2	6.6	6.6	7.2	7.2	6.6	7.2	7.2	6.6	7.2	7.2	7.2	2 X 7.2		
• Urban Collectors	6.6	6.0	6.0	6.6	6.6	6.6	7.2	7.2	6.6	7.2	7.2	7.2	2 X 7.2		
• Urban Local Routes	6.6	6.0	5.4	6.6	6.6	6.6	7.2	7.2	6.6	7.2	7.2	7.2	2 X 7.2		
On high volume urban facilities, a 3.3 m lane width may be allowed if the design speed is less than 60 km/h and the truck volumes are low, 3.0 m lane widths are allowed only in highly restricted urban areas with low truck volumes.															
Shoulder Width (m)															
• Urban Arterials	1.2	1.2	1.2	1.8	1.8	1.8	1.8	1.8	1.8	2.4	2.4	2.4	2.4	2.4	2.4
• Urban Collectors	0.6	0.6	0.6	1.5	1.5	1.5	1.8	1.8	1.8	2.4	2.4	2.4	2.4	2.4	2.4
• Urban Local Routes	0.6	0.6	0.6	1.5	1.5	1.5	1.8	1.8	1.8	2.4	2.4	2.4	2.4	2.4	2.4
On urban arterials where barrier curb is used, the minimum width shall be 1.8 m.															

Selected Design Speed	50 km/h	60 km/h	70 km/h	80 km/h	100 km/h	110 km/h
Stopping Sight Distance						
• Desirable (m)	65	85	115	140	205	250
• Minimum (m)	60	75	95	115	160	180

(See 1994 AASHTO pg. 120 for assumed speed ranges).

Passing Sight Distance ---------- As Available ---- ---------- 730 m for 110 km/h or less ----------

Minimum Radius See section 6.2 for minimum radius and superelevation relationships. Superelevation for urban roadways normally limited by e max = 6% if design speed is less than 70 km/h, and e max = 10% when the design speed is over 70 km/h.

Recommended Max. Grades %																		
Terrain	F	R	M	F	R	M	F	R	M	F	R	M	F	R	M	F	R	M
All Functional Classes	5	8	9	5	8	9	5	6	6	5	5	5	5	5	5	5	5	5

Surface Type ---------- As determined by Pavements Engineer ----------
Type of Shoulder Surface ---------- Same as traveled way ----------
Width of Structures ---------- Width of future approach roadway and shoulders, as determined above plus offset to barrier, where applicable
Width of Major Long Span Bridges ---------- Special study may be required ----------
Vertical Clearance ---------- 5.2 m ----------
Loading ---------- MS-18 Design Truck ----------

- **Climbing or Passing Lanes** shall be considered where combinations of horizontal and vertical alignment prevent passing opportunities. Use 0.6 m median when 3 or 4 lane sections result. Desirable shoulder width is 1.8 m (minimum 1.2 m). Except minimum shoulder width is 1.5 m if a bikeway.
- **Four lane construction standards** should be utilized wherever the traffic is likely to approach or exceed capacity. Refer to median table 7-1 for four lane median width.
- **Where roadside barriers are used**, the shoulder width shall be increased by 0.6 m to provide barrier clearance and lateral support. (See Section 6.3 "shoulders" and Std. Drg. No. RD420 or RD425).
- **To convert ADT's** and DHV's, contact Transportation Planning Analysis Unit.

EXCEPTIONS TO THE ABOVE STANDARDS SHALL BE APPROVED AS DESCRIBED IN SECTION 5.0

TABLE 4-6

ODOT MINIMUM STANDARDS FOR FREEWAY CONSTRUCTION

For all facilities with Freeway Functional Classifications
Including non Interstate

Terrain	Flat	Rolling	Mountain & Urban
Design Speed (km/h)	110	110	100
Lane Width (m)	3.6	3.6	3.6
Minimum Radius (m)	580	580	385
Maximum Grade %	3	4	5
Stopping Sight Distances			
X Desirable SSD (m)	250	250	205
X Minimum SSD (m)	180	180	160
Median Width (Min/Des)			
X Four Lane (m)	5.4/23	5.4/23	5.4/23
X Six Lane (m)	7.8/23	7.8/23	7.8/23
X Divided Lane Sections	See Figure 4-2 for details		
Shoulder Width (m)	3.0	3.0	3.0
	(Inside Shoulder 1.8 m on 4 lane highways)		
	(Inside Shoulder 3.0 m on 6 lane highways)		
Vertical Clearance	5.2 m	5.2 m	5.2 m
Number of Lanes	Determined by traffic analysis		

☞ Use of 100 km/h design speed in urban/mountain terrain is subject to PDT / Roadway Engineering Manager approval.

