Stormwater-Related Amendments to the Zoning Code

Adopted Draft

Report and Amendments
Adopted by City Council

City of Portland Bureau of Planning
Environmental Planning Team

Adopted by City Council February 14, 2001
Amended by City Council February 28, 2001
Effective March 16, 2001

March 2, 2001

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Portland, Oregon
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INTRODUCTION

Introduction to City Council's Adopted Draft

On February 14, 2001, City Council adopted the amendments to the Zoning Code presented in this report by Ordinance #175341. An error was discovered in the adopted code language, so on February 28, 2001, City Council adopted Ordinance #XXXXXX, which corrected the error. Both ordinances are effective March 16, 2001. This report and the code commentary it contains were adopted as legislative intent.

Purpose

The first purpose of this project is to propose amendments to the Zoning Code that will encourage integrated stormwater management, site planning, and facility design.

In April 1999, the Portland City Council adopted amendments to Title 17.38, Drainage and Water Quality, that established the city's stormwater management policies and empowered the director of the Bureau of Environmental Services (BES) to implement the *Stormwater Management Manual.* The manual gives technical guidance to meeting the standards set by the new stormwater policies. It describes "Best Management Practices" to be used in controlling stormwater runoff rates and quality.

Regardless of the approach used to manage stormwater, one of the best strategies for facilitating stormwater management is to integrate stormwater management into site and facility design from the beginning of planning. In this way, costs can often be reduced and the effectiveness of stormwater control can be increased. Parking lots offer significant opportunities for improving stormwater management. This project contains proposals intended to encourage the integration of stormwater management facilities and parking lots and make it easier to achieve.

The second purpose of this project is to propose an amendment to the Zoning Code that will remove a conflict between the *Stormwater Management Manual* and regulations governing the Columbia South Shore Plan District.

Background

Scientific Background

Effects of Urbanization on Streams
A watershed can be defined as the area within which all precipitation that runs off flows to a given water body, whether that body is the ocean, a lake, a river, or a smaller feature. In its natural state, a watershed and its stream will develop slopes, vegetation, stream-channel characteristics, and a flow regime suited to the climate and geology of the area.

Urbanization results in the removal of vegetation, installation of impervious roofs and pavement, and installation of storm sewers to carry away stormwater. The proportion

of impervious surface in a watershed is well recognized as an indicator of the degree of urbanization in a watershed and predictor of stresses to watershed functions. These changes affect runoff rates and amounts and reduce water quality, alterations that in turn lead to other adverse effects on the receiving stream. Widely-recognized adverse effects include:

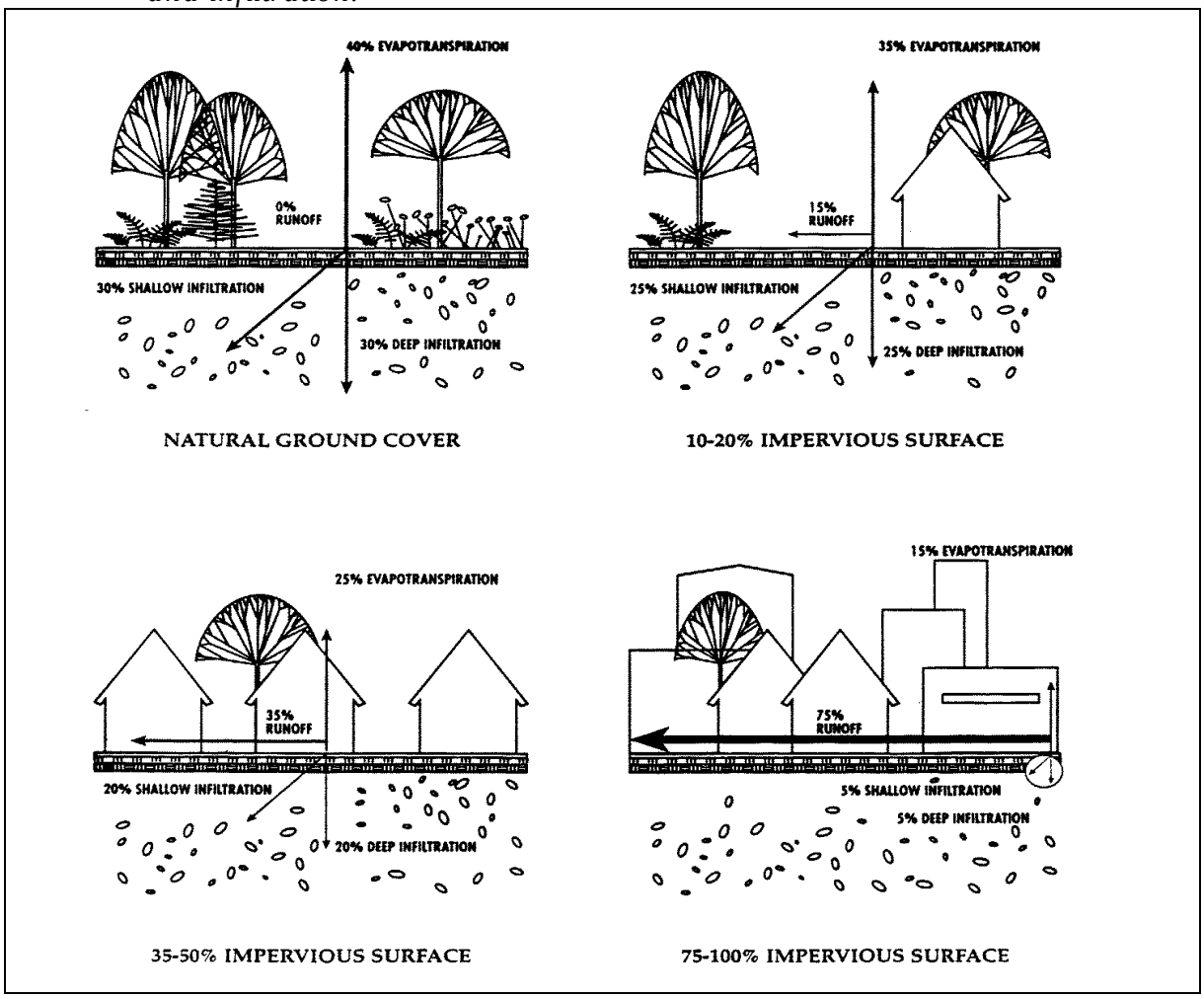
- Increased flooding.
- Changes in the amount and location of erosion and deposition of sediment.
- Instability of stream channels.
- Pollution of surface waters by nutrients, metals, petroleum hydrocarbons, pathogens, sediments, oxygen-demanding substances, and potential toxics
- Loss of riparian (streamside) habitat.
- Loss of in-stream biodiversity (variety of species).
- Increased stream temperatures.

The Relationship of Runoff to Rainfall

The water budget describes the fate of precipitation entering the watershed. Figure 1 graphically compares idealized water budgets for a typical watershed in a natural state and with increasing levels of impervious surface. Under natural conditions in the Pacific Northwest, a relatively small fraction of precipitation runs directly off and into a waterway. As the proportion of impervious surface grows, the proportion that runs off increases while evaporation, infiltration, and other elements of the water budget shrink.

Installation of impervious surface, building of storm sewers, and removal of vegetation reduces evaporation (water diffused into the air), transpiration (water taken up and diffused into the air by plants), and infiltration (water filtered through the ground). The net effect is to increase the amount of precipitation that runs off into streams. In addition, the increased runoff reaches streams or other water bodies more quickly and at a higher rate of flow.

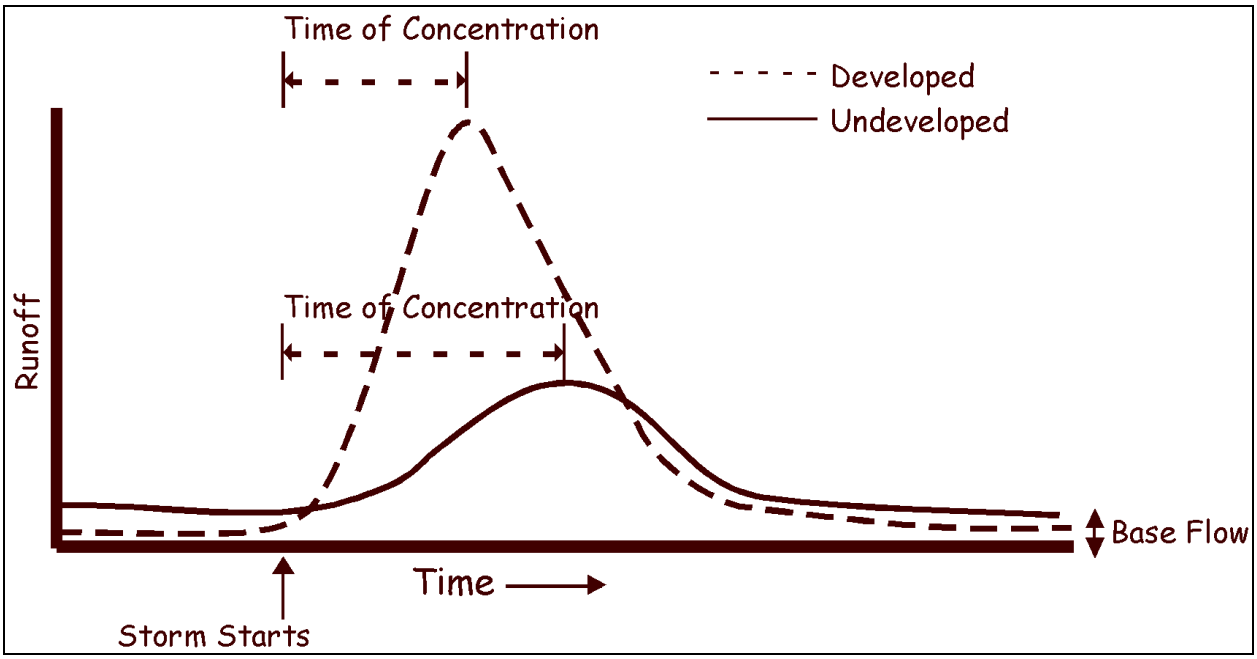
Figure 1. Effect of increasing impervious cover on runoff, evaporation, transpiration, and infiltration.



(From Cooperative Extension Center, 1994. *Impacts of Development on Waterways*; adapted from NEMO Project Fact Sheet #3. University of Connecticut, Hamden, CT.)

The hydrograph shows how streamflow changes in response to a storm. Figure 2 compares idealized hydrographs for developed and undeveloped watersheds responding to the same storm. In the developed watershed, the peak flow rate is reached more quickly: the watershed's "time of concentration" has become shorter. The peak rate is much higher, meaning that more water flows in the stream in response to a given amount of rain. Also, the steep slopes of the graph for the developed watershed show that it is more prone to flash floods. Finally, the "base flow," the flow that occurs without the stimulus of a storm or spring runoff, is lower in the developed watershed. This is because less water infiltrates, and infiltration supports year-round flow in perennial streams.

Figure 2. Idealized hydrographs for developed and undeveloped watersheds.



(Modified from Horner, R.R., J.J. Skupien, E.H. Livingston, and H.E. Shaver, 1994. Fundamentals of Urban Runoff Management: Technical and Institutional Issues. Terrene Institute in cooperation with U.S. Environmental Protection Agency. Washington, D.C.)

Regulatory Framework

Clean Water Act
Under the federal Clean Water Act, the City of Portland holds a National Pollutant Discharge Elimination System (NPDES) Municipal Separate Stormwater Sewer System Discharge permit. This NPDES permit imposes conditions to allow the city to discharge stormwater runoff into surface waters, such as rivers or streams. The permit requires the City to reduce pollutants in stormwater runoff through implementation of Best Management Practices (BMPs).

Portland's NPDES permit includes seven categories of BMPs. These BMP categories include a wide variety of measures ranging from educating the public through controlling illicit pollutant discharges to changing the city's planning and permitting processes. The *Stormwater Management Manual* was developed to help meet the intent of one of the BMP categories.

In 1996 BES convened a Stormwater Policy Advisory Committee (SPAC) in order to establish policies guiding the manual's provisions. The SPAC's recommendations were finalized in July 1997 and City Council accepted the committee's final report soon after. These recommendations formed the basis for the subsequent *Stormwater Management Manual* and stormwater policies adopted into Chapter 17.38 of the city code.

The city's stormwater policies based on the SPAC's recommendations and excerpted from their adopted form in Chapter 17.38 of the City Code are:

- Stormwater shall be managed as close as is practicable to development and significant redevelopment sites, and stormwater management shall avoid a net negative impact on nearby streams, wetlands, groundwater, and other water bodies. All permits related to water quality or quantity from local, state and federal environmental permit requirements shall be met before facilities are deemed complete. Surface water discharges from on-site facilities shall be conveyed via an approved drainage facility.
- The quality of stormwater leaving the site after development or significant redevelopment shall be equal to or better than the quality of stormwater leaving the site before development, as much as is practicable, based on the following criteria: (criteria listed in Chapter 17.38).
- The quantity of stormwater leaving the site after development or significant redevelopment shall be equal to or less than the quantity of stormwater leaving the site before development, as much as is practicable, based on the following criteria: (criteria listed in Chapter 17.38).

