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EXECUTIVE SUMMARY

Powell Butte is located in Southeast Portland, at approximately SE 162nd and Powell Boulevard The property was purchased by the Portland Bureau of Water Works (Water Bureau) in 1925 as a site for water storage reservoirs A 50 million gallon buried reservoir was constructed there in 1980 Powell Butte is still owned by the Water Bureau, although most of the site is currently managed by the Portland Bureau of Parks and Recreation (Park Bureau) as a natural resource-based park, established in 1987 and opened to the public in 1990

WHY WAS THIS MASTER PLAN PREPARED ?

This document is an update to the first Powell Butte Master Plan, prepared in 1986 by the Park Bureau After ten years, it is appropriate for the community to review issues related to park uses and the region's water supply system

Surface water from the Bull Run watershed currently serves two thirds of the Portland metropolitan region's population, or about 800,000 people Powell Butte is a key element in this regional water supply system Water from the Bull Run watershed flows by gravity directly to a 50 million gallon buried reservoir at Powell Butte, and is then distributed by gravity to Portland and the region The Powell Butte reservoir also receives the City's groundwater supply when the Columbia South Shore Wellfield is in operation Powell Butte's location and elevation are the reasons that this site is the central point for storage and distribution of the region's two primary water supplies Powell Butte will continue to play an important role in water supply in the future, as local and regional demand for water increases Possible roles for Powell Butte have been described in the recently completed Regional Water Supply Plan (Final RWSP, October, 1996)

This Master Plan provides short-term and long-term planning for water facilities on Powell Butte The primary planning objective for water facilities is to preserve options for potential facilities, and to provide information on the feasibility, impacts and costs associated with specific facilities

Powell Butte also offers unique recreational and environmental opportunities, having a diversity of upland meadow, forest and wetland habitats in close proximity to Johnson Creek. Powell Butte is a valuable recreational and environmental asset to the citizens of Portland and the region As such, Powell Butte is experiencing increasing pressure

on its resources and park facilities. This Master Plan addresses problems created by increased use of the park, including illegal activity, deterioration of park infrastructure and negative impacts on natural resources.

Finally, this Master Plan integrates the multiple uses of the Butte for water facilities and open space, and develops a plan which balances these two functions. Integrated planning for the future will protect the Butte as demands on both the water supply and the region's open spaces increase.

HOW WAS THIS MASTER PLAN DEVELOPED ?

The Water Bureau has funded and managed the preparation of the Master Plan, in collaboration with the Parks Bureau. The analysis and recommendations contained in this Master Plan are the product of sixteen months of dialogue and discussion by stakeholders with an interest in the future of Powell Butte.

Two primary project committees were established to carry out the work of this Master Plan. One project committee, the InterBureau Team, was composed of agency representatives from within City government, including City Bureaus and commissioners assistants. A second project committee, the Stakeholder Advisory Group, was composed of groups and interests outside of city government, including neighborhood associations, schools, environmental organizations, recreational interests and outside water districts. The planning process was also coordinated with other interested agencies, including Metro.

Public information and involvement formed the foundation of the master planning process. The Water Bureau acknowledged the importance of Powell Butte to the community and the region, and acknowledged that teamwork, dialogue and consensus-building offered the best chance for achieving lasting agreement on the future of multiple uses on Powell Butte.

WHAT ARE THE MAJOR WATER FACILITIES DISCUSSED IN THIS PLAN ?

As the city agency responsible for providing drinking water, the Water Bureau is responsible for planning to ensure the long-term reliability and efficiency of the water supply. A successful plan requires a strategy for addressing multiple uncertainties which affect the ultimate need, sizing and timing for construction of major water facilities.

Planned Water Facilities

Some water facilities can be predicted for Powell Butte with relative certainty Further analysis will better identify the need, timing and capacity of individual facilities Currently, the Water Bureau predicts a need for the following facilities and activities within the next twenty years

- A second buried reservoir of fifty million gallon capacity;
- A major water transmission conduit, to replace aging pipes currently bringing water from Bull Run,
- Increased earthquake protection for the existing fifty million gallon reservoir,
- Improvements to an existing buried disinfection vault,
- A small communication dish for video signals and data, and
- A facility to prevent the discharge of chlorinated water to Johnson Creek.

Potential Water Facilities

This Master Plan also provides planning for water facilities which may need to be located on Powell Butte at some time in the future The objective is to preserve the option for these facilities on the Butte, recognizing that additional study must be done to determine the need, location, timing and sizing of these facilities This Master Plan cannot, and does not, answer these critical questions This Master Plan does "reserve space" at the appropriate locations for these potential facilities, to ensure that short-term plans do not preclude future options for regional water supply Potential water facilities in the next fifty years may include

- Two additional buried reservoirs of fifty million gallon capacity;
- A regional transmission line to connect Portland and water supplies to the south,
- A second transmission conduit to replace aging Bull Run pipes,
- A water treatment plant for improved drinking water quality and quantity; and
- A twenty million gallon buried reservoir at a higher elevation on the Butte, to serve higher elevation areas surrounding Powell Butte and improve regional

water system interties, with an accompanying pump station

WHAT ARE THE MAJOR RECOMMENDATIONS OF THIS MASTER PLAN FOR WATER FACILITIES ?

Through proper design, construction and operation, major water facilities can be consistent with the vision for Powell Butte, as expressed by project stakeholders The major structures associated with the facilities described above, with the exception of the water treatment plant, will be completely buried Specific recommendations for buried facilities, which include reservoirs, pipelines and pump station minimize the impacts of these facilities on the park, and include

- Facilities should be designed to minimize visual impact Contours which blend with the natural topography should be restored, and disturbed surfaces should be revegetated consistent with desired habitat Appurtenances such as hatches and vents should be as unobtrusive as possible

- Minimize construction impacts, including the disposal of excavated material Most, if not all, fill material should be disposed off-site Some may be used for re-contouring or mitigation activities elsewhere on the Butte Only material needed to backfill should be stockpiled The rest should be hauled off-site immediately The stockpile location should be carefully selected at the time of construction to minimize impact to the park

The water treatment plant presents a special challenge because the facility cannot be entirely buried without incurring significant additional costs, which the committees judged to be not commensurate with benefits Recommended design and operational constraints for a facility at a specific location on the Butte include

- Conduct the appropriate studies and decision steps to evaluate the suitability of Powell Butte as a treatment plant site, against other potential sites Create avenues for public and agency input into the decision-making process

- If it is found that Powell Butte is an appropriate site for this facility, the following recommendations apply· Bury as much of the facility as is practicable, and follow the basic recommendations for buried facilities,

- Design above-ground structures as single-story and provide architectural treatment compatible with the Butte's rural history; and

- Provide additional mitigation for this facility to protect the unique character of Powell Butte Additional mitigation should extend beyond the area of impact

of the facility itself, to include the Butte as a whole Mitigation activities include acquisition of additional land to offset the loss of natural areas, environmental enhancement of other areas on the Butte and additional management and staffing to protect remaining resources

WHAT ARE THE MAJOR RECOMMENDATIONS OF THIS MASTER PLAN FOR PARK FACILITIES AND ACTIVITIES ?

Powell Butte should continue to be recognized as a nature park with natural resource-based recreational and educational uses This Master Plan contains an updated park design which emphasizes the primary importance of natural features on the Butte Important elements of park design include

- Natural areas Open meadow should be maintained and selectively expanded by improved management Natural drainage patterns will be utilized to create seasonal wet meadow areas, to enrich the variety of habitat in the meadow A habitat protection area will be designated in the southeast portion of the park.

- Trail system The trail system should be redesigned to increase protection of resources and reduce conflict among users Trail construction and surfaces will be improved Unauthorized trails will be eliminated Signage and trail use information will be improved

- Park Center The main entrance to the park should be enhanced, through improved design and surfacing of the road and parking areas A small interpretive center will provide information on Powell Butte plants and wildlife, recreation, and the water system Improved caretaker's quarters and restrooms will provide better security Landscaping using native plantings will screen developed areas in the Park Center and encroaching private development from the Butte's major viewpoints

HOW WILL IT ALL HAPPEN ?

This Master Plan contains recommendations for management and funding of the Powell Butte Nature Park. Major points of the Implementation Plan are

- Management of Powell Butte shall be conducted jointly by the Water Bureau and Parks Bureau

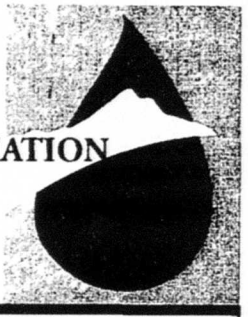
- The Bureaus will develop annually a workplan and budget for management

activities It is anticipated that management activities will generally fall in the areas of

- facilities maintenance (for both park and water facilities),
- security,
- public involvement,
- public education and interpretation,
- monitoring and maintaining the health of natural areas, and
- managing recreational impacts to the park

- Identified stakeholders will review the recommended workplan on an annual basis More extensive public involvement will be conducted when significant changes in water or park uses are proposed

- The Master Plan will be reviewed every five years and updated as needed, to respond to changing conditions and activities on Powell Butte and to incorporate the results of planning studies performed by the Water and Park Bureaus Until the Master Plan is updated, the two Bureaus agree to carry out the recommendations of the Master Plan, and to be guided in their decisions by the Vision and criteria set forth in this Master Plan



This section provides background and context for an understanding of the Powell Butte site, including its history, land use designations and key agreements governing its use

A BRIEF HISTORY OF POWELL BUTTE

Powell Butte lies in Southeast Portland, one of a series of volcanic lava domes which form the Boring/East Buttes Lava Domes Its location is shown in Figure 1-1 The 578-acre property, owned by the Portland Bureau of Water Works, has played an interesting and varied role in Portland's history