☞ When determining four lane median width, consideration should be given to future six lane expansion.

Standard Superelevation

Standard Spiral Lengths and Superelevations TABLE 4-7

STANDARD SPIRAL LENGTHS AND SUPERELEVATIONS				STANDARD SPIRAL LENGTHS			
km/h	Radius (meters)	Length (meters)	"e" % slope	km/h	Radius (meters)	Length (meters)	"e" % slope
120	8000	n/a	Crown	70	210	120	*
120	5000	n/a	Crown	70	200	120	
120	3000	120	2	70	190	120	
120	2000	120	4	60	180	120	
120	1500	120	4	60	170	120	
120	1200	120	5	60	160	120	
110	1000	120	6	60	150	120	
110	900	120	6	60	145	120	
110	800	150	6	60	140	100	
110	700	150	7	60	135	100	
110	650	150	7	60	130	100	
110	600	150	8	60	125	100	
100	550	150	8.5	60	120	100	
100	500	150	8.5	60	115	100	
100	475	150	9	50	110	100	
100	450	150	9	50	105	100	
100	425	150	9.5	50	100	85	
100	400	150	9.5	50	95	85	
90	380	150	10	50	90	75	
90	360	150	10	50	85	75	
90	340	150	10	50	80	75	
90	320	150	10	50	75	75	
90	300	150	10	40	70	75	
90	290	150	10	40	65	75	
80	280	120	10.5	40	60	75	
80	270	120	10.5	40	55	75	
80	260	120	10.5	40	50	75	
80	250	120	10.5				
80	240	120	10.5				
80	230	120	10.5				
80	220	120	10.5				

***** *See "A Policy on Geometric Design of Highways and Streets", AASHTO 1994, pgs. 165-173, for data on "e" for design speeds less than 80 km/h.*

The above spiral lengths are for a two lane traveled way. (Two 3.6 m lanes) For multi-lane highways that are superelevated in the same plane between the edges of the traveled way, the following factors should be used to obtain the required spiral length:

3 lanes - 1.2 times the above value
4 lanes - 1.5 times the above value
5 lanes - 1.8 times the above value
6 lanes - 2.0 times the above value

When standard length spirals cannot be obtained, use the formulas below to determine minimum spiral lengths by runoff, comfort, & aesthetics. Use the longest spiral solution of the three formulas and round up to the next 5 m value.

Superelevation Runoff: $Ls = we/2s$

Where: e = Superelevation rate in %
Where: w = width, (edge of travel to edge of travel)
Where: s = relative slope in percent (as follows)

s = 0.75 @ 30 km/h	s = 0.50 @ 80 km/h
s = 0.70 @ 40 km/h	s = 0.48 @ 90 km/h
s = 0.65 @ 50 km/h	s = 0.45 @ 100 km/h
s = 0.60 @ 60 km/h	s = 0.42 @ 110 km/h
s = 0.55 @ 70 km/h	s = 0.40 @ 120 km/h

Comfort Control: $Ls = v^3/28R$

Where: v = Velocity in km/h
Where: R = Radius of curve

Aesthetic Control: $Ls = v/1.8$

Where: v = Velocity in km/h

5.0 PROJECT EXCEPTION PROCESS

• General

The information in this Section is intended to provide guidance for the design of 3R and 4R (Reconstruction) projects, and new construction projects in accordance with the uniform policies and procedures of the Oregon Department of Transportation and within the limits of AASHTO guidelines. In particular, this section describes the design exception process for all projects and the inventory/analysis process for 3R/4R projects. On 3R/4R projects, the roadside inventory, the traffic evaluation and accident analysis are essential elements in establishing design criteria and exceptions.

The authority for determination of design standards on Oregon Department of Transportation Federal-Aid and State-Only funded projects has been delegated to the Technical Services Managing Engineer.