The Bureau of Planning participated in the SPAC and the development of the *Stormwater Management Manual.* In addition, the bureau participates on the BES-led committee seeking renewal of the city's NPDES permit. This project – proposing amendments to Title 33 – is intended to facilitate implementation of BMPs that will help the city comply with the terms of its NPDES permit.

"Water Quality Limited" Streams
Under the 1972 Federal Clean Water Act, Section 303(d) requires each state to identify waters that do not meet the state's water quality standards. Oregon's Department of

Environmental Quality (DEQ) reports "water-quality limited" water bodies on the "303(d) list" for each water quality standard exceeded. When a stream is listed as water quality limited, DEQ is required to calculate limits for the amount of the pollutant of concern that can be discharged to the stream. Such a limit is called a Total Maximum Daily Load, or TMDL. When a TMDL is established, controls on the pollutants of concern become enforced more strictly.

Most streams in Portland are 303(d) listed as water-quality limited for one or more standards (Table 1). All of the water quality limited streams are listed for temperature. Many streams in the Portland area are currently being considered for 303(d) listings for additional parameters. Stormwater runoff is a significant contributor to pollution in surface waters, so good stormwater management is critical for improving water quality in the area's streams. The proposals presented by this project will help improve the water quality of parking-lot runoff.

Table 1. Section 303(d) water-quality listed streams in Portland.

River or Stream Name	Standards Exceeded
Columbia Slough	Toxics, bacteria, nutrients, pH, dissolved oxygen, chlorophyll a, temperature.
Fanno Creek	Toxics, bacteria, dissolved oxygen, chlorophyll a, temperature.
Johnson Creek	Toxics, bacteria, temperature.
Tryon Creek	Temperature.
Willamette River (below Willamette Falls)	Toxics, bacteria, temperature.

Endangered Species Act

In March 1998, the National Marine Fisheries Service (NMFS) listed the Lower Columbia River Evolutionarily Significant Unit of steelhead as threatened. The area covered by this listing includes the Portland metropolitan region. Chinook and chum salmon found in the Portland area have since been listed as threatened as well, and cutthroat trout are proposed for listing as threatened. The federal government establishes protection of threatened species by prohibiting their "take."

Any activity that harms a listed species may be regarded as take, including habitat modification or degradation. A jurisdiction that conducts or permits activities leading to habitat modification or degradation that kills, injures, or significantly impairs the essential behavior of a threatened species may be liable for the take of that species. The City of Portland engages in many activities that could cause a take of steelhead, such as road and sewer construction, utility maintenance activities, and drinking water distribution. In addition, the city issues permits for development that could, in turn, cause a take of steelhead. The City's stormwater management program and

activities under the NPDES stormwater permit clearly have the potential to affect species protected by the Endangered Species Act.

The Endangered Species Act allows NMFS to determine that a program – such as the City's stormwater management program under its NPDES stormwater permit – is conducted in a manner adequately protective of threatened species. After a program or project is deemed to be adequately protective of threatened fish, activities conducted in accordance with the program are also regarded by NMFS as adequately protective.

The ESA listing of steelhead has increased the importance of taking steps to improve the management of stormwater runoff. In order for NMFS to find Portland's NPDES permit activities adequately protective, the city will have to show that it is diligently managing stormwater to protect the listed fish species. The proposals presented in the project are a small but significant step toward improving stormwater management and helping to protect threatened fish species in Portland.

Managing Stormwater Flow and Quality

Stormwater Best Management Practices (BMPs)
A wide variety of Stormwater BMPs can be used for stormwater management, ranging from public education to engineered facilities. For example, the City's NPDES permit lists seven categories of BMPs, ranging from controlling illicit discharges to establishing new development standards.

Many specific BMPs are structures or techniques that directly affect runoff rates and quality from developed areas, bringing them closer to their pre-development states. For clarity, these specific kinds of actions will be referred to in this section as "Stormwater BMPs." This kind of Stormwater BMP often works by re-creating or reproducing the effects of water-budget elements that have been damaged by urbanization.

- *Interception, evaporation, transpiration.* Where vegetation has been removed, these factors are affected. In general, where there is more vegetation, the larger these elements of the water budget become. Vegetation intercepts precipitation before it reaches the ground and allows it to evaporate. Vegetation also transpires or consumes water that has infiltrated, and water evaporates from soil, pavement, and other surfaces. Stormwater BMPs to improve these factors include eco-roofs (lightweight rooftop gardens), vegetation plantings (especially trees), and infiltration strips.

- *Infiltration.* Impervious surface has the most obvious and direct effect on this part of the water budget. The permeability of underlying soil is the most important natural factor here. Measures can be taken to enhance soil permeability, including excavation and replacement sand or gravel. Vegetation is important in enhancing infiltration because roots serve to penetrate and loosen soil. Infiltration strips, vegetation plantings, dry wells, and similar BMPs are used to enhance infiltration.

- *Shading.* Impervious surfaces tend to retain solar energy and heat up. When precipitation lands on them, it is warmed, and this warmed runoff enters streams. Steelhead and salmon require cold water to thrive. Elevated water temperatures can prevent spawning and even directly kill salmonids, so temperature control is very important. Again, vegetation provides shade, which in turn decreases the temperature of runoff. Tree canopy is especially important here.

- *Filtering.* Impervious surfaces and storm sewers provide no filtering of sediment, which is itself a water-quality problem. In addition, toxic substances may be attached to sediment particles, so filtering or settling sediment out of storm water is important for improving water quality. Natural filtering is done by soils as water infiltrates and by plants – grasses are particularly effective – as water flows past and around them on the ground surface. Sand filters, filter strips, grassy swales, and engineered filtering devices that are installed at drains are examples of BMPs used for filtering. Settling ponds, oil-water separators, and grassy swales also remove sediment by slowing water flow and allowing particles to settle.

- *Detention.* Detention refers to all methods of slowing the flow of runoff. Stormwater ponds, wetlands, cisterns, and variations on them are among the most common methods used. These methods focus on collecting runoff and then releasing it slowly. During this process water quality is often improved by settling, filtering, and processing by micro-organisms and plants. Many other methods are not considered "detention" BMPs, but they contribute to detention simply by hindering flow. Such methods include grassy swales, filter strips, eco-roofs and landscaping.

Approaches Considered

This project has two purposes: to encourage integrated stormwater management, site planning, and facility design, and to remove a conflict between the Zoning Code and the *Stormwater Management Manual.* The adopted Zoning Code amendments fall into two categories:

- Parking Lot Concepts. Pavement is one of the two principal sources of impervious surface. The Zoning Code regulates the layout and landscaping of parking lots, which create much of the pavement placed on private property. This project adopts amendments to increase the amount of interior landscaping required in parking lots, change the dimensions of parking spaces and aisles to allow the increased landscaping, and require plantings in accordance with the *Stormwater Management Manual.*
- Housekeeping Amendment. This project removes an inconsistency between Chapter 33.515 of the Zoning Code, which regulates the Columbia South Shore Plan District, and the *Stormwater Management Manual.* The proposal is described below.

Rooftops are the other principal source of impervious surface. The Zoning Code does not directly regulate the form of roofs, but can influence rooftop construction by providing incentives. Zoning Code bonuses for stormwater management are not adopted at this time for reasons described below.

Parking Lot Concepts

Purpose of These Amendments

These amendments are intended to promote the integration of stormwater management facilities into parking-lot layout, to improve the appearance of parking, and to reduce the effective cost of providing stormwater management and aesthetic benefits in parking lots.

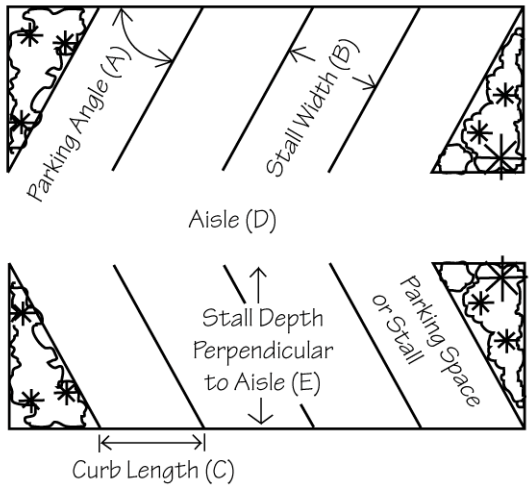
The adopted code amendments will:

- require interior landscaped areas sufficiently large to provide on-site stormwater management;
- require improved planting of interior landscaped areas;
- require improved shading of parking areas; and
- maintain vehicle parking capacity by reducing minimum required sizes for parking spaces and aisles

Terminology

The parking space or stall is the area designed to provide standing area for a motor vehicle. The "aisle" is the driving and maneuvering area in the parking area itself; that is, the driving area between or next to stalls. The "driveway" provides vehicular access to a site, for example by connecting the parking lot with a street. The "vehicle area" includes all the area on a site where vehicles may circulate or park, such as stalls, aisles, driveways, drive-through lanes, and loading areas. Parking space and aisle dimensions as used in Title 33 are illustrated by Figure 266-3.

Figure 266-3
Parking Dimension Factors



Parking Lot Issues

The standard parking lot geometry being used in cities across the U.S. today was developed in the 1960s and 1970s, when average car sizes were substantially larger than they are today. Some of the principal factors in developing conventional parking designs are traffic circulation, ease of maneuvering, and safety for pedestrians and

drivers. The wide aisles and stalls of conventional design are very convenient and provide plenty of maneuvering space most of the time. Several reasons have recently been recognized for making changes to parking lot geometry:

- Portland's NPDES stormwater permit requires the city to develop and implement BMPs to improve the quality and control the rate of stormwater runoff.
- Through its NPDES permit, the City has committed to reviewing the Zoning Code for changes that will improve and facilitate stormwater management.
- The recent ESA listing of steelhead trout and chinook salmon and the proposed listings of other fish have elevated the importance of good stormwater management. It may soon be necessary for most development proposals in Portland to take steps specifically to protect fish from harm.
- Parking lots contribute significantly to stormwater runoff. Stormwater runoff poses an obvious potential for harm to fish.
- Runoff from parking lots contributes to Combined Sewer Overflows, which the City is working to reduce.
- Studies by the Bureau of Environmental Services indicate that integrating stormwater management with site design as recommended will reduce construction costs of drainage facilities for parking lots.

The time appears ripe for reconsidering surface parking lot geometry.

Recommended Parking Lot Concepts

Parking lot landscaping provides multiple benefits. An attractively landscaped parking lot invites use and contributes to a pleasant pedestrian experience for both users and passersby. Landscaping – particularly trees – can also reduce air temperature, reduce stormwater runoff and temperature, and improve air quality.

This report proposes that 10 percent of all parking and loading areas be devoted to interior landscaping, an increase from current requirements. In addition, interior landscaping needs to meet minimum size and planting requirements. To make it possible to fit the same number of parking spaces into the same space, the minimum size of parking spaces and minimum aisle widths are to be reduced. Landscaped areas meeting the layout standards will be large enough to provide on-site stormwater management using several possible facility designs.

Until these amendments take effect, the Zoning Code requires that either 20 square feet of interior landscaping be provided per parking space or that one tree be provided for every four spaces. Circumstances and lot layouts vary too much to allow direct comparison between the percentage of space required under existing and recommended interior landscaping requirements. In practice, many developers choose to plant a tree for every four spaces. This can minimize the amount of unpaved land in a parking lot.

With the adoption of the city's stormwater policies and the implementation of the *Stormwater Management Manual,* stormwater from new and redeveloped parking lots must be managed to produce stormwater runoff similar in quantity and quality to runoff from the same property in an undeveloped state. Under existing regulations, the developer of a parking lot can choose among many stormwater management methods. The adopted amendments, in parallel with proposed changes to the

Stormwater Management Manual, establish a preference for landscape treatment of stormwater runoff from parking lots.

Runoff from parking lots commonly is directed to a drain that leads to a trap, catch basin, or other device that removes oils and sediment. The water is then discharged to a storm sewer or to the city's combined storm and sanitary sewer system. In addition, discharge generally must pass through a device to control the rate of flow. These devices are usually underground and can be expensive. Parking lot landscaping today generally serves primarily aesthetic purposes.

Using landscaping to treat and manage stormwater has several important advantages over the usual underground systems:

- Landscaping cools the runoff. This has become increasingly important with local rivers and streams being listed by DEQ as "water-quality limited" for temperature.
- Pollutants are filtered and trapped in soils and broken down by micro-organisms. This provides adequate stormwater treatment in many cases and can entirely prevent such pollutants from entering the stormwater or combined sewer systems.
- Landscaping can increase evaporation, transpiration, and infiltration (even in low permeability soils), thus reducing the total amount of runoff from each storm.
- Construction costs for the landscape approach are less than for conventional underground systems.

Good examples of stormwater management landscaping integrated into parking lots exist at the Oregon Museum of Science and Industry and the BES Water Quality Control Laboratory in St. Johns.

Issues

Are Parking Lots a Significant Source of Stormwater Runoff?
According to a Metro study that measured parking lots using aerial photography, 2,092 acres, or about 3 ¼ square miles, of the urbanized areas inside Portland but outside the downtown area are devoted to surface commercial and industrial parking. This is about 2.5 percent of the city's area excluding downtown, rivers, lakes, and undeveloped islands. It is important to note that this measurement does not include parking devoted to multi-family residential uses, structured parking, truck parking, or storage lots. The actual proportion of land devoted to surface parking lots in Portland is therefore greater than reported.