The City of Portland purchased the Wilson Homestead in April 1925 to preserve a site for future water reservoirs At that time, City engineers recognized limitations in the City's ability to meet projected daily water demands without additional in-town storage The 556-acre parcel was purchased for $135,000 from George Wilson, who had it under lease to Henry Anderegg The lease agreement allowed the Andereggs, founders of the Meadowland Dairy, to graze livestock on the property

The early history of the Butte was primarily given to activities surrounding the Andereggs' farm The Andereggs continued to farm the land on a lease from the City until 1946 and then continued to farm without a lease, but with an understanding that they would act as "caretakers" of the property until farming ceased prior to 1980

During its early history, many activities were proposed for the Butte by various groups, which was variously named the Wilson Homestead, Camp's Butte, the Anderegg Farm, Wilson Hill and most recently, Powell Butte Some of these proposed alternative uses were actually adopted by the Portland City Council, but for various reasons never came to pass Some of the more interesting proposals included a prison farm, public shooting range and clubhouse, a golf course, and a police academy

In 1935, the Federal Government requested purchase of an acre at the top of the Butte for the purpose of establishing a world-wide radio monitoring station The Southeast Portland Chamber of Commerce also proposed that an airport be established on the Butte at that time, to put 2,000 men to work for the 10 month construction period

In 1946 the City Commissioners decided there was no need for water storage on Powell Butte The plan of action turned towards developing the area as a prison farm to house City jail prisoners Quonset huts were to be brought in from Camp Adair for

living quarters, and the second growth timber on the property was to be used for firewood In 1947, the idea of establishing the "Camps Butte Down-and-Out Farm" surfaced This idea was to rehabilitate non-criminals who needed medical treatment The men confined there would be given "cures for habitual drunkenness and use of narcotics and they would be required to work on the farm" (Oregon Journal, April 4, 1947) Development of the Down-and Out-Farm was put to bid, but all bids were rejected by the City

By the 1950's the City returned to its original interest in Powell Butte as a site for water reservoirs The concept of allowing multiple uses in conjunction with the reservoirs was introduced, tempered with concern about the potential vulnerability of large open reservoirs to recently developed atomic devices It was during this time that the concept of covered reservoirs on the Butte was discussed Other uses proposed in conjunction with the reservoirs in the 1950's included a Community Center and a perimeter airport/heliport for private planes and helicopters

During the 1960's the City entertained the idea of putting together a residential development plan for the portions of the Butte that were deemed unnecessary for water reservoirs The sale of residential properties would be used to pay for the development of the planned water reservoirs A 1968 proposal included a community rifle range and clubhouse, plus a highly developed park which would feature ball fields, archery swimming, tennis, golf and horseback riding The Water Bureau did not support these improvements, and was instrumental in blocking development of the Butte through the years

During the 1970's, residential development was happening at an accelerated pace in southeast Portland Development was occurring at a time when Multnomah County ceased enforcement of mandatory developer dedication of land or money for neighborhood parks, because the County could no longer afford land maintenance costs This meant that the responsibility for providing parks in the area fell to the City of Portland, as City annexation of county land proceeded in the area Powell Butte became the focus of interest for both a neighborhood active recreation park (i e ball fields) as well as a regional passive recreation park. Also during this time, the Portland Water Bureau prepared a development plan for the Butte which identified the need for four 50 million gallon (mg) underground reservoirs to be located on the north side of the Butte

As more people moved into southeast Portland, they began to discover the recreational amenities that Powell Butte had to offer Significant wildlife habitat on the Butte and panoramic views of outstanding quality extending beyond its boundaries attracted informal (and unauthorized) use by hikers, horseback riders, bird watchers and various other users Powell Butte, with its steep side slopes and its predominantly gentle and

rolling meadow landscape, also attracted uses which were detrimental to the quality of its natural resources Since the 1960's, off-road motor vehicles, dirt bikes and motorcycles had accessed the Butte However, unlike the passive uses, such as hiking and bird watching, the vehicles and motorcycles scarred the vegetative cover of the open field and rutted the trails on the slopes of the Butte Subsequent erosion damaged the surface of many of the trails beyond repair Security measures taken by the Water Bureau and periodic increases in police patrolling of the site resulted in subsidence of the misuse

Development of Powell Butte for water facilities began in the 1960's, with the construction of the first of Powell Valley Road Water District's two above-ground reservoirs Powell Valley's second reservoir was constructed in the 1970's Design of the City of Portland's buried 50 million gallon reservoir began in 1977, and construction was completed in 1980 Landslides on the steep north slope of the Butte in the early 1980's prompted the Water Bureau to construct major drainage canals on the site in 1982 A major transmission pipeline, the Washington County Supply Line, was constructed in 1983 This 66-inch diameter pipe delivers water from Powell Butte to Washington County customers, and greatly reduced the amount of pumping which had been required to serve these areas

PLANS AND POLICIES GOVERNING POWELL BUTTE

The Portland Water Bureau constructed the first 50 mg underground reservoir in

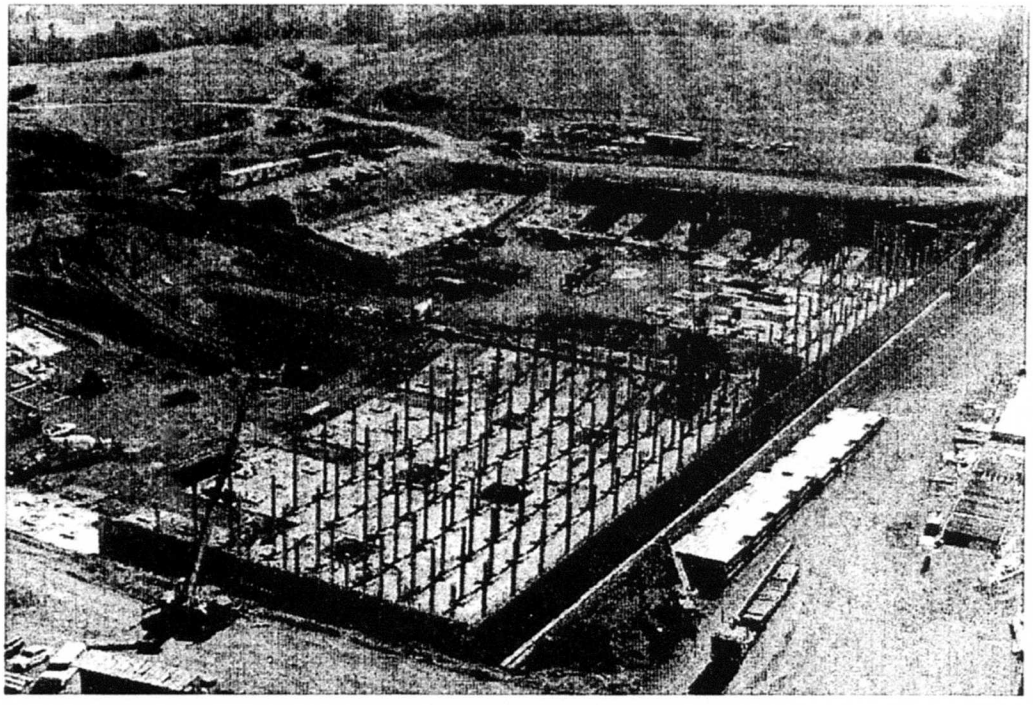


Figure 1-2

1980 In 1983, the Water Bureau and Parks Bureau agreed to participate in a collaborative effort to develop and manage the Butte as a park for outdoor recreation, in conjunction with planned water facilities Staff from the Parks Bureau prepared a Master Plan for Powell Butte in 1986 Funds were allocated from the Water Bureau and obtained through a grant from the federal Land and Water Conservation fund for implementation of the Master Plan, including construction of needed park amenities Since 1983, the Parks Bureau and the Water Bureau have worked together to manage Powell Butte as a unique nature park, as well as a location for regional municipal water facilities Current property boundaries and major features on and around the Butte are shown in Figure 1-3

InterBureau Agreement

In 1987, the City of Portland adopted an Interbureau Agreement between the Bureau of Water Works and the Parks Bureau The purpose of the agreement was to set forth the specific roles, responsibilities and uses of Powell Butte between the two City bureaus Key provisions of the agreement include

- The Water Bureau shall retain ownership of the Butte,
- The Parks Bureau will use and develop Powell Butte as a public park based on the development plan described in the 1986 Powell Butte Master Plan Any future amendments to the 1986 Master Plan shall be reviewed and approved by the Water Bureau and be consistent with the U S Department of Interior regulations dealing with property developed with Land and Water Conservation funds, The central, crown area of the Butte shall be designated as a "critical water supply area" subject to the Water Bureau's unrestricted right to place water service facilities on or beneath its surface The Water Bureau must provide six months notice prior to construction of water facilities at any spot on the Butte, and
- This agreement is in perpetuity However, the parties acknowledge that the City of Portland's water needs are paramount and will require the placement of future water facilities on or beneath the surface of Powell Butte in both the critical and non-critical water use areas

1986 Powell Butte Master Plan

Commissioned in 1986, the first Powell Butte Master Plan was adopted by the Portland City Council in August 1987 The plan provided for the joint development and utilization of Powell Butte by the Park Bureau for park and recreation purposes and the Water Bureau for water service-related uses Multiple management policies, uses

and planned facilities are identified in the plan including planned water reservoirs, park amenities and natural areas

The plan includes objectives and a set of recommendations that were derived through an extensive public involvement and planning process Proposed uses for Powell Butte set forth in the 1986 Master Plan are as follows

- Uses that will enhance appreciation of the natural environment of the Butte and offer outstanding visual experiences while providing opportunities for physical fitness,
- Uses that will capitalize on the natural environment and history of the Butte for educational purposes,
- Uses that will facilitate enjoyment of the Butte by all ages and from all segments of society; and
- Uses that are consistent with existing plans and requirements of the Water Bureau