Approval of exceptions to design standards for ODOT projects has been delegated jointly to the Region Manager and Technical Services Managing Engineer and subsequently by them to the Region Project Delivery Manager (or equivalent) and the Roadway Engineering Manager. Non-exempt projects on the NHS system also require approval of design exceptions by FHWA.

Certain figures and tables in the Highway Design Manual allow for approval by the Roadway Engineering Manager of exceptions to specific design details. Approval by the Roadway Engineering Manager of such exceptions does not require further approval by the Region Project Delivery Manager.

The Project Delivery Leadership Team has been delegated authority to resolve all project issues where agreement between the Roadway Engineering Manager and the Region Project Delivery Manager can not be obtained. These issues include unresolved design standards and exceptions.

• Justifications

Exceptions to design standards should be first discussed at project scoping, project team meetings, or during reconnaissance studies. When enough data is available, agreement on standards and on which standards to request exceptions, should be reached at these meetings. Some considerations which may cause a request for an exception to the design standards are listed on the following page: (See also Step 7 sub sec 5.2)

· Excessive construction costs
· Compatibility with adjacent sections
· No plans for improvement of adjacent sections in the foreseeable future
· Proposed improvements or changes in standards for the highway corridor
· Preservation of historic property
· Additional right of way requirements
· Environmental impacts
· Low accident history and/or accident potential
· Low traffic volumes

· Low benefit/cost

5.1 3R/4R PROJECTS

• Background

The 1976 Federal-Aid Act introduced the 3R/4R concept. The intent was to allow each state to make geometric improvements for the enhancement of safety for the motoring public. Each state could develop its own geometric standards. Oregon adopted 3R Geometric Design Criteria in April 1988 and modified them in 1998. Reconstruction (4R) projects are not covered by these criteria. ODOT standards for new construction will apply to ODOT 4R and most aspects of Freeway 3-R projects.

The clear zone concept guides many design decisions. This concept was established in the *Guide for Selecting, Locating, and Designing Traffic Barriers 1977* (AASHTO Barrier Guide) and is continued in the *1996 AASHTO Roadside Design Guide.* The *"Functional Requirements of Highway Safety Features, Participants Notebook"* provides an excellent elaboration on this concept.

Proper designs on all projects should always consider the accident potential and history, and its relationship to the improvements proposed.

• Roadside Inventory

It is essential that all non-conforming roadside features on 3-R projects, as appropriate for the Safety Investment Program Category for that section, and 4-R projects be inventoried and formally considered during the survey and design phases of each project, regardless of the funding category. Those features found not in conformance with Oregon Geometric Design Standards and non-geometric design guidelines are to be evaluated and brought into conformance where it is reasonable and cost effective to do so.

• Inventory and Accident Analysis

On 3R/4R projects, an accident analysis shall be done early in the design phase to identify problem areas and to document the relative safety of the existing section. The accident analysis will be considered during the design phase to assure the problem areas are given full consideration.

On 3R/4R and New Construction projects, all of the existing nonconforming roadside features will be inventoried in accordance with Chapter One during the survey phase.

On 3R/4R and New Construction projects, consideration will be given to bringing nonconforming design features into conformance, where practical, in the design of the project. Design exceptions and letters of concurrence will be requested only for those cases where cost effective solutions are not available.

5.2 DESIGN EXCEPTION PROCESS

• General

Requests for exceptions to design standards shall be approved by the Region Project Delivery Manager (or equivalent) and submitted to the Roadway Engineering Manager, as the need is identified at any phase of the project, in order to obtain timely Roadway Engineering Manager and FHWA approvals, and/or referral to Project Delivery Leadership Team. Requests for design exceptions must be accompanied by justification documentation and should include mitigation. Processing of exceptions to design standards will be undertaken as soon as agreement is reached between the Region Project Delivery Manager and the Roadway Engineering Manager.

Requests for exceptions to design standards with justification and mitigation shall be submitted to the Roadway Engineering Manager for approval prior to incorporation of design features into project plans and/or other documents.