The stormwater runoff from over 3 ¼ square miles of impervious surface is significant, and measures to control its flow rate and quality are justified.

How Much Interior Landscape Area Should Be Required?
This project proposes that 10 percent of all parking and loading areas be landscaped in addition to the perimeter landscaping already required for screening. "Parking and loading area" includes parking spaces, aisles, and loading areas, but excludes driveways, drive-through lanes, and fire lanes. All of this area is impervious and produces stormwater runoff that must be managed properly. Driveways are excepted because research showed that common driveway configurations make it difficult to provide space for 10% landscaped area in addition to the walkways and perimeter landscaping that are already required for these long, narrow features.

BMPs such as landscape swales, vegetative filters, stormwater planters, and landscape infiltration facilities all can fit in ten percent of a site and effectively handle the runoff generated by the precipitation events covered by Portland's *Stormwater Management Manual*. Some site-specific conditions may make 10 percent landscaping insufficient for stormwater management, but on most sites it would be more than enough. Any landscaped area not needed for adequate functioning of the stormwater facility will still provide the other benefits of landscaping, such as improved aesthetics, lower temperatures, and improved air quality.

Cities around the region and around the country define their landscaping requirements differently, so it's difficult to compare simple percentages directly. Table 2 (following page) summarizes parking lot interior landscaping requirements for various jurisdictions.

Although many of these requirements do not compare directly with an across-the-board percentage of vehicle area, all of them range upward from 5 or 6 percent. In the Portland area, where water quality and endangered species are important issues, there is additional justification for requiring more landscaping than the minimum needed for adequate aesthetics and other purposes.

Increased landscaping requirements will make it more difficult to develop sites with adequate parking unless the area devoted to impervious surfaces can be reduced. Although building footprints could be reduced, this would tend to make projects less profitable, or even uneconomical. It is simpler and more direct to shrink the space required for parking and maneuvering. This will minimize the cost of providing enhanced stormwater management and the other benefits of increased landscaping.

Should Stormwater Management Be Required in the Landscaped Areas?
It is a goal of this project to promote the integration of stormwater management facilities into parking lot designs. The 10 percent landscaping requirement provides sufficient space to manage stormwater runoff from parking lots in most circumstances.

In order to meet the City's obligations under the Combined Sewer Overflow project and the NPDES Stormwater permit it is necessary to minimize the amount of stormwater reaching sewers or storm sewers. Landscape infiltration and interception by vegetation are the chief means of reducing runoff. An additional benefit is that in many circumstances, landscape filtering and infiltration can provide removal of oil and grease and some other common runoff pollutants without additional treatment. Generally, the levels of oil and grease that run off parking lots can be managed by landscape-type stormwater facilities without damaging the vegetation.

On July 26, 2000, City Council adopted the recommendations of the Stormwater Advisory Committee, thus requiring that landscaped areas of parking lots generally be required to manage stormwater runoff. The ordinance established this requirement in Portland City Code Chapter 17.38, Drainage and Water Quality, with appropriate exceptions for difficult or unusual circumstances.

Table 2. Parking lot interior landscaping requirements for various jurisdictions.

City	Requirement	Notes
Portland (existing)	20 sq. ft. of interior landscaping per parking space (about 12% of a space); or one tree per 4 parking spaces.	One tree per 200 sq. ft. of landscape area if using the 20 sq. ft. per space standard.
Lake Oswego	15% to 20% of total lot area.	No specific requirement for interior landscaping of parking lots.
Gresham	10% of the parking and maneuvering area, including one tree per 9 parking spaces	Landscape strips must be at least 5 feet wide.
Beaverton	One landscape island the size of a parking space for every 12 parking spaces.	8.5% of parking spaces only; doesn't include aisles.
Oregon City	No specific requirements for parking lots.	At least 15% of total lot area must be landscaped.
Chicago, Illinois	Interior landscaping required for 5% of all vehicle areas for lots <4,500 sq. ft., 7.5 % for lots from 4,500 to 30,000 sq. ft., 10% of lots over 30,000 sq. ft.	Interior landscape required in addition to perimeter landscaping.
Minneapolis, Minnesota	At least 20 percent of building lot area, not including the building footprint, must be landscaped.	Not tied specifically to parking. Includes perimeter landscaping.
Oklahoma City, Oklahoma	At least six percent of the site must be landscaped in addition to buffers (perimeters).	Applies to entire site. Has requirements for trees and dispersal of landscaping in parking lot.

How Will the Adopted Amendments Affect Costs?

Because site-by-site circumstances vary, it is not possible to determine the effect of the adopted requirements on costs in all situations. Some cost factors include:

- Engineering and design costs. Developing a parking lot with integrated stormwater management facilities in the landscaping will usually require the services of a registered engineer and perhaps a landscape architect. Care must be taken in design to avoid erosion damage to pavement, grading, and landscaping, and water infiltration under the pavement. Even so, the cost differential may be small. Under the new *Stormwater Management Manual*, an engineer's services are likely to be required to design stormwater management facilities in all parking lots, whatever kind of facilities are used.
- Construction and materials. Whatever stormwater management approach is used, parking lots have to be graded and paved, so this part of the construction cost remains about the same – although landscape swales may add to the cost of grading. Integrated designs often result in lower materials costs because less paving and less formed concrete curb are required, and plant materials are generally much less expensive than asphalt and concrete. In some cases, parking lot landscaping may do away with the need for piped stormwater systems, or even a connection to a storm sewer, resulting in considerable savings.
- Maintenance. Pavement is generally viewed as much less expensive to maintain than landscaping, but if the landscaping manages stormwater runoff, it is more pertinent to compare landscaping to conventional underground piped systems. Depending on the design, landscaping may require weeding, watering, and trash removal. Parking lots conventionally have underground stormwater management facilities, and these facilities also require regular maintenance, such as removing silt, oil, grease, and debris. Although some believe that if water infiltrates around the pavement edges into the base material it will cause weakening and damage of the pavement, research was unable to uncover any documented instances of this.
- Loss of space for parking. In most situations, the adopted standards will allow the same number of parking spaces plus the required landscaping to fit onto less space than under the current standards. The adopted standards will cause parking spaces to be lost in two identified situations. First, some zones allow all parking spaces to be "compact," and because the new minimum parking space is larger than the compact space, the new landscape requirement could result in a loss of parking spaces. Second, parking lots smaller than 3000 square feet will have difficulty providing space for the required landscaping, and are exempted from the new regulations.

How Big Should Parking Spaces Be?
The standard parking space (90 degree angle to curb) in almost all jurisdictions researched is 8½ to 9 feet wide and 19 to 21 feet long (parallel parking spaces are somewhat longer). This size was developed in the 1960s and early 1970s as a national standard based on cars in wide use at the time. Standard parking space size reflects the fact that average car size reached a peak during those years. Since then, the average car size has diminished. Where 18-foot long cars were once common, most cars now are 16 feet long or less. Cars and light trucks are typically seven feet wide or less.

As car sizes shrank, "compact" stalls were introduced, which partly compensated for the fact that less space was needed to park the same number of vehicles. A common complaint with compact stalls is that people do not restrict their parking to appropriately-sized stalls (Figure 3). Large vehicles take small spaces and small vehicles take large ones. Sometimes a large vehicle will occupy two compact spaces, frustrating other drivers if parking spaces are scarce.

Stall width and length are both important for maneuvering. When a car is backing out of a stall that is too narrow, the driver cannot begin turning until almost completely out. Pulling into narrow stalls is also difficult, requiring the driver to swing wide before turning in. Adequate maneuvering space for narrow stalls requires a wide aisle to back into. If stalls are kept relatively wide, the need for additional aisle space is reduced.

Figure 3. Full-size truck occupying compact parking space. This truck was parked in the row farthest from the building entrance, a strategy that gives the driver more room to maneuver the vehicle and get into and out of it once it is parked.

This adopted amendments set the standard parking space at 8½ feet wide by 16 feet long, as compared to the previous standard of 9 feet wide by 19 feet long. The width will allow relative ease of entering and leaving the space. The length will allow most cars to pull entirely into the stall, but a significant fraction will overhang from a few inches to as much as two feet.

How Wide Do Aisles Need To Be?

The previous standard two-way aisle width for 90-degree angle parking was 24 feet in Portland's Zoning Code and in most jurisdictions researched. This is a little wider than three typical cars or light trucks. This width allows virtually all vehicles to pull into or out of any standard parking space in a single motion. Even the largest cars can pull out of a space and come parallel to traffic movement in a single motion. This width also gives ample room for pedestrians to walk while allowing cars to pass in opposite directions simultaneously. For these reasons, there has been little reason to consider narrowing the standard two-way aisle in the past.

Figure 4. In this parking lot with 19-foot deep parking spaces and 24-foot wide aisles, most cars do not fill the parking spaces, as shown by the alignment of cars parked on the left side of the picture. Unfilled parking spaces add to the effective width of the aisle for maneuvering, though the painted striping defines the driving area.

Portland's need to improve stormwater runoff management and respond to the needs of threatened fish makes it worth trading some of this convenience for an improvement in the environment.

The City's experience with "skinny streets" shows that narrower driving aisles are workable. Skinny streets serve many of Portland's older neighborhoods, and the city requires most newly constructed residential streets to be "skinny." Skinny streets are 20 feet wide with parking on one side or 26 feet wide with parking on both sides. Both streets have an effective travel lane of about 12 feet. There is enough room for residents to maneuver into and out of their driveways, although if a car is parked opposite the driveway, it may require a three-point maneuver rather than a single motion. Skinny streets' stormwater runoff benefits are well recognized. In addition, these streets are known to lower construction costs and encourage traffic safety by causing drivers to slow down.

The effective width of the driving aisles is affected by the size of vehicles using the parking spaces. Some larger cars and light trucks will overhang their parking stalls into the aisles by amounts ranging from a few inches to as much as two feet. This overhang will reduce the effective width of the driving aisle. On the other hand, some of the vehicles in the lot will not completely fill their parking spaces, leaving extra aisle width. Because over-size vehicles are only a fraction of all vehicles in a parking lot, the overhang will not interfere with the maneuvering of most parking lot patrons – but some drivers will be inconvenienced. The adopted parking lot standards will require some drivers to perform three-point maneuvers to pull into and out of parking stalls.

Figure 5. This parking lot has parking spaces 16 feet long by 8 ½ feet wide, and 24-foot-wide aisles. Only one car in this row extends into the aisle (the white car in the background). These spaces do not overhang landscaping, so this picture shows how cars will fit into a 16-foot deep parking space.

Staff did not find recent data on the sizes of cars on the road. To estimate the proportions of large, medium, and small cars using surface parking in Portland, city staff conducted a survey. The intent of the survey was not to establish a valid statistical sampling: car sizes were estimated, not measured, and sample locations were selected partly based on convenience. Nevertheless, the results give some idea of parking lot use. Three categories were created.

- Compact. Cars around 15 feet long or less, like the Honda Civic or Toyota RAV4.
- Mid-size. Cars from about 15 feet to 16 ½ feet long, like the Toyota Camry or Ford Taurus. This category includes most small pickups, most SUVs (for example, the Jeep Cherokee), and standard vans (like the Dodge Caravan).
- Large. Full-size pickups and vans, smaller pickups with expanded cabs, full size cars, and large SUVs, like the Chevrolet Suburban.

Figure 6. In the same parking lot shown in Figure 5, some rows overhang landscaping, making the spaces an effective 18 feet deep. The black car in the foreground is "full size," while the white SUV behind it is "mid-size," according to the parking-lot survey conducted for this report.

Table 3 gives the results of the survey. It shows that up to a third of the cars in some lots may be full size, but that as few as one in ten are full size in others. Obvious factors affecting the outcome are the use served by the parking lot and the part of town the parking lot is located. The adopted parking space and aisle standards are minimums. Where a developer or owner knows that customers will be using larger

vehicles – as at a hardware or lumber store patronized by contractors – it may make sense to use stall and aisle sizes above the minimum.

Table 3. Car sizes in Portland parking lots. The survey was conducted between 9 AM and noon on September 16, 1999.

Location Information	Compact	Mid-size	Large
Jantzen Beach Home Depot Retail use; 157 vehicles total	22%	42%	36%
Jantzen Beach Safeway Retail use; 118 vehicles total	19%	52%	30%
Lloyd Center Tower Office use; 99 vehicles total	13%	70%	17%
Lloyd Center, across from Port Building Office use; 76 vehicles total	14%	71%	14%
Lloyd Mall, northeast end retail use; 182 vehicles total	20%	59%	21%
Hillsdale Shopping Center Retail use; 82 vehicles total	15%	73%	12%
Watertower at John's Landing Retail use; 93 vehicles total	10%	77%	13%

Balancing Competing Concerns

Certainly, smaller parking spaces and narrower aisles in parking lots will be somewhat less convenient. Some drivers will likely find the new sizes disconcerting. Others may be annoyed when having to perform a three-point maneuver to back out of a parking space. The experience with skinny streets suggests, though, that safety will not be compromised. Drivers will slow down in parking lots in response to tighter spaces.