The plan includes a brief history and description of the site, adjacent land uses, zoning, existing and potential future water reservoir locations and natural features The plan recommended facilities such as a public access road, a trail system, a demonstration farm and visitor facilities

Other Plans and Agreements

Johnson Creek Resources Management Plan, 1995

This comprehensive plan provides for management of resources in the Johnson Creek watershed Johnson Creek receives runoff from tributaries on Powell Butte This plan sets forth specific natural resource management provisions for Powell Butte More detail on this plan and its provisions is included in Appendix A

Outer Southeast Community Plan, 1996

This plan seeks to guide growth and development in outer southeast Portland to the year 2015 The plan designates Powell Butte as open space and contains provision for protection of natural areas on and around the Butte This plan was based in part on the recommendations contained in several neighborhood plans One of these, the Pleasant Valley Neighborhood Plan (October, 1995), describes the planned and potential water facilities contained in this Master Plan More detail on the Outer Southeast Community Plan is included in Appendix A

LAND USE AND ENVIRONMENTAL CHARACTERISTICS OF POWELL BUTTE

Land uses on Powell Butte are governed by multiple adopted planning designations The most important of these designations applied to Powell Butte are the Open Space (OS), Environmental Conservation (EC) and Environmental Protection (EP) zones which are identified in Figure 1-4

Powell Butte is zoned almost entirely OS The purpose of this zoning designation is to preserve open and natural areas including scenic qualities, opportunities for outdoor recreation, contrasts to the built environment and capacity and water quality of the stormwater drainage system The OS zone is applied to the entire area that comprises Powell Butte including both the meadow and the forested areas

The OS zone is somewhat restrictive in the types of uses that are allowed The Portland Zoning Code specifies that only agricultural uses and minor park facilities can be allowed on Powell Butte without obtaining a Conditional Use permit Other uses are allowed in the OS zone, but only through Conditional Use review Basic utilities are uses specifically identified in the OS zone as requiring a Conditional Use review Most of the park and water facilities identified for development in this plan are subject to the OS Conditional Use review process

In addition to the OS base zone, the Butte contains two forms of an environmental (e-zone) overlay zone The purpose of the e-zone is to protect significant natural resources and functional values identified by the City Functional values are defined as the benefits provided by resources They may be physical, aesthetic, scenic, educational, or some other nonphysical function, or a combination of these Two variations of the e-zone are applied to Powell Butte The EC or "c" zone is applied to the area generally identified as the meadow The EP or "p" zone is applied to the forested area.

The "p" zone is the most restrictive and requires that it be demonstrated that there are no alternative locations within the City for proposed improvements, in order to justify locating improvements in this zone If development were to be proposed for the p-zone, a Natural Resources Management Plan (NRMP) would probably be required by the City of Portland's Bureau of Planning An NRMP must identify management objectives to maintain and enhance resources, must provide a detailed assessment of the natural resources of Powell Butte, must specify allowed and prohibited uses and must identify facilities, environmental impacts and types of mitigation, timetables and other information The City has recently approved NRMP's for Forest Park and for Smith and Bybee Lakes

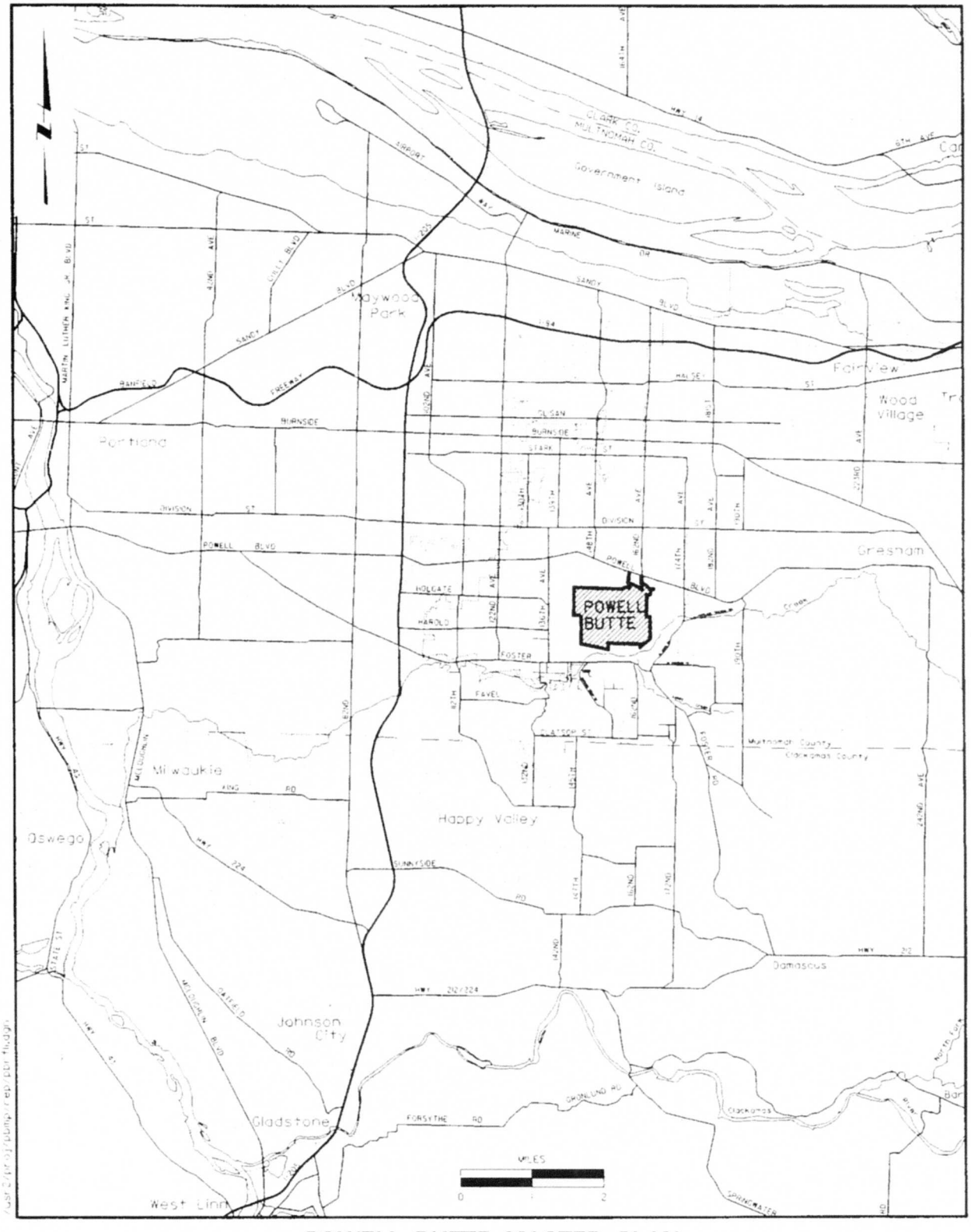
In this Master Plan, no water facilities or constructed park facilities are proposed for development in the "p" zone

The "c" zone is less restrictive and allows facility development provided specific environmental issues are adequately addressed All park and water facilities proposed to be developed within this plan will be subject to the Environmental Review process predicated by the "c" overlay zone and the Open Space base zone The Portland Zoning Code does allow some exemptions for minor uses and/or alterations to existing uses, which would apply to minor park improvements such as modifications to the trail system Generally, the e-zone regulations apply to any development, impact on native vegetation, change in topography, grading, excavation and fill, and resource enhancements on the Butte

Mitigation may be required to address environmental impacts resulting from the construction and operation of water facilities on Powell Butte Recommended mitigation strategies are discussed later in this Master Plan

Finally, the environmental zone currently prohibits the bulk use of hazardous substances anywhere within the zone Essential water treatment chemicals which are needed for the current operation of water facilities on Powell Butte, and which will be required to support the operation of proposed and potential water facilities on Powell Butte fall under this prohibition The City will have to amend the e-zone regulations to resolve this conflict between the necessary protection of the public water supply and protection of the environment This prohibition also affects the City's water facilities in other e-zoned properties, including storage reservoirs at Washington Park. Possible resolutions to this issue include an exemption to this prohibition for water treatment and distribution facilities in the e-zone, approval on a case-by-case basis or resolution through a Conditional Use Master Plan permitting process

A detailed discussion of the environmental characteristics which form the basis for the environmental zoning on Powell Butte is given in Appendix B, including topography, soils, geology, hydrology, scenic resources, vegetation, habitat, wetlands and wildlife A current compilation of field-verified plant species is given in Appendix C, and animal species are listed in Appendix D