• **Procedures**

Responsibility	Type of Project	Step	Action
Region (Project Leader or other)	All (3R, 4R, New Construction)	1	Completes Project Prospectus including Design Standards, Design Speed, and need for exception(s). If assistance is needed, contact the Roadway Engineering Manager.
Roadway Engineering Manager	All	2	Reviews Project Prospectus Part 2 for Design Standards, Design Speed and need for exceptions. Compares such data to that contained in the Project Scoping Form, if available. If necessary, contacts Region for clarification. If Region and Roadway Engineering Manager are not in agreement, refers unresolved issues to the Project Delivery Leadership Team (PDLT) for resolution. **NOTE:** Other standards and exceptions shall be resolved during project survey and/or design phase.
Project Leader and Roadway Section Liaison/Designer	All	3	Prepares exception letter and supporting justification. Submits letter and supporting documentation to Region Project Delivery Manager for approval. Data should include the information given in the following table:

EXCEPTION JUSTIFICATION DATA

1) Summary of the proposed exception.

2) Project description/purpose

3) Affect on other standards.

4) Cost to build to standard.

5) Reasons (low benefit/cost, relocations, environmental impacts, etc.) for not attaining standard.

6) Compatibility with adjacent sections (route continuity).

7) Accident history and potential (specifically as it applies to the requested exception.)

8) Probable time before reconstruction of the section due to traffic increases or changed conditions.

9) Mitigation measures to be used.

Region Project	All	4	Reviews letter and supporting documentation, and approves if in

Delivery Manager			agreement that the design exception is justified. Forwards to Roadway Engineering Manager for final processing.
Transportation Design Manager (Roadway Team Leader)	All	5	Promptly reviews exception letters upon receipt in Roadway Engineering and consults with designer to assure that the letter accurately describes the conditions that warrant a design exception. Makes recommendation to Roadway Engineering Manager as to whether the exception(s) should be granted.
Roadway Engineering Manager	All	6	Reviews letter and recommendation from Transportation Design Manager. Approves letter if sufficiently justified. Issues that can not be resolved between the Region Project Delivery Manager and the Roadway Engineering Manager shall be referred to the Project Delivery Leadership Team for final resolution. On non-exempt Federal-Aid projects,, submits request to FHWA for exceptions on nonconforming geometric standards. NOTE: Design exceptions **formally obtained in writing** during the Environmental or Survey phases need not be requested again. A list of the design standards that must be considered in the exception process, depending on the type of project, can be found on the following two pages.
Roadway Engineering Manager	All	7	Receives FHWA approval for design exceptions and forwards copy to Region Project Delivery Manager and Project Leader. Maintains original in approved design exception file.

On all **New Construction, 4-R, and Freeway 3-R** projects, exceptions shall be approved by ODOT when the following geometric design elements do not meet or exceed the minimums given in the *ODOT Highway Design Manual*.

Additionally, it will be necessary to secure FHWA approval for non-exempt projects located on the National Highway System (NHS) when ODOT Standards are not met.

1) Design Speed
2) Lane Width
3) Shoulder Width
4) Bridge Width
5) Horizontal Alignment
6) Vertical Alignment
7) Grades
8) Stopping Sight Distance
9) Pavement Cross Slope
10) Superelevation
11) Vertical Clearance
12) Structural Capacity
13) ADA Standards
14) Spiral Lengths on Horizontal Curves with radius less than 2000 m
15) Superelevation Runoffs shall Match ODOT Spiral Length

Note: ODOT Standard for Design Speed & Vertical Clearance may in some cases be higher than the AASHTO values.

On all **3-R Non-Freeway** projects, exceptions must be approved by ODOT when the following geometric design elements do not meet or exceed the minimum 3-R or New Construction Standards (as appropriate) given in the *ODOT Highway Design Manual*.

1) Lane Width (3-R)
2) Shoulder Width (3-R)
3) Bridge Width (3-R)
4) Horizontal Alignment (3-R Criteria B)
5) Vertical Alignment (3-R)
6) Pavement Cross Slope (New Const.)
7) Superelevation (New Const.)
8) Vertical Clearance (3-R)
9) ADA Standards
10) Pavement Design Life (3-R)

5.3 ROADSIDE INVENTORY/ANALYSIS CONCURRENCE PROCESS

Responsibility	Type of	***Step***	VI.