The needs of threatened fish and the requirements of the Clean Water Act make this a good time to trade some convenience for environmental benefits. As part of this tradeoff, the public will benefit from improved aesthetics, better air quality, and reduced "urban heat island" effects from solar heating of impervious surfaces. Another tradeoff will be to provide the space required for additional landscaping and stormwater management by reducing the amount of pavement needed to provide the required parking spaces. As a result, costs for many projects will be less because construction costs for pavement, curbing, and structural devices are generally higher than for landscaping.

"Housekeeping" Amendment

Purpose of This Amendment
This amendment is intended to remove an inconsistency between the Zoning Code and the *Stormwater Management Manual.*

Adopted Concept
When the city's stormwater policies were adopted and the *Stormwater Management Manual* was implemented, a conflict was created with a provision in Chapter 33.515 of the Zoning Code dealing with disposal of stormwater runoff in the Columbia South Shore Plan District.

The Zoning Code prohibits on-site stormwater disposal in the Columbia South Shore Plan District while the adopted stormwater policy and manual require it. The Bureau of Water Works is responsible for protecting the groundwater production wells in the Columbia South Shore area. Existing practice is for the Bureau of Water Works to review development proposals involving on-site disposal of stormwater.

Bureau of Water Works and BES staff agree that certain on-site infiltration systems for stormwater are satisfactory. The adopted amendment removes this prohibition to allow on-site stormwater disposal into BES-approved systems.

Rooftop Concepts

Eco-roofs are lightweight roof systems supporting a few inches of soil and small plants. Roof gardens differ in being heavy roofs, usually with a foot or more of soil supporting large plants, shrubs, or trees, either directly on the roof or in planters. Eco-roofs are widely used in Europe, but have not yet been commonly accepted in the U.S. The Bureau of Environmental Services is actively researching the use of eco-roofs through demonstration projects to help quantify the stormwater management benefits, costs, and maintenance characteristics. This research is intended to promote the use of eco-roofs in Portland.

Eco-roofs can be an economical and effective stormwater management technique. In areas where rooftops or pavement cover a high percentage of the land, there is little land left for controlling stormwater runoff in the landscape. Particularly in such circumstances, eco-roofs can make substantial improvements in stormwater runoff quality and quantity. Eco-roofs are expected to become an important element in meeting the City's stormwater management obligations

This project considered offering incentives through the Zoning Code to encourage the use of eco-roofs and rooftop gardens. Both of these BMPs provide substantial stormwater management benefits by slowing runoff and increasing interception, evaporation, and transpiration. Eco-roofs and rooftop gardens help maintain lower stormwater runoff temperatures. There are also aesthetic, air quality, and ambient temperature benefits from eco-roofs and rooftop gardens.

The Zoning Code contains a variety of bonus incentives to encourage developers to provide features that support City policies. These bonuses commonly take the form of additional density, height, or floor-area ratio (FAR), or a combination of them. The FAR is the ratio of the amount of floor area to the amount of site area. All of the bonuses available through the Zoning Code affect the appearance of the built environment by changing the size and mass of buildings, or the amount and character of landscaping.

Although eco-roofs and rooftop gardens are a good idea, the question of where they should be encouraged through incentives is complex. In some circumstances or areas, it may even make sense to require eco-roofs; for example, where soil contamination can make stormwater infiltration inadvisable, or where commercial or industrial areas adjoin environmental zones. However, some higher-density areas abut residential neighborhoods where people are sensitive about the height and bulk of nearby buildings.

The Central City Plan District currently contains a bonus provision for rooftop gardens. Because of the importance of improving stormwater management in the downtown core to meet the City's obligations under the Combined Sewer Overflow Project and NPDES permit, this bonus provision is being revised and updated as part of the North Macadam project.

Because of the obvious benefits of eco-roofs and rooftop gardens – particularly in contaminated areas or industrial areas with high levels of imperviousness – we strongly encourage the City to investigate incentives for builders to incorporate eco-

roofs into their designs. Incentives could include rates, zoning code bonuses, or other benefits. Zoning incentives should be explored in the context of a more comprehensive examination of the city's current bonus incentive system and multiple, and sometimes competing, objectives.

ADOPTED AMENDMENTS TO TITLE 33, PLANNING AND ZONING

FOR

PARKING LOTS

33.248 LANDSCAPING AND SCREENING

Chapter 33.248.010 Purpose

Recognize stormwater management as a purpose for landscaping requirements.

CHAPTER 33.248
LANDSCAPING AND SCREENING

(Amended by: Ord. No. 165594, effective 7/8/92; Ord No. 166572, effective 6/25/93; Ord. No. 173533, effective 7/31/99.)

Sections:

33.248 010 Purpose
33.248.020 Landscaping and Screening Standards
33.248.030 Plant Materials
33.248.040 Installation and Maintenance
33.248.050 Landscaped Areas on Corner Lots
33.248.060 Landscape Plans
33.248.065 Tree Preservation Plans
33.248.068 Tree Protection Requirements
33.248.070 Completion of Landscaping
33.248.080 Street Trees
33.248.090 Mitigation and Restoration Plantings

33.248.010 Purpose

The City recognizes the aesthetic, ecological, and economic value of landscaping and requires its use to:

- Preserve and enhance Portland's urban forest;
- Promote the reestablishment of vegetation in urban areas for aesthetic, health, and urban wildlife reasons;
- Reduce stormwater runoff pollution, temperature, and rate and volume of flow;
- Establish and enhance a pleasant visual character which recognizes aesthetics and safety issues;
- Promote compatibility between land uses by reducing the visual, noise, and lighting impacts of specific development on users of the site and abutting uses;
- Unify development, and enhance and define public and private spaces;
- Promote the retention and use of existing vegetation;
- Aid in energy conservation by providing shade from the sun and shelter from the wind;
- Restore natural communities through re-establishment of native plants; and
- Mitigate for loss of natural resource values.

33.248.030 Plant Materials

A. Ground cover. The adopted requirements give clear guidance on ground cover planting in all circumstances. The adopted spacing will allow ground cover plants to grow together, avoiding large expanses of exposed mulch.

B. Shrubs. The existing requirements for shrubs have been moved to this paragraph.

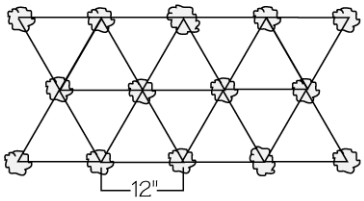
33.248.030 Plant Materials

A. ~~Shrubs and g~~ Ground cover.

1. Ground cover required. All of the landscaped area that is not planted with trees and shrubs must be planted in ground cover plants, which may include grasses. Mulch (as a ground cover) must be confined to areas underneath plants and is not a substitute for ground cover plants.

2. Size and spacing. Ground cover plants other than grasses must be at least the four-inch pot size. Area planted in ground cover plants other than grass seed or sod must be planted at a rate of one plant per 12 inches on center, in triangular spacing (see Figure 248-8).

Figure 248-8
Ground Cover Planting on Twelve-Inch Centers



B. Shrubs. All ~~required ground cover plants and~~ shrubs must be of sufficient size and number to meet the required standards within 3 years of planting.

C. ~~B.~~ Trees. (No change)

D ~~C.~~ Plant material choices. (No change)

E ~~D.~~ Exceeding standards. (No change)

F ~~E.~~ Complying with the standards. (No change)

33.248.040 Installation and Maintenance

E. Topping or pollarding of trees in required landscaping is prohibited.

City Council received testimony that topping of trees (including the practice of pollarding) should be prohibited.

To best meet the objectives of required landscaping (such as parking lot or perimeter landscaping), trees should be allowed to grow in their natural form. Topping prevents this. Pollarding is an aesthetic style and trees will live if it is performed correctly, but topping usually damages or kills trees. In any case, pollarded or topped trees do not meet the stormwater management or shade objectives of required landscaping.

The prohibition on topping does not apply to pruning for safety, for the health of the tree, or to avoid overhead utilities.

Smaller trees that are topped must be replaced, while larger trees must be restored to health through a five-year pruning program carried out by a certified arborist.

33.248.040 Installation and Maintenance

A. Installation. (No change).

B. Maintenance. (No change).

C. Irrigation. (No change).

D. Protection. (No change).

E. Topping prohibited. Topping of trees required by this Title is prohibited, required trees must be allowed to grow in their natural form. This prohibition does not apply to pruning performed to remove a safety hazard, to remove dead or diseased material, or to avoid overhead utilities.

If a tree smaller than 8 inches in diameter is topped, it must be replaced in kind. If a tree 8 inches or larger in diameter is topped, the owner must have a certified arborist develop and carry out a 5-year pruning schedule.

33.266 PARKING AND LOADING

33.266.130 Development Standards for All Other Uses

A. Purpose. Add stormwater management as a purpose of parking lot development standards.

CHAPTER 33.266
PARKING AND LOADING

Sections:

33.266.010 Introduction
Motor Vehicle Parking
33.266.100 General Regulations
33.266.110 Required Parking Spaces
33.266.120 Development Standards for Residential Uses with One or Two Units
33.266.130 Development Standards for All Other Uses
33.266.140 Stacked Parking Areas
33.266.150 Vehicles in Residential Zones
Bicycle Parking
33.266.200 Purpose
33.266.210 Required Bicycle Parking
33.266.220 Bicycle Parking Standards
Loading
33.266.300 Purpose
33.266.310 Loading Standards

33.266.130 Development Standards for All Other Uses

A. Purpose. The development standards promote vehicle areas which are safe and attractive for motorists and pedestrians. Vehicle area locations are restricted in some zones to promote the desired character of those zones. Together with the transit street building setback standards in the base zone chapters, the vehicle area restrictions for sites on transit streets and in pedestrian districts:

- Provide a pedestrian access that is protected from auto traffic; and
- Create an environment that is inviting to pedestrians and transit users.

The parking area layout standards are intended to promote safe circulation within the parking area, <u>provide for the effective management of stormwater runoff from vehicle areas,</u> and ~~to~~ provide for convenient entry and exit of vehicles. The setback and landscaping standards:

- Improve and soften the appearance of parking areas;
- Reduce the visual impact of parking areas from sidewalks, streets, and especially from adjacent residential zones;
- Direct traffic in parking areas;
- Shade and cool parking areas; ~~and~~
- <u>Reduce the amount and rate of stormwater runoff from vehicle areas;</u>
- <u>Reduce pollution and temperature of stormwater runoff from vehicle areas; and</u>
- Decrease airborne and waterborne pollution.

B. Where these standards apply. [No change]

C. On-site locations of vehicle areas. [No change]

D. Improvements

3. Protective curbs around landscaping. Where stormwater is intended to run off the parking area into a landscaped area, the curbs must be discontinuous (as with tire stops) or perforated. Where landscaping is at higher grade than the parking area, the curbs must be continuous to prevent soil or other material from washing off the landscaped area onto the vehicle area. This language permits curbs to be continuous or discontinuous as is appropriate to the situation. In response to testimony received by City Council, the adopted language clarifies that tire stops may only be used at the front of parking spaces.

   The proposed draft included a provision to require parking lot landscaping to be at lower grade than the adjacent paved parking areas. The Planning Commission recommended against this provision, and City Council agreed.

   The provision to require landscaping at lower grade was dropped principally because of the argument that it would create excessive complications for nonconforming development. Parking lot landscaping is on the list of nonconforming development that must be upgraded when new improvements or alterations are proposed at a site. If parking lot landscaping must be at lower grade than adjacent parking areas, then the nonconforming development rules will require removal of existing landscaping and re-grading of the landscaped area in some circumstances, even though this will not necessarily make landscaped areas into functioning stormwater facilities. In addition, mature landscape plantings – which have stormwater benefits – might need to be removed to achieve the re-grading. Such a requirement would incur significant costs without creating significant stormwater benefits, and may discourage redevelopment or re-investment in some situations, although such expenditures are limited by the Zoning Code.

D. Improvements.

1. Paving. In order to control dust and mud, all vehicle areas must be paved. However, some portions of individual parking spaces may be landscaped per the standards of Paragraph F.4, below.

2. Striping. All parking areas, except for stacked parking, must be striped in conformance with the parking dimension standards of Subsection F. below.

3. Protective curbs around landscaping. All perimeter and interior landscaped areas must have protective curbs along the edges. Curbs separating landscaped areas from parking areas may allow stormwater runoff to pass through them. Tire stops, bollards, or other protective barriers may be used at the front ends of parking spaces. Curbs may be perforated or have gaps or breaks. Trees must have adequate protection from car doors as well as car bumpers.

E. Stormwater management.

Although few members of the public testified on this provision at the Planning Commission hearing, Subsection E generated much discussion. As adopted by City Council, this subsection informs applicants that the Bureau of Environmental Services (BES) regulates stormwater management, and that both the Stormwater Management Manual and Chapter 17.38 of the City Code contain stormwater management requirements specific to parking lot landscaping.

All bureaus agree that managing stormwater runoff in the parking lot landscaping is the best stormwater management approach. It is usually the most cost-effective approach and provides environmental benefits beyond stormwater management. The question is how best to establish the requirement and administer it through City Code. The Bureau of Planning (BOP), Office of Planning and Development Review (OPDR), and BES have discussed this issue at length, and the City Attorney's office has been consulted. The bureaus have been unable to reach agreement on how to structure the requirement in city code to: 1) best accomplish the shared objectives of the bureaus, and 2) avoid introducing unintended consequences. Details of the bureaus' concerns are presented below.