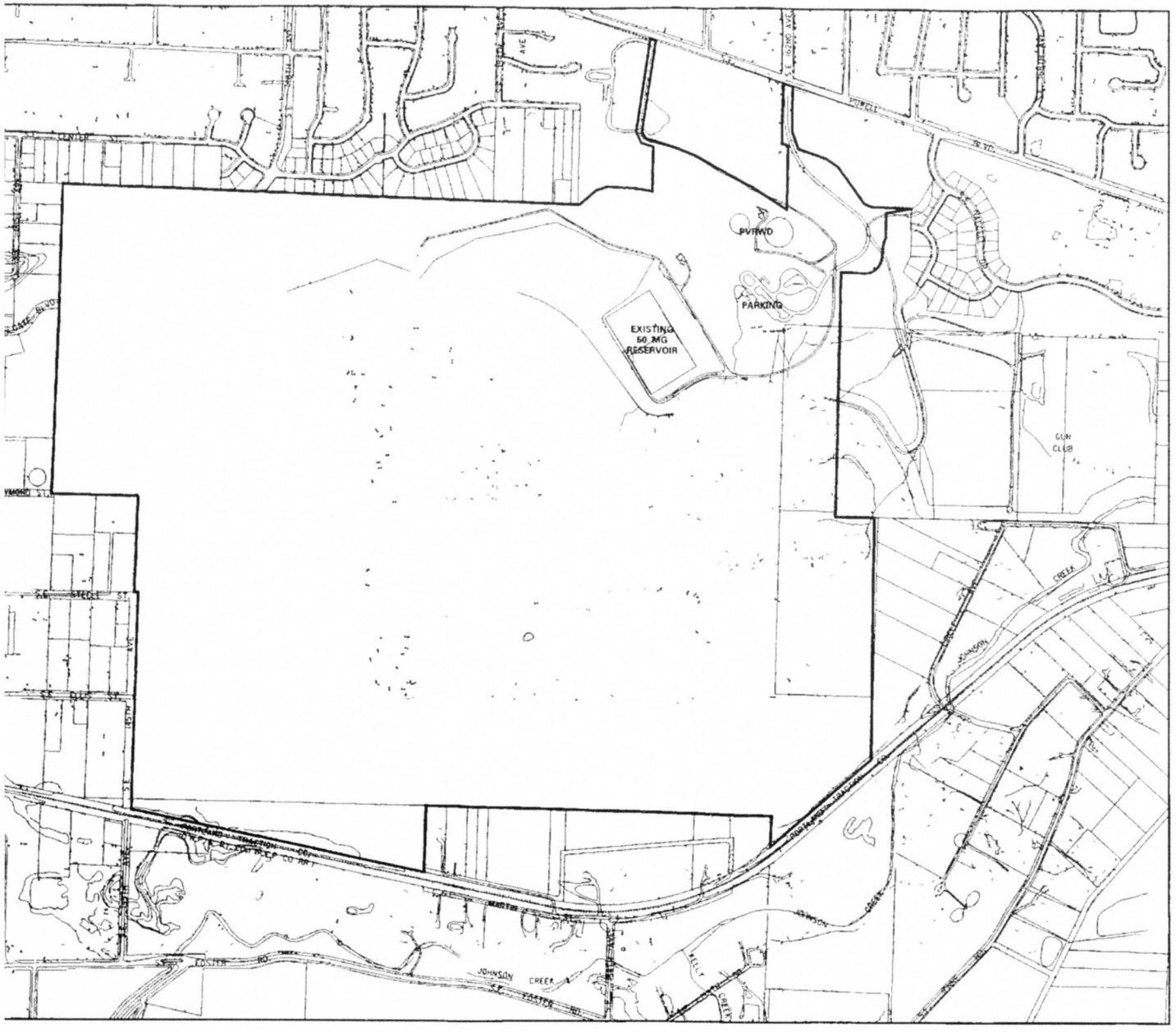
POWELL BUTTE MASTER PLAN
VICINITY MAP

FIGURE 1–1

MONTGOMERY WATSON

Portland, Oregon

35571



LEGEND

PROPERTY LINE

EXISTING VEGETATION

N

POWELL BUTTE MASTER PLAN
SITE MAP

FIGURE 1-3

MONTGOMERY WATSON

Portland Oregon

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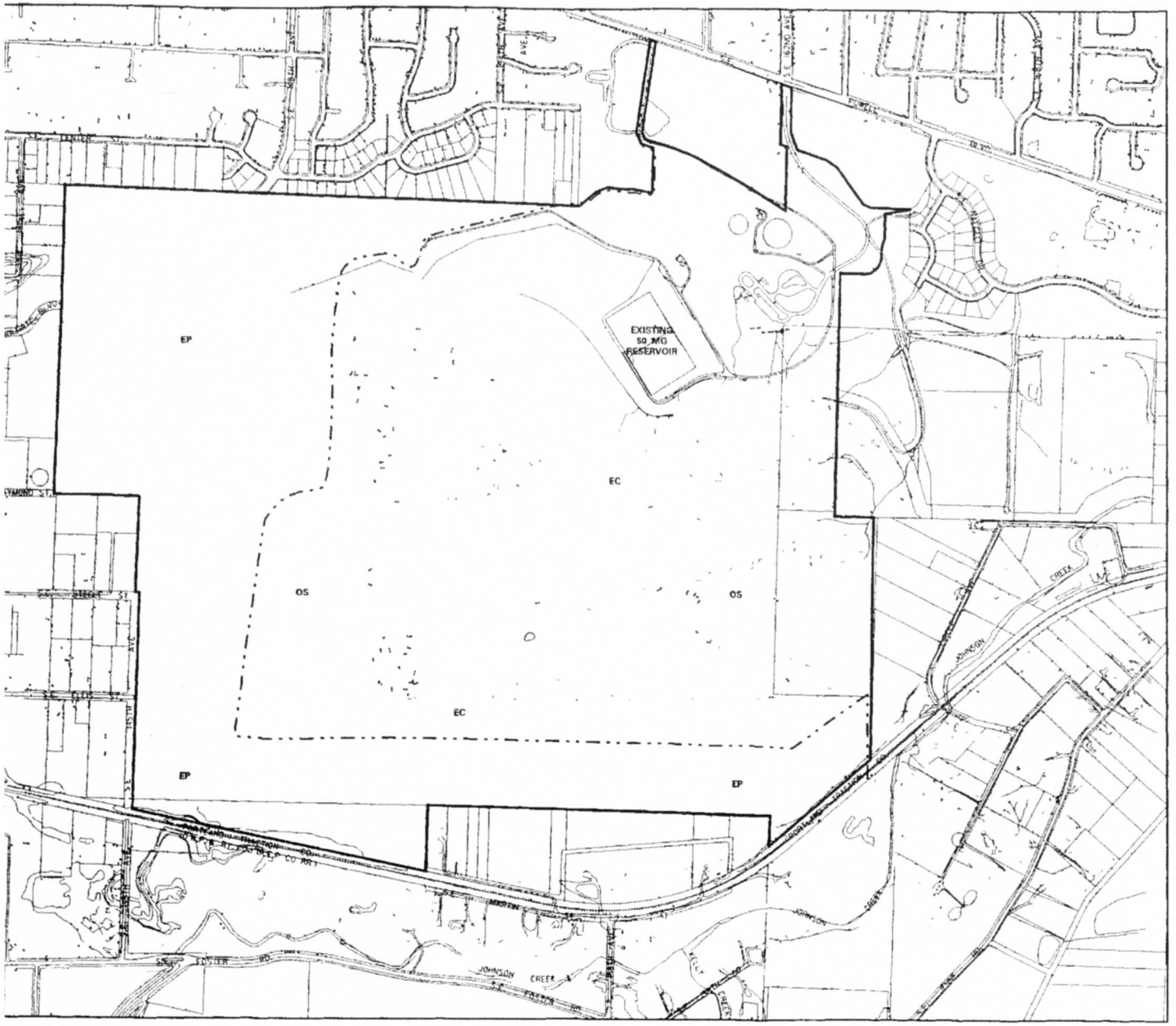


LEGEND

———	PROPERTY LINE
	EXISTING VEGETATION
EC	OPEN SPACE – ENVIRONMENTAL CONSERVATION ZONE
EP	OPEN SPACE – ENVIRONMENTAL PROTECTION ZONE
OS	OPEN SPACE ZONE

N

CITY OF PORTLAND OREGON 1851

POWELL BUTTE MASTER PLAN
ENVIRONMENTAL ZONING

FIGURE 1-4

MONTGOMERY WATSON
Portland Oregon

This section provides basic information on the Master Plan project, including WHY the project was undertaken, WHAT the Master Plan contains in summary, and WHO were the project participants

PURPOSE OF THE MASTER PLAN PROJECT

This document serves as an update to the 1986 Master Plan After ten years, it is appropriate for the community to review issues related to both park uses and the region's water distribution system

The Need For Water Facilities Planning

Powell Butte As An Element of the Regional Water Supply System

The City of Portland's primary water supply is surface water from the Bull Run watershed, which lies about 35 miles east of the city Three large diameter pipelines carry water from the Bull Run directly to the Powell Butte reservoir, as illustrated in Figure

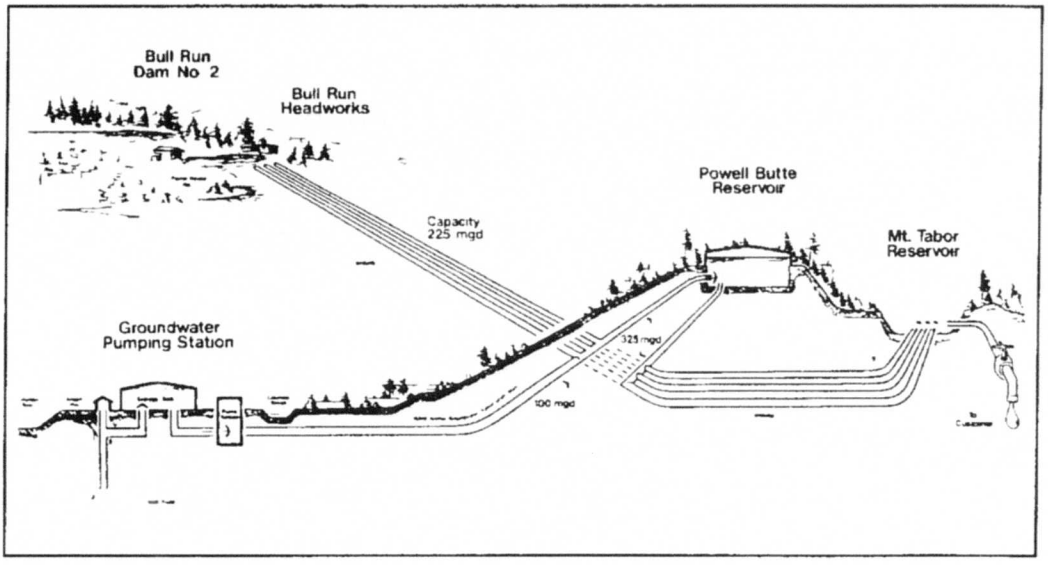


Figure 2-1

2-1 The fifty million gallon Powell Butte reservoir then distributes this water by gravity to the open reservoirs on Mount Tabor and Washington Park, as well as to Washington County through the Washington County Supply Line The Powell Butte reservoir also receives the City's groundwater supply when the Columbia South Shore