	Project		VII. Action
Project Leader	3R/4R	1	Notifies Project Team, Region Traffic Operations Supervisor, Traffic Engineering, and Systems Planning that a traffic evaluation, accident analysis, and Roadside Inventory will be required.
Traffic Engineer	3R/4R	2	Initiates the Preliminary Traffic Evaluation. Prepares an accident history summary and analysis identifying highest accident locations. Transmits completed Pages 1 and 3 to Region.
Traffic Analysis Engineer	3R/4R	3	Completes Page 2 of worksheet and transmits it to the Region.
Region Traffic Operations Supervisor	3R/4R	4	Reviews and evaluates the data from Steps 2 & 3 and forwards, after the project scoping trip, recommendations along with completed preliminary Traffic Evaluation to the Project Leader responsible for the project.
Project Team	3R/4R	5	Inventories all appropriate roadside features within (3R) or just outside (4R) the r/w or clear zone that do not meet the appropriate Oregon geometric or non-geometric standards. This scope of the inventory will be set by the project scoping team and the work should normally be done concurrently with other field survey work. (See Appendix for roadside inventory forms and Section 4.1 for a list of references to these standards.)
Project Leader and Project Team	*3R/4R*	6	Considers designing into the project those improvements recommended by the Region Traffic Operations Supervisor. Reviews the accident analysis to determine if there are additional improvements that would enhance safety. The survey narrative should discuss the disposition of the Region Traffic Operations Supervisor's recommendations and any further safety improvements that are proposed to be included in the project design.
Region Traffic Operations Supervisor	3R/4R	7	Reviews and comments on the design proposals made by Project Team before detailed design work begins. Such comments shall be included in the project documentation.
Project Leader and Project Team (PT)	3R/4R	8	Determines those roadside features that can be eliminated or protected by practical design improvements. Lists those roadside features that are not eliminated or protected by the design and prepares data to justify a guideline variance. The justification data should discuss: 1) which roadside features are not in conformance; 2) impact on other design elements; 3) is anything being introduced that will mitigate the nonconforming features, and 4) accident history relative to the nonconforming features and anticipated future safety without correction. The list, justification data and roadside inventory on 3R/4R projects should be submitted as early in the project development process as possible in order to obtain necessary approvals early to

			minimize the risk of redesign.
Transportation Design Manager	3R/4R	9	Reviews the project design including the accident analysis, inventory and the list of suggested design guide variances that have not had prior approval. The design, variance list and roadside inventory on 3R/4R projects is accepted as submitted or appropriate revisions are made after discussions with the Project Leader. Forwards completed Roadside Inventory/Safety Analysis on 3R/4R projects to Roadway Designer.
Roadway Designer (Region or TSB)	3R/4R	10	Reviews all project data and prepares the project in its final form. For features remaining which do not meet the applicable guidelines, prepares request for concurrence in variances and submits along with justification data and inventory to the Roadway Engineering Manager.
Roadway Engineering Manager	3R/4R	11	After review and concurrence in the variances, returns copy to Designer, Project Leader, and Region Project Delivery Manager. Keeps original copy in permanent file in Roadway Engineering. On non-exempt NHS projects submits copies of completed Roadside Inventory and Variance Letters to FHWA with Preliminary Plans.