BES believes that the provision recommended by the Planning Commission will not meet BES objectives for promoting integrated stormwater designs. To achieve these objectives, BES has proposed two alternatives to the Planning Commission's recommended provision in Subsection E:

1. That the Zoning Code require landscape areas to be used to manage stormwater runoff from the parking area in accordance with the Stormwater Management Manual; or
2. That the Zoning Code require applicants to label the landscape areas that are intended to become stormwater management facilities.

BES believes that either or both of these alternative provisions will better achieve BES objectives for the following reasons:

- Clear and early notice to applicants. Applicants deal directly with planning staff in the permit center – who implement the Zoning Code – from the beginning of the permitting process. Placing this requirement in the Zoning Code will give clear notice of stormwater management requirements to applicants at the beginning of the process. This will more effectively promote integration of stormwater facilities and landscape design.

~~**E. Setbacks and perimeter landscaping for parking areas.** The minimum required setbacks and landscaping for surface parking areas are stated in Table 266-4. The setback and landscaping requirements also apply to any portion of structured parking area where the parking area is within 4 feet of adjacent grade and there is no roof over it. The landscaping requirements also apply to parking area driveways. The setbacks apply when a parking area abuts a street or lot line. For stacked parking areas, see 33.266.140 below.~~

E. Stormwater management. Stormwater runoff from parking lots is regulated by the Bureau of Environmental Services. See Chapter 17.38, Drainage and Water Quality, and the City's *Stormwater Management Manual*, which contain requirements for managing stormwater in parking lot landscaping.

- Consistency. On July 19, 2000, amendments to the Stormwater Management Manual and Chapter 17.38, Drainage and Water Quality, to require that stormwater runoff from parking areas be managed in the parking-lot landscaping were presented to City Council for adoption. No adverse testimony was received, and a second reading is scheduled for July 26, 2000. City codes should establish consistent requirements. The Zoning Code should agree with Chapter 17.38.

BES believes that inclusion of one of the two alternatives will not, by itself, make the stormwater management requirement a land use decision. BES agrees that the review of stormwater facilities is a technical decision best performed by BES engineers. BES believes that other pre-existing safeguards in the Zoning Code will prevent the creation of administrative problems and disincentives to re-investment.

OPDR believes that placing either of the BES alternative provisions in the Zoning Code will, in effect, make stormwater facility design part of the Zoning Code, and create two principal implementation problems:

- Confusion of technical and land use decisions. Placing stormwater management requirements in the Zoning Code will make stormwater facility design a land use decision; it should instead be a technical decision, as it is now. The flexibility available to technical decision-making will disappear, and costs to applicants will increase. Decisions on stormwater facility design will become subject to the public notice and other legal requirements of land use decisions (see sidebar, p. 34).
- Administrative problems. OPDR staff in the Development Services Center and Land use Review section implement the Zoning Code, but lack the expertise to make decisions or give advice regarding the design of stormwater facilities. If stormwater management requirements are added to the Zoning Code, OPDR staff will be unable to directly administer this section of the code.

(continued)

BES Alternate #1 is the stronger requirement, stating that stormwater runoff must be managed in the parking lot landscaping. If Alternate #1 is included in the Zoning Code, OPDR is concerned that an additional problem will be created:

- Possible barrier to re-investment. Under the Planning Commission recommendation, nonconforming parking lot landscaping can be resolved by re-striping, increasing the landscaped area, or enhancing plantings – improvements that can be made incrementally. Under the BES proposal, nonconforming parking lot landscaping will be required to be converted to stormwater management facilities, requiring the regrading and re-plumbing of parking lots. Such changes cannot be made incrementally, and the high costs may discourage re-investment to upgrade sites.

In OPDR's view, the BES proposals are unnecessary. BES should regulate stormwater through Chapter 17.38 and the Stormwater Management Manual, which are adequate vehicles for establishing and enforcing stormwater management requirements. Stormwater requirements do not fit in the context of the Zoning Code, which deals primarily with land uses, layout, and appearance of development.

Land Use vs. Technical Decisions

Under Oregon law, there is a distinction between technical and land use decisions.

Land use decisions *must either employ objective, quantifiable criteria, or, if using subjective, discretionary criteria, must provide the opportunity for a public hearing. There are additional procedural requirements for land use decisions – such as notification. These decisions are made by OPDR, one of the review bodies associated with OPDR, or the City Council.*

Technical decisions *may be discretionary, but are based on performance of certain functions – and often on engineering principles. Technical decisions are made by the service bureaus, using standards or guidelines in City Code, handbooks approved by City Council or the City Engineer, or in response to a federal, state, or regional requirement.*

The City Attorney's Office advised against including stormwater management provisions in the Zoning Code. At present, stormwater facility design decisions are made as technical decisions informed by the professional judgment of engineers or other qualified staff. If BES Alternative #1 is adopted, stormwater facility design in parking lots may become a land use decision. Land use decisions can be made administratively only on the basis of clear and objective standards. Otherwise, a discretionary review is required. Clear and objective standards for making these parking-lot landscaping/stormwater facility decisions do not now exist. According to the City Attorney's office, if BES Alternative #2 is adopted, the effect is less clear, but there is some risk that adding any language about stormwater management to the Zoning Code could lead to a determination that stormwater facility design is a land use decision. (continued)

BOP is also concerned that the BES proposal may confuse land use and technical decisions, and believes that Chapter 17.38 and the Stormwater Management Manual are adequate vehicles for regulating stormwater management. The Bureau of Planning supports the Planning Commission recommendation.

The Planning Commission recommendation will:

- Use the Zoning Code to govern land use issues, such as the amount of parking lot landscaping, its layout, and its plantings. These issues are land use matters. OPDR will be responsible for administering these issues.
- Use the Stormwater Management Manual and PCC Chapter 17.38, Drainage and Water Quality, to govern stormwater management matters, such as the adequacy of stormwater facility design. BES will be responsible for making these technical decisions.
- Avoid making stormwater facility design subject to a land use review process.

For these reasons, City Council adopted the Planning Commission recommendation contained in paragraph 33.266.130.E, Stormwater Management.

F. Parking area layouts

2. Parking space and aisle dimensions. A single parking space size is adopted that is three feet shorter and six inches narrower than the current standard space. The new parking space size is the minimum allowed. Compact spaces are eliminated. Parallel parking space size is unchanged.

   There are three main reasons to shorten stalls significantly while maintaining most of their existing width: 1) narrow stalls are more difficult to drive into and out of; 2) narrow stalls make it more difficult for passengers to enter and exit vehicles; and 3) more space can be saved at less cost to convenience by shortening stalls rather than narrowing them.

   Required minimum aisle sizes are reduced by as much as four feet, depending on the situation. Where access to a structure is through the parking area (rather than by a driveway separated from the parking area), a fire access lane may be required to provide adequate access and maneuvering room for fire and emergency vehicles. Fire lanes are regulated by the Fire Bureau through the Uniform Fire Code.

4. A portion of a parking space may be landscaped instead of paved. This measure allows cars to overhang the edge of landscaped areas. The purpose of this measure is to further offset the demand for additional space created by the adopted increase in landscaped area requirements. The landscaped portion of the parking space may count toward interior landscaping requirements (of 10 percent of the parking and loading area). However, it cannot count toward perimeter landscaping requirements, which would allow car overhangs to reduce the effective perimeter width.

F. Parking area layouts.

1. Access to parking spaces. [No change]

2. Parking space and aisle dimensions. ~~At least 60 percent of the required~~ Parking spaces and aisles must meet the minimum ~~standard~~ dimensions contained in Table 266-4. ~~All additional parking spaces must comply with at least the dimensions for compact spaces, stated in Table 266-5. Compact spaces must be clearly labeled on the site for compact use.~~ For stacked parking areas, see Section 33.266.140 below.

3. ~~Disabled parking.~~ Parking for the disabled. [No change]

4. A portion of a parking space may be landscaped instead of paved, as follows:

   a. The landscaped area may be up to 2 feet of the front of the space as measured from a line parallel to the direction of the bumper of a vehicle using the space, as shown in Figure 266-2;

   b. Landscaping must be ground cover plants; and

   c. The ~~landscaping does not apply towards any perimeter or interior landscaping requirements, but does count towards any overall site landscaping requirement~~ landscaped area counts toward parking lot interior landscaping requirements and toward any overall site landscaping requirements. However, the landscaped area does not count toward perimeter landscaping requirements.

5. Office of Transportation review. [No change]

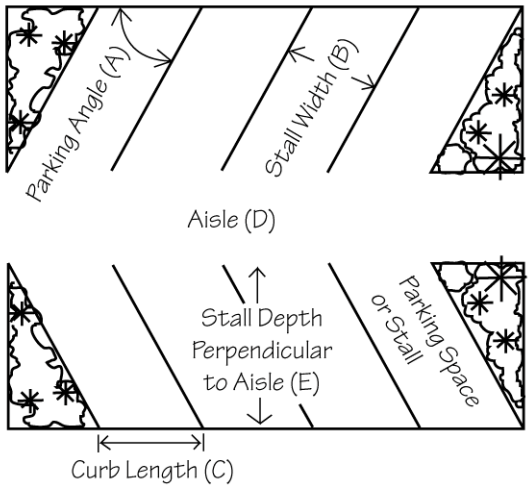
Table 266-4.

Separate standards for compact and standard stalls are deleted and replaced by a single size for the standard parking stall. Minimum aisle widths are reduced. The space needed to provide the necessary number of parking spaces is reduced enough to allow for the expanded amount of required landscaping.

Most cars are 15 to 16 feet long, but full-size trucks and cars reach 18 feet or more. Depending on the use and location, from one vehicle in ten to almost one in three is longer than the adopted parking space and will stick out into the aisle from one-half foot to two feet. Because most cars are shorter than the parking space, adequate maneuvering room will be maintained, although three-point maneuvers will sometimes be necessary. The 8½-foot parking space width helps maintain ease of maneuvering in and out of the spaces. Some uses, such as large home-improvement retailers, may wish to maintain wider aisles to accommodate the higher proportion of full-size trucks and vans using their parking lots. These standards are minimums, and allow larger spaces and aisles to be used.

Shapes and sizes of parking lots vary greatly. In most cases, the total area needed for parking and landscaping will be equal to or less than what was required under the previous standard. In others – particularly in narrow lots where one-way aisles serve parking angles from 30 to 60 degrees – the number of parking spaces in the lot may need to be reduced to provide adequate landscaping. This problem is offset by the provision proposed in subparagraph G.3, which sets a minimum parking lot size requiring interior landscaping.

Parking Dimension Factors



~~**Table 266-5**~~
~~**Minimum Parking Space and Aisle Dimensions [1]**~~

~~Angle (A)~~	~~Type~~	~~Width (B)~~	~~Curb Length (C)~~	~~1 Way Aisle Width (D)~~	~~2 Way Aisle Width (D)~~	~~Stall Depth (E)~~
~~0° (Parallel)~~	~~Standard~~ ~~Compact~~ ~~Disabled [2]~~	~~8 ft.~~ ~~7 ft. 6 in.~~	~~22 ft. 6 in.~~ ~~19 ft. 6 in~~	~~12 ft.~~ ~~12 ft.~~	~~24 ft.~~ ~~24 ft.~~	~~8 ft.~~ ~~7 ft. 6 in.~~
~~30°~~	~~Standard~~ ~~Compact~~ ~~Disabled [2]~~	~~9 ft.~~ ~~7 ft. 6 in.~~	~~18 ft.~~ ~~15 ft.~~	~~12 ft.~~ ~~12 ft~~	~~24 ft.~~ ~~24 ft.~~	~~17 ft.~~ ~~14 ft.~~
~~45°~~	~~Standard~~ ~~Compact~~ ~~Disabled [2]~~	~~9 ft.~~ ~~7 ft. 6 in.~~	~~12 ft. 6 in.~~ ~~10 ft. 6 in.~~	~~12 ft.~~ ~~12 ft.~~	~~24 ft.~~ ~~24 ft.~~	~~19 ft.~~ ~~16 ft.~~
~~60°~~	~~Standard~~ ~~Compact~~ ~~Disabled [2]~~	~~9 ft.~~ ~~7 ft. 6 in.~~	~~10 ft. 6 in.~~ ~~8 ft. 6 in.~~	~~18 ft.~~ ~~15 ft.~~	~~24 ft.~~ ~~24 ft.~~	~~20 ft.~~ ~~16 ft. 6 in.~~
~~90°~~	~~Standard~~ ~~Compact~~ ~~Disabled [2]~~	~~9 ft.~~ ~~7 ft. 6 in.~~	~~9 ft.~~ ~~7 ft. 6 in.~~	~~24 ft.~~ ~~22 ft.~~	~~24 ft.~~ ~~24 ft.~~	~~19 ft.~~ ~~15 ft.~~

~~Notes:~~
~~[1] See Figure 266-3.~~
~~[2] See Section 33.266.130.F.3.~~

Table 266-4
Minimum Parking Space and Aisle Dimensions [1,2]

Angle (A)	Width (B)	Curb Length (C)	1 Way Aisle Width (D)	2 Way Aisle Width (D)	Stall Depth (E)
0° (Parallel)	8 ft.	22 ft. 6 in.	12 ft.	20 ft.	8 ft.
30°	8 ft. 6 in.	17 ft.	12 ft.	20 ft.	15 ft.
45°	8 ft. 6 in.	12 ft.	12 ft.	20 ft.	17 ft.
60°	8 ft. 6 in.	9 ft. 9 in.	16 ft.	20 ft.	17 ft. 6 in.
90°	8 ft. 6 in.	8 ft. 6 in.	20 ft.	20 ft.	16 ft.