Wellfield is in operation, and blends groundwater and surface water prior to distribution Groundwater serves as Portland's backup supply in case of emergency, and as a supplemental source when the region's needs exceed the available surface water supply

Powell Butte's location, elevation and size are the reasons that this site is the central point for storage and distribution of the region's two primary water supplies the Bull Run and Columbia South Shore Wellfield Its elevation assures that it can receive water by gravity flow from the existing conduits as well as the planned Conduit 5 It is high enough to supply water to nearly all major storage points in the region by gravity Finally, its size allows ample space for major water facilities, at a location which is easily accessible and maintained Powell Butte will continue to play an important role in water supply in the future, as regional demand for water increases and as drinking water regulations continually become more stringent

For the future, Powell Butte has been identified as a continuing regional reservoir site for in town storage of Bull Run water, and potentially for a Columbia River supply option, as described in the recently completed Regional Water Supply Plan (Final RWSP, October, 1996) Powell Butte has also been identified as a link in several major regional transmission corridors Regional transmission corridors connect water demand centers and supply local transmission facilities Powell Butte could receive water from a potential water treatment facility for the Bull Run at Lusted Hill, east of the city The RWSP has identified the potential for increased supply from the Bull Run by construction of a third dam Alternatively, Powell Butte could receive treated or raw water from a potential Columbia River source from the north, and from a Clackamas River source to the south Finally, Powell Butte could connect to western supplies, including potential Willamette River and Tualatin River sources and storage via Beaverton

Ongoing planning efforts will further refine the timing, capacity and scope of possible improvements to the Powell Butte site

Master Plan Objectives

The Master Plan provides short-term and long-term planning for water facilities on Powell Butte The primary planning objective for water uses is to ensure that options for water facility placement are not precluded by other facilities or activities Further study will identify the need, timing and capacity for specific facilities In addition, the master planning process provides information to the Water Bureau on feasibility, design constraints and costs associated with specific facilities This information, used in conjunction with other planning results, helps the Water Bureau to clarify strategies

for overall system improvements

The Need For An Update To The Park Facilities Plan

Previous sections have discussed Powell Butte's unique natural characteristics, and its importance as a piece in the larger pictures of Johnson Creek and Outer Southeast Portland resources

This Master Plan addresses problems created by the rapid development of areas surrounding the Butte, as well as problems resulting from increased pressures on park resources

Master Plan Objectives

This Master Plan provides an updated design for the Powell Butte Nature Park The design incorporates activities and facilities which meet the needs of City and regional users, in a manner consistent with community values and goals The design showcases some of the unique natural aspects of the Butte, and seeks to better protect those natural resources which are threatened by human impacts Finally, the design ensures the future ability of Powell Butte to function as a multiple-use site, for open space and water facility needs

MAJOR COMPONENTS OF THE MASTER PLAN

Water Facilities Plan

The Master Plan provides short-term and long-term planning on Powell Butte for planned and potential water transmission, storage and treatment facilities to serve the City of Portland and the region As the city agency responsible for providing drinking water, the Water Bureau must perform planning to ensure the long-term reliability and efficiency of the water supply Prudent planning requires facing multiple uncertainties with respect to the ultimate need, sizing and timeline for construction of major water facilities Further study will define the need, sizing and timing for specific facilities

Planned Water Facilities

Some water facilities and activities can be predicted for Powell Butte with greater certainty Increasing demands for water in the City and region, stresses on other major components of the City's water system and aging of major water system components predict a need for the following facilities and activities on Powell Butte within the next 20 years

- A second buried reservoir of 50 million gallon capacity This would double the

existing capacity of storage at Powell Butte and would increase system reliability by providing backup storage to the existing 50 mg reservoir,

- A major water transmission conduit to bring water from the Bull Run watershed to Powell Butte This conduit would replace one of the three existing, aging conduits or would be used in conjunction with existing conduits to increase delivery capacity,

- Seismic upgrade for the existing 50 million gallon buried reservoir, to reinforce this critical facility;

- Upgrade of an existing buried vault to improve disinfection capability during emergency conditions,

- A small microwave dish to transmit water facility data and video signals to the Water Control Center in northeast Portland, and

- A facility to prevent the discharge of chlorinated water to Johnson Creek

Potential Water Facilities

This Master Plan also provides planning for water facilities for which the need and timelines are very uncertain The objective of the Master Plan is to preserve the option for these facilities on Powell Butte, recognizing that much additional study must be done to determine the ultimate need, location, timing and size of these facilities The current Master Plan cannot and does not answer these critical questions The current Master Plan does "reserve space" for these potential facilities at appropriate locations, to ensure that short-term plans do not preclude future options for regional water supply Further study will define the need and timing for these improvements

This Master Plan also provides a conservative estimate of facility impacts in terms of land area requirements and environmental impacts It is anticipated that water facilities which may be constructed several decades into the future will benefit from technological advances permitting smaller footprints and less environmental impact Planning using today's design criteria for tomorrow's facilities results in conservative estimates, ensuring that future facilities will not have greater impacts than those described in this Plan

Potential facilities for which Powell Butte will be considered include

- Additional buried reservoirs, of similar size and shape to the original 50 million gallon reservoir, for additional storage,

- A regional transmission pipeline to connect Portland and water supplies to the south,

- A second major transmission conduit to bring water from the Bull Run to Powell Butte, to replace aging conduits or to support the operation of larger storage facilities ,

- A water treatment plant for the treatment of the Bull Run supply, possibly blended with other supplies such as groundwater,

- Buried storage at 600 foot elevation to serve areas of higher elevation surrounding the Butte, and to better serve the region, and

- A pump station to serve the 600 foot tank, to generate hydropower from water flowing to lower elevations and enhance conduit capacity from the Bull Run

The Master Plan describes the location, anticipated layout and design constraints on these facilities The Master Plan also discusses environmental impacts of these facilities and recommends mitigation activities where appropriate

Park Plan

The second major component of this Master Plan is an update to the design of the Powell Butte Nature Park A physical plan for design of the park was first described in the 1986 Powell Butte Master Plan The current plan expresses the community's current vision and responds to needs observed in the ten years since development of the original master plan

A major element of park design focuses on the natural features of Powell Butte and the characteristics which make this park unique, and recommends design features to enhance these characteristics The park plan revises the current trail system to improve patterns of recreational use and protect natural values of the Butte Finally, the park plan describes proposed road and parking improvements and recommended modifications to built facilities

Implementation Plan

The third and final component of the Master Plan is a recommended program to carry out the improvements described in this plan Additional attention, commitment and funding is necessary to assure preservation of the important natural and recreational values that Powell Butte offers the citizens of Portland

The Implementation Plan describes the sharing of operational and fiscal responsibility

between the Water and Parks Bureaus and community representatives, for management of the Nature Park. The implementation program sets up a system for ongoing public involvement and for routine revisions and updates to the master planning process The implementation program identifies and addresses some of the critical management issues for Powell Butte, including impacts of recreational use on natural areas, improved security and educational opportunities

PROJECT PARTICIPANTS

The Water Bureau has led the preparation of the 1996 Master Plan, with the Parks Bureau as a partner in this effort Many other people have given their time to voice their concerns and express their vision for the future of Powell Butte These project participants include representatives of recreational groups, environmental interests, neighborhood associations, schools and other city bureaus

Project participants were organized into two advisory groups These two groups have developed the recommendations and conclusions contained in this Master Plan over an eighteen-month period One advisory group was composed of agencies within city and regional government, having an interest in Powell Butte This project committee was called the "InterBureau Team" and included

Water Bureau -	Bob Willis, Principal Engineer Teri Liberator, Senior Engineering Associate Lorna Stickel, Chief Planner
Park Bureau -	Jim Sjulin, Natural Resources Supervisor John Sewell, Chief Planner
Bureau of Planning -	Duncan Brown, Senior City Planner
Bureau of Environmental Services -	Eric Machorro, Environmental Specialist
Commissioner Hales -	Susan Des Camp, Commissioner Assistant
Commissioner Lindberg -	Jeff Golden, Commissioner Assistant

Another advisory group was composed of groups and interests outside of city government, having an interest in Powell Butte This group was called the "Stakeholder Advisory Group" and included

Audubon Society -	Phil Lehenbauer
Centennial Neighborhood Association -	Bob Luce

Friends of Powell Butte -	Ralph Thomas Rogers
Friends of Springwater Trail/Johnson Creek -	Jan Bosio
City of Gresham -	Dale Anderson
Multnomah County Sheriff's Posse -	Bill Goss
Pleasant Valley Neighborhood Association -	Linda Bauer
Portland United Mountain Pedalers -	Jack Chilson
Powellhurst-Gilbert Neighborhood Association -	Jack Vahey
Powell Valley Road Water District -	Tom Pokorney
Schools Liaison -	Linda Miller
Tualatin Valley Water District -	Jesse Lowman
40 Mile Loop Land Trust -	Bob Akers

The project was also coordinated with other interested agencies, including Metro Water Bureau staff provided technical input and discussion in the areas of water quality, operations, engineering, maintenance, planning and public involvement