APPENDIX B

APPROVALS ON

CONVENTIONAL HIGHWAY PROJECTS

Approval Action	AGENCY RESPONSIBLE		
	NHS PROJECTS PS&E Approval By FHWA	NHS PROJECTS PS&E Approval By ODOT	Non-NHS PROJECTS
PROGRAMMING			
Verify project in STIP	FHWA	FHWA	FHWA
Verify eligibility for proposed funding category	FHWA	FHWA	FHWA
FINANCIAL MANAGEMENT			
Obligate funds	FHWA	FHWA	FHWA
Approve Vouchers	FHWA	FHWA	FHWA
Approve Federal-aid Project Agreement (PR-2) time extensions for initiating construction	FHWA	FHWA	FHWA
DESIGN			
Public interest finding with respect to airport-highway clearance (23 CFR 620.104)	FHWA (1)	ODOT	NA (5)
Approve exceptions to design standards [23 CFR 625.3 (f)]	FHWA (2)	ODOT (2)	NA (5)
Approve preliminary plans for major and unusual structures [23 USC 109(a)]	FHWA (3)	ODOT	NA (5)
Approve plans, specifications and estimates (23 CFR 630.205)	FHWA	ODOT	NA (5)
Authorize preliminary engineering work to proceed (23 CFR 630.114)	FHWA	FHWA	FHWA
Authorize advance consturction and conversions (23 CFR 630.703 & 709)	FHWA	FHWA	FHWA
Approve use of publicly owned equipment (23 CFR 635.106)	FHWA	ODOT	NA (5)
Approve use of proprietary products, processes (23 CFR 635.411)	FHWA	ODOT	NA (5)
Concur in use of publicity furnished materials (23 CFR 635.407)	FHWA	ODOT	NA (5)
Authorize utility or railroad force account work (23 CFR 645.113 & 646.216)	FHWA	FHWA	FHWA
Approve utility and railroad agreements (23 CFR 645.113 & 646.216)	FHWA (4)	ODOT	NA (5)
Approve use of consultants by utility companies [23 CFR 645.109 (b)]	FHWA (4)	FHWA (4)	NA (5)
Approve exceptions to maxium railroad protectve insurance limits (23 CFR 646.111)	FHWA (4)	FHWA (4)	NA (5)
Exempt bridge from Coast Guard permit requirements (23 CFR 650.805)	FHWA	FHWA	FHWA
Authorize advertising for bids (23 CFR 635.112)	FHWA	FHWA	FHWA
Approve hiring of consultant to serve in a “management” role [23 CFR 172.5 (a)]	FHWA	FHWA	FHWA
Approve consultant agreements (23 CFR 172.7 – 172.9)	ODOT	ODOT	ODOT
ENVIRONMENT			
All approval actions required by Federal law and regulations	FHWA	FHWA	FHWA
RIGHT-OF-WAY			
Authorize Right-of-Way activities (23 CFR 712.204)	FHWA	FHWA	FHWA
Accept Right-of-Way certificate as a condition of PS&E approval [23 CFR 635.309 (b)(c)]	FHWA	ODOT	ODOT
Approve Federal funded Hardship and Protective Buying [23 CFR 712.204(d)]	FHWA	FHWA	FHWA
CONSTRUCTION			
Approve cost effectiveness and emergency determinations for contracts awarded by other than competitive bidding (23 CFR 635.104 & 204)	FHWA	ODOT	ODOT
Approve construction engineering by local agency (23 CFR 635.105)	FHWA	ODOT	NA (5)
Approve advertising period less than three weeks (23 CFR 635.112)	FHWA	ODOT	NA (5)
Approve addenda during advertising period (23 CFR 635.112)	FHWA	ODOT	NA (5)
Concur in award of contract (23 CFR 635.114)	FHWA	ODOT	NA (5)
Concur in rejection of all bids (23 CFR 635.114)	FHWA	ODOT	NA (5)

Approve changes and extra work (23 CFR 635.120)	FHWA	ODOT	NA (5)
Approve contract time extensions (23 CFR .635)	FHWA	ODOT	NA (5)
Concur in use of mandatory borrow/disposal sites (23 CFR 635.407)	FHWA (1)	ODOT	NA (5)
Accept materials certification (23 CFR 637.207)	FHWA (1)	ODOT	NA (5)
Concur in settlement of contract claims (23 CFR 635.124)	FHWA	ODOT	NA (5)
Concur in termination of contracts (23 CFR 635.125)	FHWA	ODOT	NA (5)
Waive Buy American provisions (23 CFR 635.410)	FHWA	FHWA	FHWA
Final inspection/acceptance of completed work [23 USC 114(a) and 23 USC 121]	FHWA	ODOT	NA (5)
CIVIL RIGHTS			
All approval actions required by Federal laws and regulations	FHWA	FHWA	FHWA

Footnotes:

(1) FHWA approval will be based on abbreviated review procedures with subsequent validation using QI&A's or other methods.

(2) Exceptions for vertical clearance are subject to coordination with the Military Traffic Management Command for the rural Interstate system and the single urban routing of the Interstate system in urban areas. Coordination may be accomplished through the FHWA.

(3) Delegation of authority subject to FHWA Order 5520.1.

(4) Subject to change upon FHWA approval of alternate procedures.

(5) 23 USC 109(p) makes these specific Federal approval actions no longer applicable to non-NHS projects. Approvals, if any, will be those required by State laws, regulations, policies, and procedures. However, this does not relieve the ODOT from responsibility for these areas, nor from compliance with non-Title 23 Federal requirements which may remain applicable.