Notes:
[1] See Figure 266-3.
[2] Dimensions of parking spaces for the disabled are regulated by the Uniform Building Code. See Section 33.266.130.F.3.

Figure 266-2: Landscaped area at front of parking space.

This figure shows a section of a landscape strip where the front two feet of the space is landscaped. The tire stop does not count as part of the landscaping.

Figure 266-3: Parking dimension factors.

This is an updated version of the existing Figure 266-2, which shows the dimensions used in Table 266-5, Minimum Parking Space and Aisle Dimensions for Parking Lots.

Figure 266-2
Landscaped area at front of parking space.

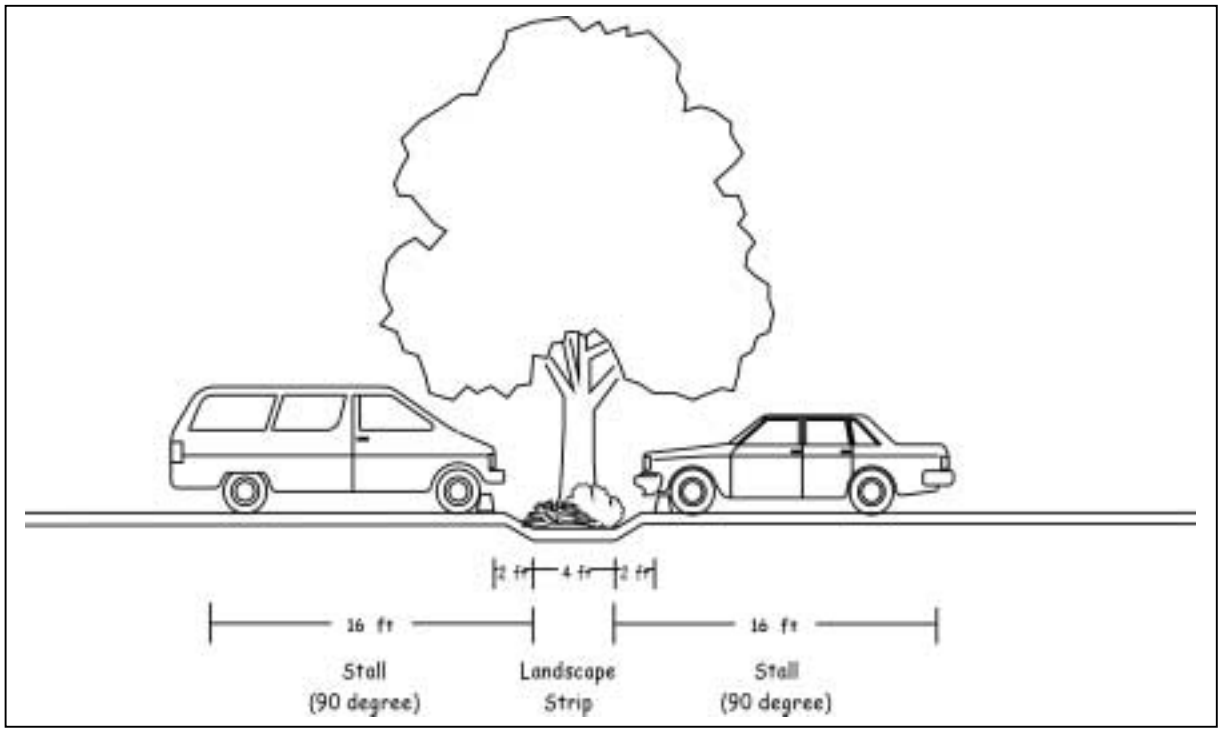
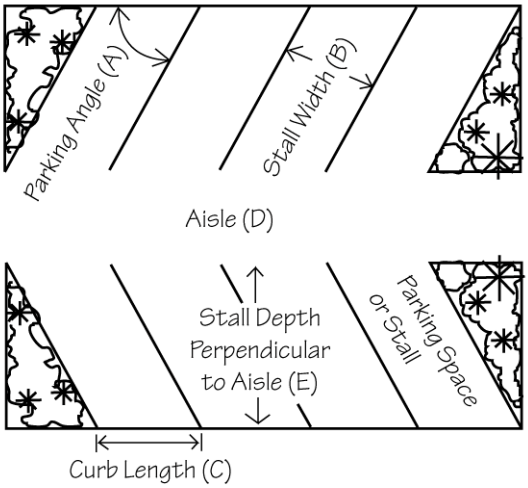


Figure 266-~~2~~ 3
Parking Dimension Factors



G. Parking area setbacks and landscaping.

1. All landscaping must comply. Subsection H, below, specifies those plant materials that differ from the requirements of Chapter 33.248, Landscaping and Screening. Other requirements of Chapter 33.248, such as those for installation and maintenance, still apply to parking lot landscape plantings.

2. Setbacks and perimeter landscaping.

b. This provision exempts lot lines lying within shared driveways from meeting the setback and landscaping requirements.

G. Parking area ~~interior~~ setbacks and landscaping.

1. ~~Amount of landscaping~~. All landscaping must comply with the standards of Chapter 33.248, Landscaping and Screening, except plant materials specified for parking lot landscaping in Subsection 33.266.130.H, below. Trees and shrubs must be fully protected from potential damage by vehicles. ~~All surface parking areas with more than 10 spaces must provide interior landscaping complying with one or a mix of both the standards stated below. For stacked parking areas, see Section 33.266.140 below.~~

   a. ~~Option 1. Interior landscaping must be provided at the rate of 20 square feet per stall. At least one tree must be planted for every 200 square feet of landscaped area. Ground cover plants must completely cover the remainder of the landscaped area.~~

   b. ~~Option 2. One tree must be provided for every four parking spaces. If surrounded by cement, the tree planting area must have a minimum dimension of 4 ft. If surrounded by asphalt, the tree planting area must have a minimum dimension of 3 ft.~~

2. ~~Development standards for parking area interior landscaping.~~ Setbacks and perimeter landscaping.

   a. ~~All landscaping must comply with the standards of Chapter 33.248, Landscaping and Screening. Trees and shrubs must be fully protected from potential damage by vehicles.~~ Where these regulations apply. The regulations of this paragraph apply where a surface parking area abuts a lot line. The setback and perimeter landscaping requirements also apply to any portion of a structured parking area where the parking area is within 4 feet of adjacent grade and there is no roof over it. The perimeter landscaping requirements also apply to parking area driveways. For stacked parking areas, see Section 33.266.140 below.

   b. ~~Interior parking area landscaping must be dispersed throughout the parking area. Some trees may be grouped, but the groups must be dispersed.~~ Setbacks. The minimum required setbacks for surface parking areas are stated in Table 266-5. Lot lines lying within shared driveways are exempt from setback and perimeter landscaping requirements.

Table 266-~~4~~ 5
Minimum Parking Area Setbacks ~~And Perimeter Landscaping~~

Location	**All zones except EG2 and IG2**	**EG2, IG2**
Lot line abutting street	~~5 ft. / L2 or~~ ~~10 ft. / L1~~ 5 ft.	~~10 ft. / L2 or~~ ~~15 ft. / L1~~ 10 ft.
Lot line abutting a C, E, or I zone lot line	~~5 ft. / L2 or~~ ~~10 ft. / L1~~ 5 ft.	~~5 ft. / L2 or~~ ~~10 ft. / L1~~ 5 ft.
Lot line abutting a OS or R zone lot line	~~5 ft. / L3~~ 5 ft.	~~10 ft. / L3~~ 10 ft.

c. Perimeter landscaping. Previous perimeter landscaping requirements called for L1 (general) and L2 (low hedge) standards in most circumstances. Both of these standards called for trees every 30 lineal feet of landscaped area.

The L1, L2, and L3 standards are replaced by the stormwater plantings described in Subsection H, below, combined with either a low screen or high screen requirement. This will allow the perimeter landscaped areas to provide stormwater management functions in addition to screening. Walls may also be used for screening if they are constructed to allow stormwater runoff to pass through them.

3. Interior landscaping.

a. Interior landscaping is required for sites with combined parking and loading areas larger than 3,000 square feet – equal to 60% of a 5,000 square foot lot. Smaller lots are exempted because the standard will be more difficult to meet in smaller lots.

The Planning Commission recommended that ten percent of all parking and loading areas must be devoted to interior landscaping. Driveways and perimeter landscape areas are exempted from the interior landscape area calculation.

City Council heard testimony stating that this method of calculating the landscaping requirement will lead to the loss of many acres of Employment and Industrial-zoned land because in these zones, loading areas often predominate over parking areas. Therefore, in Employment and Industrial zones only the parking area must be used to calculate the required landscaping. Where aisles serve both for truck access and access to parking, the amount of aisle width used in the landscape calculation is limited to the width required for parking access.

c. Perimeter landscaping. ~~may not substitute for interior landscaping. However, interior landscaping may join perimeter landscaping as long as it extends 4 feet or more into the parking area from the perimeter landscape line.~~

(1) Surface parking abutting streets, and C, E, and I zones. Where a surface parking area abuts a street lot line, or a C, E, or I zone lot line, the required setbacks must be landscaped. The landscaping must meet the low-screen landscaping standards of Subparagraph 33.266.130.H.3.c, below.

(2) Surface parking abutting OS and R zones. Where a surface parking area abuts an OS or R zone lot line, the required setbacks must be landscaped. The landscaping must meet the high screen landscape standards of Subparagraph 33.266.130.H.3.d, below.

~~d. Parking areas that are 30 feet or less in width may locate their interior landscaping around the edges of the parking area. Interior landscaping placed along an edge is in addition to any required perimeter landscaping.~~

3. Interior landscaping. The regulations of this paragraph apply to all surface parking areas except stacked parking areas. For stacked parking areas, see Section 33.266.140 below.

a. Amount of interior landscaping required. The amount of landscaping required is as follows:

(1) In OS, R, and C zones. In OS, R, and C zones, interior landscaping must be provided for sites where there is more than 3,000 square feet of parking and loading areas, not including driveways and perimeter landscaped areas. At least 10 percent of the parking and loading area, not including driveway area, must be landscaped;

(2) In E and I zones. In E and I zones, interior landscaping must be provided for sites where there is more than 3,000 square feet of parking area, not including loading areas, driveways and perimeter landscaped areas. At least 10 percent of the parking area, not including driveways and loading area, must be landscaped.

Where a driveway leading to a truck loading area is within or adjacent to the parking area, or where a truck maneuvering area is within or adjacent to the parking area, the area used to calculate the amount of landscaping required is modified as follows. See Figure 266-4.

- Where an aisle is used for one-way traffic, and is also used for truck access to a loading area or is also used for truck maneuvering area, no more than 16 feet of the aisle width is included in the calculations;

- Where an aisle is used for two-way traffic, and is also used for truck access to a loading area or is also used for truck maneuvering area, no more than 20 feet of the aisle width is included in the calculations.

3. Interior landscaping (continued).

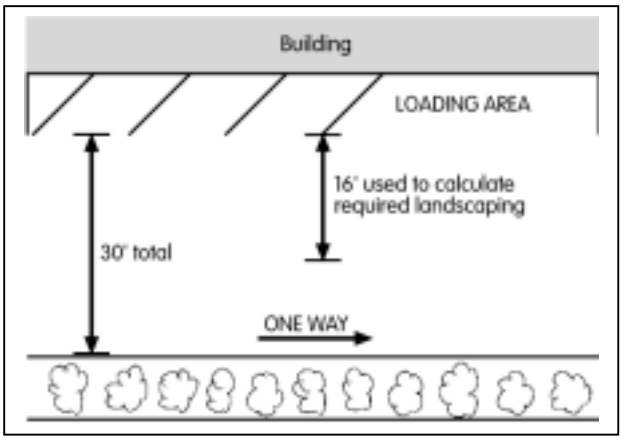
c. This provision is intended to prevent required landscaping from being concentrated in one portion of a parking area, leaving the remainder without trees or other landscaping.

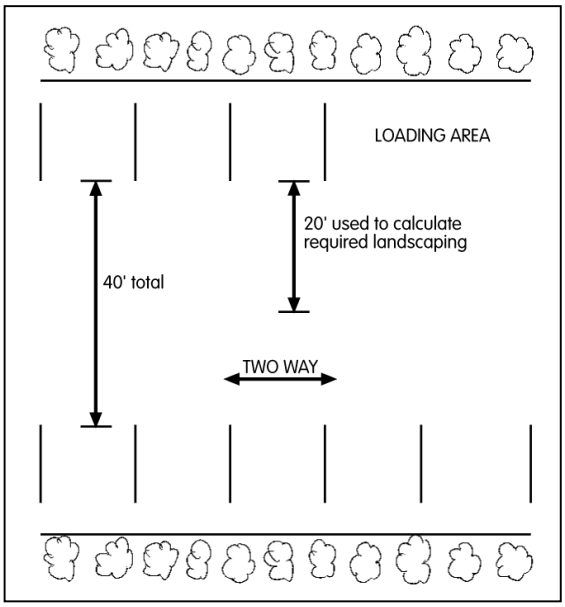
d. This provision will prevent meeting the interior landscaping requirement by only slightly widening perimeter landscaping.

e. Subparagraph e was added by City Council on December 19, 2000. This provision will resolve any conflicts in existing lots between the minimum parking requirements and the new landscaping requirements. The minimum parking requirement is automatically waived in favor of the landscaping requirement. No adjustment will be required unless an applicant wishes to reduce the amount of landscaping in favor of keeping the parking.