PUBLIC INFORMATION AND INVOLVEMENT

Public information and involvement formed the foundation of the master planning process The Water Bureau emphasized public involvement as the central aspect of the master planning process, and dedicated more than one third of the master plan budget to this effort The Water Bureau recognized the importance of Powell Butte to the community and to the region, and realized that teamwork, dialogue and consensus-building offered the best chance for achieving lasting agreement on the future of multiple uses on Powell Butte

This section describes the many components of public involvement in the master planning process, and discusses how these activities were used to create the Master Plan

Stakeholder Surveys and Interviews

Between July 24 and August 7 1995, interviews were conducted with approximately fifty stakeholders The interviews comprised a thorough list of individuals with some interest in or relationship to Powell Butte Stakeholders included neighborhood associa-

tions, recreation and environmental groups, water purveyors and government agencies Almost all of the interviews were conducted in person, and explored with the stakeholders their particular views on issues, vision, opportunities, problems, and responsibilities related to Powell Butte

The interviews were used to provide information to the master planning team about the environment which existed prior to the start of planning The interviews revealed that most stakeholders were highly committed to a positive future for Powell Butte Although there were some potentially conflicting goals, stakeholders recognized the validity of other uses and goals Both water and parks interests placed an extremely high value on the Butte as a unique site A consistent vision for the nature park emerged, as a place emphasizing passive, nature-based recreation, with a minimum of constructed facilities Security and enforcement of rules was a major concern for nearly all stakeholders

Project Advisory Groups

Two project advisory groups conducted the bulk of the work for development of this Master Plan These two groups have been described in Section I as the InterBureau Team (IBT), composed of agencies within city and regional government, and the Stakeholders Advisory Group (SAG), composed of groups and interests outside government.

The InterBureau Team functioned as an advisor to the Water and Parks Bureaus for development of the Master Plan, to ensure that the plan was one that would work, legally and operationally, and that it would be consistent with the City's goals and requirements The SAG functioned as an advisory group to the IBT, to ensure that the plan was consistent with the values and vision of the community and users of the Butte

These groups met approximately monthly during the course of the project Their tasks were first to develop a vision statement for Powell Butte, providing overall guidance to the planning process, and then to develop a set of decision criteria to evaluate park and water facilities design concepts These groups also reviewed specific design elements for parks and water uses, and provided input into the implementation program elements for the Butte The content and recommendations of this Master Plan are supported by both project advisory groups

Public Workshops

Two public workshops were held during the master planning process These workshops served to inform the general public of project activities and to solicit additional

Open House Workshop # 1 - October 25, 1995

The workshop was held at Lynchwood Christian Church near Powell Butte Approximately 30 people attended, mostly residents of Southeast Portland who had been informed of the project by direct mail delivery of an informational newsletter The purpose of the workshop was to provide the public with information about the project and to solicit citizen input on concerns and issues

Three primary concerns emerged from the workshop One was a strong desire to preserve Powell Butte park as a nature park, emphasizing nature-based recreation A second major concern was to protect the Butte from encroaching development Neighboring residents expressed their support for orderly development which will protect natural resources They felt that the unique character of Powell Butte was in danger of being obliterated by development occurring in that portion of Southeast Portland Workshop participants also felt that increased use pressures and the lack of enforcement were causing personal security and vandalism problems on the Butte They felt strongly that this was a major problem which affected not only users of the Butte, but homeowners in surrounding areas as well

Open House Workshop # 2 - October 12, 1996

The second open house workshop was held at the Powell Butte caretaker's residence from noon to 4 00 p m The purpose of the event was to encourage public review of the key proposals contained in the draft Master Plan About 60 people attended (not including project-related staff and committee members), despite extremely rainy weather

One key issue that emerged was concern and opposition to separation of trail uses This view was expressed by mountain bikers, who feel that they are currently the largest users of the Butte, that they have been primarily responsible for trail maintenance over the past several years, and that conflicts between user groups can be adequately addressed by better education

Some participants expressed concern that the recommended development of the Park Center was not consistent with the expressed vision for a nature park. The primary improvements of concern were paving the parking area and upgrading the caretaker's residence

Apart from these two comments, participants comments were positive in general, with support for many improvements and appreciation expressed for the opportunity to review and comment on the proposals

Briefings and Meetings

The project scope includes briefings to interested groups, including the Water Bureau's Water Managers Committee, Portland City Council, the Portland Planning Commission and the Regional Water Providers In addition, six informational presentations were made during the planning process to the three neighborhood associations adjacent to Powell Butte' including Centennial, Pleasant Valley and Powellhurst-Gilbert Neighborhood Associations These presentations provided project information to residents of the area and solicited public input and comment on master plan recommendations

Newsletters and Mailers

An initial mailing of a project newsletter was made to 1,500 residences surrounding the Butte and to interested agencies and individuals A second project newsletter was sent to approximately 500 residences and individuals In addition, regular mailings provided notice of project meetings to approximately 150 surrounding residents and project participants Project newsletters also solicited public input on specific issues and aspects of the planning process by inclusion of a return mail questionnaire A final newsletter will be distributed following adoption of the Master Plan, summarizing the plan's recommendations and informing people of ongoing opportunities for involvement

This section provides information on the planning process used to develop the recommendations contained in this Master Plan

AN OVERVIEW OF THE PLANNING PROCESS

Powell Butte is an important resource for Portland and the entire region It is strategically located for water storage, delivery and treatment In addition, Powell Butte contains unique natural resources and recreational opportunities The process for developing a Master Plan which can satisfy these multiple interests is complex and challenging

The planning process developed for this project can be described in five steps

Scanning - the first phase of the planning process, in which information is gathered to guide development of the planning process,

Initiating - in which stakeholders are notified of the project and invited to participate, and project committees are formed,

Focusing - in which issues, values and goals are identified, and stakeholders begin to develop common objectives and consensus,

Designing - in which facilities are identified, and alternatives evaluated with respect to stakeholder goals and criteria, and

Selecting - in which final design recommendations are made

The following sections describe the results of this process in more detail

THE SCANNING PROCESS

The initial phase of the planning process included an inventory and summary of existing plans, documents, agreements and other written commitments made by the City of Portland in connection with Powell Butte Also, a series of interviews were conducted with approximately fifty people familiar with the Butte or responsible for decision-making in connection with the Butte The interviews established stakeholder likes, dislikes, concerns and opportunities The purpose of this phase was to identify existing issues and relationships in order to bring them into the planning process

THE INITIATING PROCESS

The second stage of the planning process brought together the agencies and individuals who would guide the project and provide needed information and comment Primary committees were formed (the InterBureau team and the Stakeholder Advisory Group) to develop the recommendations contained in this Master Plan

THE FOCUSING PROCESS

This phase formally identified the issues and values which would determine the plan's final outcome Input was received from the InterBureau Team and Stakeholders Advisory Group, as well as from the public at an open house workshop The community's issues and values were clarified and prioritized by the project committees

The final listing of issues, not prioritized, included

Water Issues

Meeting the region's future water needs,

Controlling additional land at the base of the Butte for future piping access,

Maintenance,

Reliability of system (regional),

Hydraulics (pump vs gravity), and

Public safety

Parks Issues

Preserving/enhancing the nature park,

Vistas from and to the Butte,

Land use protection from encroaching uses,

Biological connection to Johnson Creek, and

Park funding

General Issues

Personal security,

Well educated decisions, not just popular,

Stakeholder involvement,

Agency coordination,

Integrating existing city policies,

Maintaining multiple uses,

Building partnerships,

Code compliance,

Biological concerns, and

Mitigation of negative impacts

Based upon the expression of issues and values, it was possible to create a vision statement which articulated an image for Powell Butte's future

Vision Statement

To provide a common focus and to give project participants an opportunity to develop agreement about the Butte's future, the following vision statement was developed The vision statement was used to maintain perspective and to aid in decision-making The vision was particularly important in determining appropriate park facilities and uses The final Vision Statement as adopted by the project committees is given below, and reflects stakeholders' vision for the Butte in the year 2015

POWELL BUTTE IS RECOGNIZED AS AN IMPORTANT REGIONAL/ COMMUNITY SITE AND RESOURCE.

The addition of water facilities, natural park amenities and programs has increased both the use and the public recognition of Powell Butte as important to Portland and the Region Because of this dual responsibility each public resource has developed with the recognition that the other resource must be considered in all project designs

Fortunately many instances where the two activities complement each other have been found Water facilities developed on the Butte have been constructed in a balanced manner so as to protect the visual appearance of the area, while allowing the biological resources of the area to be maintained, and in some instances enhanced Improvements are developed in a manner that enhances both the water facility and park amenity needs of the region, as well as the local community's concerns for recreation and visual amenities

The public recognizes that Powell Butte plays a key role in the provision of water and open spaces in Portland and throughout the region

Although recognized for its regional significance as an open space resource the Butte has also become a valued community resource for nearby residents

As an important site for numerous regional scale natural resources the Butte is kept accessible for many open space and educational activities Wildlife and natural resource elements of Powell Butte have been enhanced as part of the overall management of the area Activities on Powell Butte are monitored and managed to protect the natural resource values of the site

An important part of the Butte's success has resulted from continuing efforts to educate people about how to use the Butte's resource areas for open space, recreation and water facilities, while preserving the natural resource values of the site

Overcoming a variety of challenges has resulted in increased public safety and comfort when using the Butte, although this is an ongoing concern

Powell Butte is the home of a diversity of public water and park uses, developed compatibly with the natural resources of the site

Part of the reason for the Butte's success is the growing operational and financial partnership among the managing agencies and other Butte users

It is the physical and natural assets, diversity of uses and coordinated commitment that has made the Butte such a popular and important place

Decision Criteria

With the acceptance of the Vision Statement and an understanding of the values important to the participants, it was then possible to create evaluation criteria These criteria were important to making effective choices among alternatives, and in prioritizing various factors in the planning process The criteria were also used as goals to be achieved by this Master Plan Criteria were not ranked or weighted