Figure 266-4. Calculating the amount of required landscaping in the Employment and Industrial zones.

The pictured aisles are used both for truck access to a loading area and vehicle access to a parking area. For one-way aisles, no more than 16 feet of aisle width is used to calculate the required landscaping. For two-way aisles, no more than 20 feet of aisle width is used to calculate the required landscaping.





b. The landscape materials must meet the general standards of Subsection 33.266.130.H, below.

c. The landscaping must be dispersed throughout the parking area. All of the required landscape area may be in the parking area, or some may be in the loading area.

d. Perimeter landscaping may not substitute for interior landscaping. However, interior landscaping may join perimeter landscaping as long as it extends at least four feet into the parking area from the perimeter landscape line.

e. Exception for existing parking lots. Where compliance with Subparagraph G.3.a, above, would result in the loss of existing required parking spaces, the amount of parking required is reduced by the amount needed to accommodate the minimum landscaping required.

f. Layout of interior landscaped areas.

(1) Option 1: Landscape strips.

Arranging landscape strips between rows of parking stalls provides the greatest stormwater management benefit. The distance water must flow across pavement is reduced, which minimizes heat gain and the concentration of flow into rivulets. In addition, dispersing the areas of filtering and infiltration reduce the physical demands placed on each stormwater facility and so help reduce maintenance and performance problems.

Landscape strips at least four feet wide between each double row of parking spaces will provide the best management of runoff from a parking lot with the adopted layout dimensions. Allowing cars to overhang two feet along either edge – or both edges – will not interfere with the needed stormwater-related plantings if the landscape strip is widened accordingly. Wide landscape strips will also protect plants from damage by vehicles. Because the overhang area contributes to stormwater management, the overhang counts toward the interior landscaping requirement.

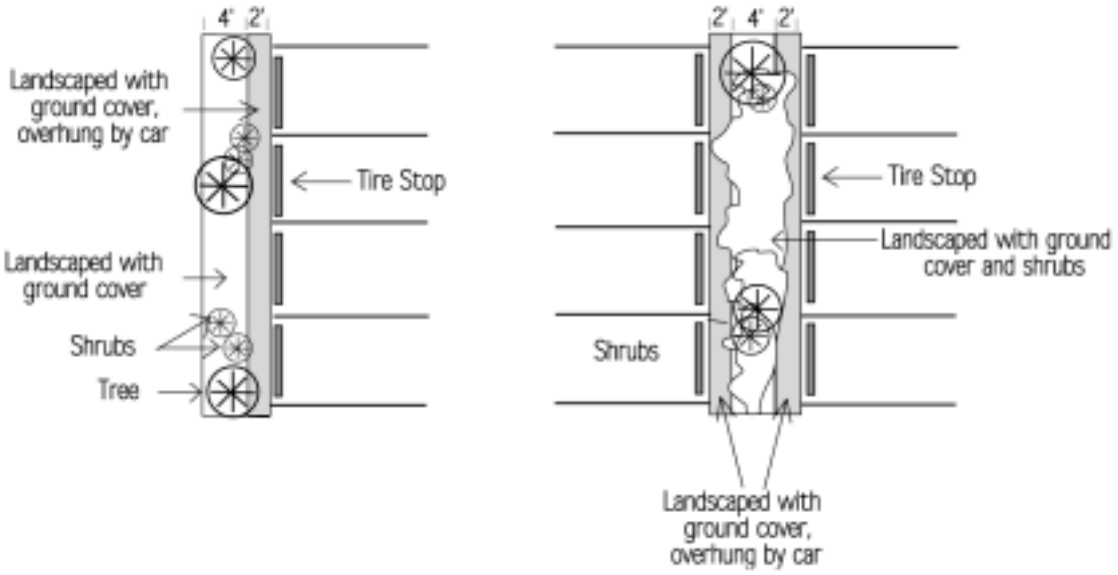
f. Layout of interior landscaped areas. The layout of the interior landscaped areas must meet either one or a combination of the standards of this subparagraph:

(1) Option 1: Landscape strips.

- Interior landscaping must be arranged in landscape strips at least four feet wide between rows of parking stalls, as shown in Figure 266-4.

- Where the front portions of parking stalls are landscaped as allowed by Subparagraph F.4, the landscaped portion of the parking stall must be added to the landscape strip, widening the strip to at least six feet for one row of parking stalls and at least eight feet for two rows of stalls, as shown in Figure 266-5.

Figure 266-5
Landscape Strips



(2) Option 2. Other landscape patterns.

Some parking lots will have dimensions, slopes, or other constraints that make landscape strips between rows of parking unworkable. The purpose of this option is to allow the interior landscaping to be arranged to meet site constraints and still be dispersed as much as practicable.

The requirement for interior landscaping to extend at least four feet into the parking area where it adjoins perimeter landscaping is intended to keep interior landscaping from being dispersed around the edges of parking lots in narrow bands. If the interior landscaping is too narrow, it is less likely to be able to provide space for adequate plantings and protection of the required trees.

g. Individual tree-planting areas. This subparagraph sets the minimum dimension for an area planted with a single tree. The existing requirements allow a minimum space of three feet surrounded by asphalt pavement or four feet where surrounded by concrete. The adopted five-foot minimum dimension will help protect trees from damage and provide the minimum space needed for planting and growth.

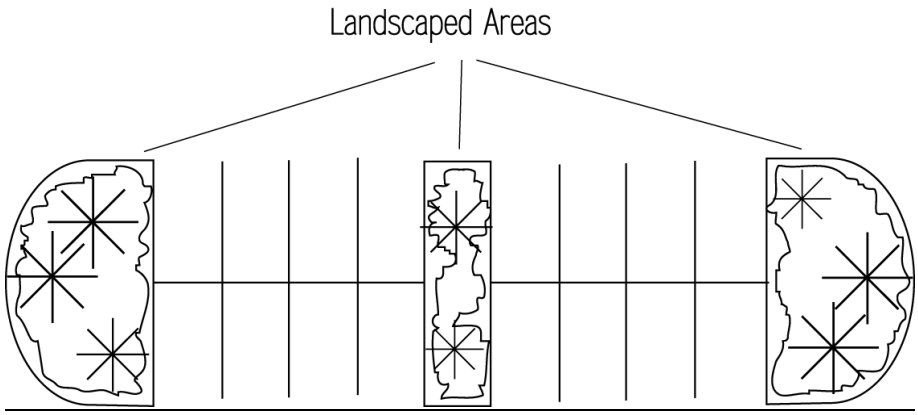
Figure 266-7 illustrates the minimum dimensions of individual tree-planting spaces. Such spaces need not be square, but they must have a minimum interior dimension of five feet and meet other requirements for protection of the trees from damage.

(2) Option 2: Other landscape patterns.

- Interior landscaping must be arranged in areas at the ends of rows of parking or between parking spaces within rows of parking. See Figure 266-5.

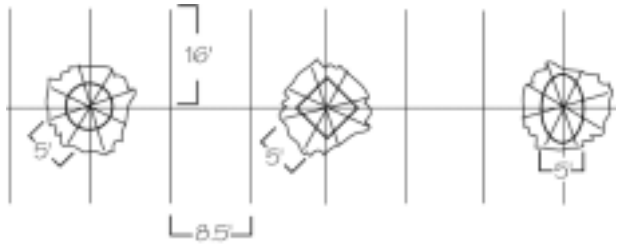
- Interior landscaping may join perimeter landscaping as long as the interior landscape area extends at least 4 feet into the parking area from the perimeter landscape line.

Figure 266-6
Other Landscape Patterns



g. Individual tree-planting spaces. Where an individual tree is planted in a space surrounded by pavement, the planting area must have a minimum interior dimension of five feet. See figure 266-6.

Figure 266-7
Individual Tree-Planting Spaces



H. Required landscape materials for parking lot landscaping.

This Subsection assures that specified plantings meet the requirements for landscape swales, vegetative filters, stormwater planters, and landscape infiltration facilities as laid out in BES's Stormwater Management Manual. These types of facilities generally will work in parking lot landscape areas. The specified plantings will therefore satisfy the requirements of both the Zoning Code and the Stormwater Manual. Even if the landscaped area is not used for stormwater management, these plantings will provide an attractive landscaped area, and other benefits related to enhanced landscaping.

1. All landscaping. Nuisance plants in the Portland Plant List are not currently prohibited in parking lot landscaping. This recommendation will prohibit them.

2. Trees. The provisions are designed to provide adequate plantings and shade while encouraging retention of larger existing trees and prohibiting use of nuisance and prohibited plants.

   Staff from BOP, BES, the Bureau of Parks and Recreation (Parks), and the Urban Forester's office have held several discussions concerning technical aspects of these tree requirements. Specific Bureau concerns are highlighted below.

   a. Shade is critical for reducing pavement and air and stormwater runoff temperatures, as well as softening the appearance of parking lots. One tree is required for every 120 square feet of landscaping, equivalent to a circle about 12 and a half feet across. In landscape strips four feet wide, trees will be planted every 30 feet. In strips eight feet wide, they will be planted 15 feet apart. This density of planting is in accordance with the requirements of the Stormwater Management Manual. Parks planners have expressed concern that this will result in trees being spaced too closely. BES regards this density as beneficial for stormwater management. City Council adopted the language shown.

      Using existing trees to meet the standard will encourage the retention of older, larger trees. These trees provide greater stormwater benefits in the short term than plantings of smaller trees. The first 6 inches of existing tree diameter replaces the requirement for one tree to be planted. Each additional 3-inch increment replaces an additional new tree.

H. Required landscape materials for parking lot landscaping. Landscape materials for parking lot interior and perimeter landscaping must be provided as follows:

1. All landscaping. Plants listed as nuisance or prohibited plants on the Portland Plant List are prohibited in all parking area landscaping.

2. Trees.

   a. Trees required. At least one tree must be provided for every 120 square feet of required landscape area. Existing trees may be used to meet this standard. If existing trees are retained, each tree 6 inches or less in diameter counts as one tree. Each tree more than 6 inches and up to 9 inches in diameter counts as two trees. Each additional 3-inch diameter increment above 9 inches counts as one tree

b. Size. City Council, after receiving testimony concerning tree size and species, asked the Bureau of Planning to work with BES and the City Forester's office to develop a list of trees for use in parking lots.

Use of the Parking Lot Tree List will encourage the use of trees appropriate for parking lots and discourage the use of inappropriate trees. The Parking Lot Tree List contains 11 native trees and 44 ornamental or non-native trees pre-approved for use in parking lots. Trees selected from the list may be planted in parking lots in non-residential zones at a minimum caliper size of 2 inches or height of 5 feet, depending on type. If trees not on the list are used, they must meet the standards of Chapter 33.248, which call for 3-inch caliper or 6 foot tall trees in non-residential zones, depending on type. In residential zones, Chapter 33.248 continues to allow 1.5 inch caliper trees to be planted.

The City Forester, in consultation with the Urban Forestry Commission and BES, will periodically update the Parking Lot Tree List. This will allow the addition to the List of promising tree species or cultivars and the removal from the List of trees that prove to be unsuited for parking lots.

d. Types of trees. City Council received testimony concerning the Planning Commission recommendation and asked the Bureau of Planning to investigate the issue and make a recommendation.

The Planning Commission recommendation for a fixed 40 percent evergreen requirement is changed to "at least 20 percent." Most of those consulted by the Bureau of Planning believed that a fixed 40 percent requirement was too restrictive and could lead to unintended problems in some settings. Because evergreen trees provide greater stormwater benefits than deciduous trees, a compromise is adopted to require at least 20 percent evergreens to be planted.

This recommendation does not conflict with the Stormwater Management Manual, which requires 40 percent evergreens for stormwater facilities.

b. Size of trees. Trees in residential zones must meet the tree size standards of Chapter 33.248, Landscaping and Screening. In non-residential zones, trees must meet the standards of Chapter 33.248, except for trees on the Parking Lot Tree List. The Parking Lot Tree List is maintained by the City Forester in consultation with the Bureau of Environmental Services and the Urban Forestry Commission. Trees on the Parking Lot Tree List must be fully branched and meet one of the following tree size standards:

(1) Broadleaf trees must be at least 2 caliper inches at the time of planting; or

(2) Conifer trees must be at least 5 feet tall at the time of planting.

c. Trees must be dispersed throughout the parking area to provide shade for the parking area. Some trees may be grouped, but the groups must be dispersed.

d. Types of trees. At least 20 percent of the trees planted must be evergreen trees. Plants listed as arborescent shrubs in the Portland Plant List may not be used to meet the tree requirement.