The criteria were divided into two categories for ease of use and to clarify their purpose The first section dealt with the physical development of the Butte and focused on how the Butte would appear and function as a result of this Master Plan The second segment dealt with the ongoing activities, with special attention given to the park programs that would be so visible on the Butte

The Goals/Decision Criteria were developed over a several month period by the project committees, and were adopted as follows

Physical Design Criteria *(criteria are not ranked)*

The Master Plan should

1 Be consistent with regional, sub regional and local water supply and other infrastructure plans,

2 Maintain opportunities for meeting future water needs,

3 Assure systems and services can be provided at an affordable cost in an effective and efficient manner,

4 Minimize negative construction impact,

5 Foster public safety by reducing risk to persons and property;

6 Comply with current and anticipated future regulations/codes/policies,

7 Maintain a nature park with resource-based recreational uses, in order to,

7a Preserve and enhance the quality of the meadow and habitat,

7b Preserve forest, and enhance quality of forest habitat,

Operational Criteria (criteria are not ranked)

The following criteria will be used to assist in making decisions about the management and operation of the facilities, amenities and programs that will be part of the Powell Butte Master Plan Criteria were not ranked or weighted

Management and implementation should

1 Promote compatible land uses adjoining the Butte,

2 Provide for on-going public involvement,

3 Promote partnerships to achieve the goals of the Master Plan,

4 Provide appropriate use of the park by the public, consistent with the vision,

5 Monitor overall health, species diversity and vigor of designated natural areas, and

6 Maintain a nature park with resource-based recreational uses

The process of developing the goals and decision criteria for this plan was a complex and lengthy process, but was necessary to ensure project success By taking the time to establish common agreement about outcomes and to clarify what aspects of the Butte were most important, it was possible to craft a package of facilities and activities to meet important community needs Further, the criteria will serve as important tools in evaluating changes to the Butte well into the future These criteria will assist in the necessary transitions and adjustments, and will help to foster positive working relationships between all those involved

THE DESIGNING PROCESS

As described above, decision criteria were developed by the two project committees in order to achieve the vision expressed by the community The vision and criteria were used to determine which park facilities and activities were appropriate and should be recommended in the Master Plan They were also used to guide the design and location of constructed park facilities The vision and criteria were used to evaluate design alternatives for planned and potential water facilities, recognizing that this Master Plan uses assumptions which other planning and engineering studies will evaluate in more detail Unlike the park facilities, the project committees were not asked to evaluate the need for planned or potential water facilities

Design Process for Water Facilities

The planning and design process for individual water facilities described in this Master Plan was based on iterative review of design information by the two project advisory committees Design iterations continued as necessary until consensus was achieved among project participants about facility siting, layout and impacts

For each water facility, the design process proceeded as follows

1) The technical team identified potential sites for the facility The technical team developed alternative layouts and summarized information on the advantages and disadvantages of alternatives Finally, the technical team summarized information on construction and environmental impacts

2) Information was presented to the project committees, and the alternatives were discussed

3) The technical team prepared follow-up design information, if necessary, and responded to project committee questions

4) Follow-up presentations were made to the project committees Consensus was developed on preferred location and layouts, where alternatives existed Constraints and conditions were expressed by the project committees

Design Process for Park Facilities

The park design process emphasized close coordination between the project's technical team and the project committees, for the integration of park and water facilities A list of facilities and improvements was developed and evaluated in alternative designs, always considering the basic goal of maintaining a nature park with natural resource-based recreational uses

Project participants were charged with answering major questions, such as "What constructed facilities should be included in design?" and "What park activities are appropriate?" The technical team developed visual and design concepts for presentation based on project participants answers to these basic questions

THE SELECTING PROCESS

As described above, the design of water and park facilities and amenities was an iterative process, in which draft designs were developed and discussed with the project committees and the public Draft designs were revised based on comments and ideas

received by project participants, until solutions which satisfied the vision and decision criteria could be found

For water facilities, draft language summarizing project committees' consensus was drafted for review by the project committees Approved language was adopted for inclusion in the Master Plan

The decision process for park design was similar to that used for water facilities. Through iterative review and discussion between the technical team, project committees and the public, consensus was achieved on overall park design

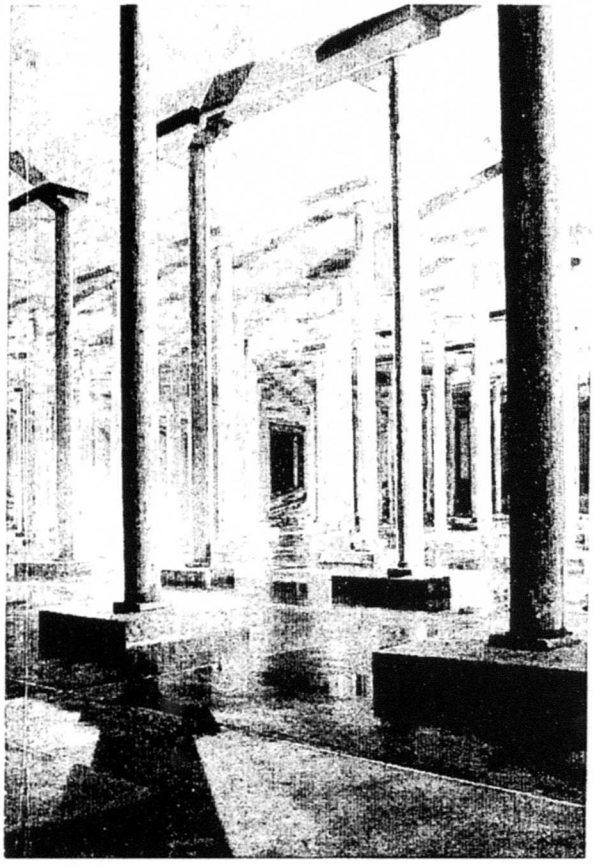
This section describes the water facilities and activities which may be needed on Powell Butte Background is given for an understanding of each facility, together with the recommendations for design, construction and operation

MAJOR WATER FACILITIES

PLANNED AND POTENTIAL STORAGE AT ELEVATION 530'

Background

The Water Bureau completed construction of the existing 50 million gallon buried reservoir in 1980 Figure 4-1 shows the interior of the existing reservoir and its many support columns Short-term planning for additional storage at Powell Butte is being driven by the Water Bureau's need to maintain the reliability and flexibility of the water system As described above, the existing reservoir serves as terminal storage for the entire Bull Run supply A second reservoir would provide flexibility for rehabilitation and maintenance of the existing 50 million gallon reservoir, and for other major storage facilities A second reservoir also provides flexibility for the operation of the water system as a whole, and improves reliability Funds to begin pre-design for another 50 million gallon buried reservoir at Powell Butte are included in the Water Bureau's Capital Improvement Project (CIP) budget for 1999/2000 Other ongoing studies will



verify the timeline for construction of this reservoir This Master Plan assumes construction of this facility within the next ten years

Long-term planning for additional storage at Powell Butte is being driven by increased demand for water storage in the region over the next twenty to fifty years Powell Butte provides water to meet peak demands and for fire protection for most of East Multnomah County While not specifically an element of this study, it is assumed that additional storage will be required to serve this area in the coming decades Also, as discussed above, Powell Butte has been identified as a key site for regional storage in the Regional Water Supply Plan Two additional 50 million gallon buried reservoirs are included in this Master Plan, as part of the long-term water supply plan for Powell Butte The Master Plan assumes construction of these facilities in the next 20 to 50 years, although considerable uncertainty exists in this projection

In total, the Master Plan identifies location and layout for three additional 50 million gallon buried reservoirs, as shown in Figure 4-2 This concept has been part of the Water Bureau's historical vision for the Butte, and was described in the 1986 Powell Butte Master Plan The three additional reservoirs create an arc on the north side of Powell Butte, lying alongside the existing reservoir, at an approximate elevation of 530' (above City of Portland datum)

Design Constraints

Detailed design in the master planning process focused on the next reservoir A second reservoir would be constructed immediately to the west of the existing reservoir Its location is constrained along the north/ south axis by topography and the need to maintain a reservoir overflow elevation of 530' This is the overflow elevation of the existing reservoir, and the two reservoirs must work together The location of the second tank is constrained along the east/west axis by the need to anticipate an ultimate storage capacity of 200 million gallons

Discussion and design efforts focused on the ability of the finished reservoir to "blend in" with the natural landscape, and on strategies to minimize the impacts of construction

Recommendations

Up to three additional 50 million gallon buried reservoirs can be constructed in a way that is consistent with the Vision Statement and Decision Criteria The project committees developed recommended design and operational constraints Their major recommendations are

- A buried reservoir should be designed to minimize visual impact This includes restoration of contours which blend with the natural topography, revegetation of reservoir surface consistent with desired meadow habitat, and design of reservoir appurtenances such as hatches and vents to be as unobtrusive as possible

- Construction impacts, including the disposal of excavated material, should be minimized The project committees recommended that most of the fill material be disposed off-site Some fill material could be used for re-contouring or mitigation activities elsewhere on the Butte Only material needed to backfill should be stockpiled, the rest should be hauled off-site immediately The stockpile location should be carefully selected at the time of construction, in order to minimize impact to the park

- Make existing facilities more compatible with the vision and criteria described in this Master Plan This would include modification of the surface of the existing reservoir to increase contouring and give the surface a more natural appearance The existing concrete drainage channels should be removed where possible, or modified to take advantage of natural drainage Finally, in the long term, options for replacement or redesign of the Powell Valley Road Water District tanks in a manner more compatible with the vision and criteria should be investigated