3. Shrubs.

   a. Shrubs required. This planting rate matches the requirements of the Stormwater Management Manual.

   c. Low screen landscaping. This provision adds the requirement for a low hedge or wall to the stormwater plantings.

   d. High screen landscaping. This provision adds the requirement for a high hedge or wall to the stormwater plantings.

      City Council amended the provisions in subparagraphs c and d at the hearing on December 19, 2000. The Planning Commission's Recommended Draft required too many shrubs in perimeter landscape areas five feet wide. The provisions as adopted resolve this problem.

3. Shrubs.

a. Shrubs required. At least one shrub must be provided for every 30 square feet of required landscape area.

b. Size. Shrubs must be at least the one-gallon container size.

c. Low screen landscaping. Where a low screen is required by subparagraph G.2.c, above, one of the following standards must be met:

(1) Shrubs. Enough shrubs are required to form a continuous screen at least three feet high. Where the landscaped area is five feet or less in width, the shrubs used to form the screen are also counted towards meeting the requirement of H.3.a., above. If the landscaped area is more than 5 feet in width, the screening shrubs are required in addition to the shrubs required by H.3.a, above; or

(2) Masonry wall. A three-foot high masonry wall is required, in addition to the shrubs required by H.3.a, above. The wall must provide a solid screen, except that the wall may be perforated or have voids at the base that allow stormwater runoff to pass through it.

d. High screen landscaping. Where a high screen is required by subparagraph G.2.c, above, one of the following standards must be met:

(1) Shrubs. Enough shrubs are required to form a continuous screen at least six feet high. Where the landscaped area is five feet or less in width, the shrubs used to form the screen are also counted towards meeting the requirement of H.3.a., above. If the landscaped area is more than 5 feet in width, the screening shrubs are required in addition to the shrubs required by H.3.a, above; or

(2) Masonry wall. A six-foot high masonry wall is required, in addition to the shrubs required by H.3.a, above. The wall must provide a solid screen, except that the wall may be perforated or have voids at the base that allow stormwater runoff to pass through it.

4. The ground cover planting requirements are in accordance with the Stormwater Management Manual's requirements for stormwater management facilities that will work in parking lot landscaping.

   a. Ground cover required. This subparagraph allows bricks, flagstones, and similar material to be used to establish access across landscape areas as needed. The paths do not, however, count toward the required landscape area because the impervious materials do not contribute toward stormwater management.

   c. Turf grasses used for lawns are undesirable planting materials in these landscape areas, as they require irrigation, frequent mowing, and are usually heavily fertilized and sprayed for weeds. In addition, turf grasses used for lawns do not develop extensive root systems compared with many native plants. All of these traits are particularly undesirable if the landscape area is used for stormwater management. The grass species identified in the Stormwater Management Manual include both native and non-native grasses that provide the desired characteristics.

4. Ground cover.

   a. Ground cover required. All of the landscaped area that is not planted with trees and shrubs must be planted in ground cover plants, which may include grasses. Paths made of paving stones, flagstones, bricks, pavement, or similar materials may provide access across landscaped areas, but the surface area of impermeable materials does not count toward the required landscaped area.

   b. Size and spacing. Ground cover plantings must meet the requirements of Chapter 33.248, Landscaping and Screening.

   c. Type. If grasses are planted, the species must be selected from the "Grass Seed Mix" exhibit in the Bureau of Environmental Services' *Stormwater Management Manual*.

33.258 NONCONFORMING SITUATIONS

33.258.070 Nonconforming Development

D. Development which must be brought into conformance.

1. Nonconforming development with a new nonconforming use or new nonconforming residential density.

   e. The Planning Commission recommended that parking lot landscaping become nonconforming when these new regulations are adopted. City Council agreed, and adopted the amendments as shown. All adjustments to parking lot interior landscaping granted prior to the effective date of these amendments will become void (see Chapter 33.730.130, below) when these amendments become effective.

   To understand this recommendation, consider two landowners applying for permits (in the future) that trigger the requirement to bring nonconforming development into conformance. The first landowner's parking lot fully meets all requirements of the code before the current amendments were adopted. The second landowner's parking lot does not meet the requirements, but instead received an adjustment.

   If the adjustments are allowed to stand, the adjusted parking lot would not be required to meet the new parking lot landscaping rules. But the other lot, which fully met all previous requirements, would have to be brought into conformance with the new rules. The Planning Commission believes that this is not equitable, and recommends that all lots be subject to these amendments regardless of adjustments.

   Adjustments to landscaped setbacks for surface parking are not voided (subparagraphs D.1.b and D.2.b(1)). Most adjustments to parking lot setbacks are granted to allow narrower setbacks than the standard calls for. The adopted amendment eliminates the option for a wider L1 (general) landscaped setback while retaining the same minimum setback width and calling for additional landscape plantings. This is not a significant change to the landscaped setback requirement for parking lots, so these adjustments do not need to be voided.

CHAPTER 33.258
NONCONFORMING SITUATIONS

33.258.070 Nonconforming Development

A. Purpose.

B. Continued operation.

C. Changes.

D. Development which must be brought into conformance. The regulations of this subsection are divided into two types of situations, depending upon whether the use is also nonconforming or not. These regulations apply except where superseded by more specific regulations in the code.

1. Nonconforming development with a new nonconforming use or new nonconforming residential density.

   a. Exterior display, storage, and work activity areas, including landscaping;

   b. Landscaped setbacks for surface parking and exterior development areas;

   c. Pedestrian circulation systems, as set out in the base zone pedestrian standards;

   d. Bicycle parking by upgrading existing bicycle parking and providing additional spaces in order to comply with 33.266.220;

   e. Interior parking lot landscaping. See Subsection 33.730.130.D, Expiration of adjustments approved prior to [effective date of these regulations];

   f. Landscaping in **existing** building setbacks;

   g. Minimum landscaped area (where land is not used for structures, parking, or exterior improvements);

   h. Screening; and

   i. Paving of surface parking and exterior storage and display areas.

2. Nonconforming development with an existing nonconforming use, allowed use, limited use, or conditional use.

   See the discussion of Paragraph D.1, above.

2. Nonconforming development with an existing nonconforming use, allowed use, limited use, or conditional use. [No change]

   a. Thresholds triggering compliance. [No change]

   b. Standards which must be met. Development not complying with the development standards listed below must be brought into conformance or receive an adjustment.

      (1) Landscaped setbacks for surface parking and exterior development areas;

      (2) Pedestrian circulation systems, as set out in the base zone pedestrian standards;

      (3) Bicycle parking by upgrading existing racks and providing additional spaces in order to comply with 33.266.220, Bicycle Parking. Sites that do not have accessory surface parking or are inside the Central City Core Area or Lloyd District, as shown on Map 510-8, are exempt from this standard;

      (4) Interior parking lot landscaping. <u>See Subsection 33.730.130.D, Expiration of adjustments approved prior to [effective date of these regulations];</u>

      (5) Landscaping in existing building setbacks;

      (6) Minimum landscaped area (where land is not used for structures, parking, or exterior improvements);

      (7) Screening; and

      (8) Paving of surface parking and exterior storage and display areas.

   c. Caps on the cost of required improvements. (No change)

CHAPTER 33.730 QUASI-JUDICIAL PROCEDURES

Section 33.730.130 Expiration of an Approval

See the discussion of 33.258.070.D.1 above.

CHAPTER 33.730
QUASI-JUDICIAL PROCEDURES

33.730.130 Expiration of an Approval

A. Expiration of unused land use approvals issued prior to 1979. (No change)

B. When approved decisions become void. (No change)

C. Deferral of the expiration period. (No change)

D. Expiration of adjustments approved prior to March 16, 2001. Adjustments to parking lot interior landscaping requirements approved prior to March 16, 2001 became void on March 16, 2001. Parking lot interior landscaping approved through an adjustment prior to March 16, 2001 is nonconforming development.

33.910 DEFINITIONS

This definition clarifies the prohibition in paragraph 33.248.040.E, Topping prohibited.

33.910 Definitions

Topping. Topping is pruning a tree to shorten it or prevent it from growing in its natural form. The definition of topping includes pollarding, which is training the shape of a tree by pruning its major branches back to stub-shaped ends. Topping does not include pruning performed to remove a safety hazard, to remove dead or diseased materials, or to avoid overhead utilities.

ADOPTED AMENDMENTS TO TITLE 33, PLANNING AND ZONING

FOR

"HOUSEKEEPING"

Chapter 33.515 COLUMBIA SOUTH SHORE PLAN DISTRICT

33.515.255 Sumps, Septic Tanks, and On-Site Disposal Systems

The existing prohibition includes all on-site stormwater infiltration systems. The Bureau of Environmental Services and Portland Water Bureau, which review applications involving stormwater disposal in this area, agree that certain types of stormwater infiltration methods may be acceptable. The adopted amendment will allow applicants to seek approval for on-site stormwater infiltration systems.

CHAPTER 33.515
COLUMBIA SOUTH SHORE PLAN DISTRICT

33.515.255 Sumps, Septic Tanks, and On-Site Disposal Systems

New sumps, septic tanks, cesspools, and other on-site disposal systems for sanitary <u>disposal</u> ~~,~~ <u>or disposal of</u> industrial <u>process</u> ~~, or storm~~ water are prohibited. All on-site storm water and waste water <u>treatment and disposal systems</u> must be disposed of into a system approved by the Bureau of Environmental Services <u>and the Office of Planning and Development Review.</u>

ADOPTED

PARKING LOT TREE LIST

Parking Lot Tree List

This list is adopted into the Zoning Code by reference. In accordance with Chapter 33.266.130.H.2.b, the List is maintained by the City Forester in consultation with the Bureau of Environmental Services and the Urban Forestry Commission. City Council asked that the list be updated on a regular basis, at least every two years. In addition, City Council recommended that its update be coordinated with the biennial update of the Stormwater Management Manual.

The Parking Lot Tree List contains 55 tree species. Eleven of the species are native trees from the Portland Plant List, and the other 44 are ornamental tree species.

The Parking Lot Tree List is to be made available in the Development Services Center. Information about the growth and needs of the trees on the list may be added to the list to guide applicants in selecting the most appropriate trees for specific situations.

PARKING LOT TREE LIST

Native Trees (on the Portland Plant List):

Species Name	Common Name
Abies grandis	Grand Fir
Acer macrophyllum	Big Leaf Maple
Alnus rubra	Red Alder
Crataegus douglasii, var. douglasii	Black Hawthorn, wetland form
Fraxinus latifolia	Oregon Ash
Pinus ponderosa, ssp. Valley	Ponderosa Pine, Valley subspecies
Pseudotsuga menziesii	Douglas Fir
Quercus garryana	Oregon White Oak
Rhamnus purshiana	Cascara
Thuja plicata	Western Red Cedar
Thuja plicata	Western Red Cedar 'Hogan'

Ornamental (non-native) Trees:

Species name	Common Name
Abies amabilis	Silver Fir
Acer campestre	Hedge maple
Acer campestre	Hedge maple 'Evelyn'
Acer pseudoplatanus	Sycamore maple
Acer rubrum	Red maple 'Embers Red,' 'October Glory,' 'Red Sunset,' 'Gerling,' 'Autumn Flame'
Acer saccharum	Sugar Maple (Except 'Legacy')
Calocedrus decurrens	Incense Cedar
Carpinus betulus	European Hornbeam
Celtis occidentalis	Hackberry
Cercidiphyllum japonicum	Katsura Tree
Cladrastis kentuckea	Yellowwood
Cornus kousa var. *chinensis*	Chinese Dogwood
Crataegus x lavallei	Lavalle Hawthorn
Fagus grandifolia	American Beech
Fagus sylvatica	European Beech
Fagus sylvatica	European Beech 'Roseo-marginata,' 'Tricolor'
Fraxinus americana	White Ash
Fraxinus excelsior	European Ash
Fraxinus pennsylvanica	Green Ash 'Marshall,' 'Patmore,' 'Summit,' 'Urbanite'
Ginkgo biloba	Ginkgo 'Shangri-la,' 'Saratoga'
Liquidambar styraciflua	Sweetgum

Species name	Common Name
Liriodendron tulipifera	Tulip Tree or Tulip Poplar
Magnolia grandiflora	Southern Magnolia
Magnolia kobus	Kobus Magnolia
Metasequoia glyptostroboides	Dawn Redwood
Nothofagus dombeyi	South American Beech or Southern Beech
Nothofagus obliqua	Roble Beech
Nyssa sylvatica	Black Gum or Black Tupelo
Ostrya virginiana	American Hornbeam
Pinus contorta	Shore Pine
Pinus monticola	Western White Pine
Quercus bicolor	Swamp White Oak
Quercus coccinea	Scarlet Oak
Quercus frainetto	Hungarian Oak 'Forest Green'
Quercus nigra	Water Oak
Quercus phellos	Willow Oak
Quercus robur	English Oak
Quercus rubra	Northern Red Oak
Quercus velutina	Black Oak
Sequoia sempervirens	Coast Redwood
Sequoiadendron giganteum	Giant Sequoia
Sophora japonica	Japanese Pagoda Tree
Taxodium distichum	Bald Cypress
Umbellularia californica	California Laurel, Oregon Myrtle, Bay
Zelkova serrata	Sawleaf Zelkova 'Green Vase,' 'Halka,' 'Village Green'