It should be noted that a construction period of approximately two years is expected for this facility Construction will entail significant increases in truck and vehicle traffic, heavy equipment movement on the site and disturbance of the work area surrounding the reservoir site Construction will be managed according to the requirements of the City and following the recommendations expressed by the project committees

PLANNED CONDUIT 5 AND POTENTIAL CONDUIT 6

Background

Three large diameter pipelines currently deliver the Bull Run supply by gravity flow to the Powell Butte reservoir These pipelines were constructed between 1911 and 1953, and have a combined capacity of 210 million gallons per day The Water Bureau began planning for the eventual replacement of aging conduits in the 1970's. Preliminary design for the next conduit, Conduit 5, was performed in 1974 However, the timing for construction of this major project is uncertain The Master Plan assumes that construction will occur within the next twenty years Looking even

farther ahead, beyond the next half a century, Conduit 6 may be brought on-line to replace other aging conduits or to support additional storage in the Bull Run The need and timing of the Conduit 6 project is very uncertain, but it is included in this Master Plan on a conceptual level The anticipated capacity and route of this conduit would be similar to Conduit 5

Design Constraints

The Water Bureau has acquired rights-of-way for the entire conduit path, from Bull Run to Powell Butte Conduit 5 will approach Powell Butte from the east, along a 100 foot wide easement Existing conduit routes and intended route for Conduits 5 and 6 are shown in Figure 4-3 A stub to connect the conduit to the existing reservoir was constructed as part of the original Powell Butte reservoir project

Recommendations

Conduits 5 and 6 can be constructed in a way that is consistent with the Vision Statement and Decision Criteria The project committees developed recommended design and operational constraints Their major recommendations are

- Conduits 5 and 6 should be constructed to minimize visual impact This includes restoration of contours which blend with the natural topography, revegetation of the pipeline path, and design of pipeline appurtenances such as hatches and vents to be as unobtrusive as possible

- Construction impacts, including the disposal of excavated material, should be minimized The project committees recommend that most of the excess excavated material be disposed off-site Some fill material could be used for re-contouring or mitigation activities elsewhere on the Butte Stockpiling of excavated material during construction should be minimized The stockpile location should be carefully selected at the time of construction, in order to minimize impact to the park. A construction period of six months is anticipated for the portion of the pipeline on the Butte Construction of the pipeline may be timed to coincide with reservoir construction, to minimize the period of disturbance

POTENTIAL WATER TREATMENT PLANT

Background

The Powell Butte Master Plan addresses the option for a water treatment plant at Powell Butte The Master Plan does not recommend or endorse this possibility, but recognizes the City's responsibility to preserve the option for water facilities on Powell

Butte, including the option for a drinking water treatment plant No decision has been made as to whether Powell Butte is the best place for a regional water treatment plant However, the Butte's location and importance to the regional water system suggest that it should not be eliminated as a potential site at this time

The City of Portland currently maintains an unfiltered surface water supply, originating in the Bull Run watershed A change in treatment method is probably inevitable for this supply, and will be driven by changing water quality regulations and/or supply needs The timing for a change in drinking water treatment is very uncertain

Siting of this major facility would require detailed studies, taking several years to complete Potential sites would be evaluated with respect to economic, operational and environmental criteria The public and affected agencies would participate by developing the evaluation criteria and contributing to the decision making process A preferred site would go through an environmental assessment process, to verify its suitability with respect to wetlands, wildlife and scenic impacts

To date, three sites have been identified as possible locations for a future water treatment plant The Bureau's Headworks property in the Bull Run watershed is the beginning of the region's water system Space in the watershed is extremely cramped and would not permit construction of a filtration facility, although some other, non-filtration treatment could be practiced there Lusted Hill is property also owned by the Water Bureau to the east of Powell Butte, close to the Sandy River and outside the Urban Growth Boundary by some miles The Water Bureau currently ammoniates the Bull Run supply at this location, and is in the process of constructing a corrosion control treatment facility there The disadvantages of Lusted Hill are that it cannot treat multiple sources, its elevation requires pumping and the property lies outside the Urban Growth Boundary Finally, Powell Butte has been identified as a potential treatment plant location in previous studies The existing Powell Butte reservoir already receives the majority of the Bull Run supply and could serve as a treated water storage tank in the future, thereby reducing the cost of a treatment plant Multiple supplies could be treated at this site and its elevation does not require pumping for the Bull Run source The Powell Butte site also has significant disadvantages, including impacts to aesthetic, recreational and wildlife values and associated land use issues As discussed above, the advantages and disadvantages of each of these sites, as well as any new sites which have been identified, must be considered carefully at the appropriate time

The permitting process for a water treatment plant will take several years to complete A treatment plant would be subject to a Conditional Use permit process, as well as an Environmental Zone permit for a plant on Powell Butte These are separate permits,

but both entail public notification and public hearing A host of other local, state and federal permits is also required, dealing with construction practices, discharges to waterways and design standards

This Master Plan recognizes that important questions about water treatment plant siting have not yet been answered The purpose of the treatment plant discussion is to identify fundamental design constraints and stakeholder concerns for a treatment alternative on Powell Butte

Design Constraints

The primary design constraint for location of a filtration plant on Powell Butte is the need to maintain an elevation at the head of the plant of 550' This elevation assures that the plant can receive Bull Run water by gravity with Conduit 5 in place, and can distribute treated water by gravity to the region Three potential sites were identified on the 550' contour line by the technical team One site was eliminated due to environmental concerns, and the remaining two were carried forward into the design process

Assumptions were made regarding the treatment processes and capacity of the plant, based on current technology and drinking water regulations An assumed maximum plant capacity is 500 million gallons per day (mgd) The treatment plant layouts include ozonation for disinfection, followed by granular activated carbon filtration for removal of particulates These assumptions dictate the size of the unit processes that make up the plant, and dictate the layout of the plant to some extent Figure 4-4 illustrates a possible plant layout, in the location recommended by stakeholders

The primary design objective was to minimize visual impacts of the plant Two approaches were followed one approach was to "blend" the plant into the landscape through a variety of techniques, a second approach was to completely bury the treatment plant so that no feature was visible on the ground surface Techniques of the "blended" design approach included bury structures where possible, minimize the number of above-ground structures and keep these low-profile, use natural topography to screen the plant, and use an appropriate architectural style for above-ground structures Figure 4-5 shows a view of the treatment plant, using the "blended" approach in the location selected by the project committees Above ground structures were developed in a farmhouse style, to be compatible with the Butte's agricultural history

The layout and vision for the treatment plant illustrated in Figures 4-4 and 4-5 represent the preliminary design concepts which were considered and discussed by the project committees Other layouts and designs may be better able to achieve the

"blended" objective, as illustrated in Figures 4-6 and 4-7 This design approach goes further to utilize existing topography to screen the plant from view In this approach, above-ground structures are pushed into the hillside, so that they become invisible from above The view from above is important as it is the primary viewpoint, including the orchard and mountain-finder Much more work would need to be done to finalize plant design and layout The vision contained in this Master Plan provides a "base case" layout More intensive design efforts and advances in water treatment technology suggest that a future water treatment plant on Powell Butte, if it ever becomes necessary, may have less of an impact on the site than what is shown here

The impacts of a treatment plant designed as shown in Figures 4-4 and 4-5 will be several Visual impacts have been discussed above A treatment plant will cause an increase in traffic to the area during the construction period and then due to ongoing plant operations A treatment plant of the size and type described above would require two full-time operators, on duty 24 hours per day Some additional travel would also be required by maintenance staff Delivery of water treatment chemicals by truck would be required once every two days, on average Water treatment residuals would be trucked off-site for disposal approximately once per day A buried access tunnel is recommended for evaluation, if further analysis of Powell Butte is performed A tunnel would connect the plant and an off-site access point, reducing noise and visual impacts of traffic on the nature park

Noise can be effectively controlled by equipment selection and plant design There would be no air emissions or odors from the treatment plant

Recommendations

The project advisory committees considered design and layout options for a water treatment plant at two locations on the Butte The advisory committees recommended a treatment site near the existing buried reservoir, and developed some specific design recommendations The committees recommended against the option of a completely buried water treatment plant, having an increased construction cost of approximately 25 percent, or $50 million The committees did recommend additional mitigation activities to offset the impact of a "blended" treatment plant on the Butte Their specific recommendations are summarized below·

A water treatment plant will have significant impacts on the Powell Butte Nature Park and raises serious concerns Siting of this facility should only be considered if the following decision steps support this conclusion

- *A treatment needs study*, in which the Water Bureau and City make the determination that a change in treatment is needed,

- *A treatability study*, in which the Water Bureau establishes the technical process which will be used to treat drinking water to meet new regulations or supply requirements,

- *A siting study*, which will consider all potential sites for a water treatment plant The public and involved agencies would assist in developing criteria, including economic, noneconomic factors and environmental impacts, and evaluating alternatives,

- *An environmental assessment study*, in which an identified site is evaluated with respect to environmental impacts and natural resources,

- *A pre-design and design process*, which establishes specific design elements of the water treatment plant, and

- *A permitting process*, which involves several major permits, including the City's Conditional Use and Environmental Zone permits, in addition to other City, state and federal permits The major permits required for the facility include a public notification, hearing and appeals process

The Water Bureau and the City of Portland have a responsibility to complete each of these studies in a thorough and thoughtful manner, and to create a legitimate role for public and agency input into the decision-making process

If, through the completion of the work described above, Powell Butte is identified as the best site for a regional water treatment facility, the unique character of Powell Butte must be protected to the greatest extent feasible The City should commit to a mitigation program which focuses not only on the water treatment plant itself, but on Powell Butte as a whole Possible mitigation activities include acquisition of additional land to offset the loss of natural areas, environmental enhancement of other areas on the Butte and/or additional management and staffing of the Butte to protect remaining resources

In addition, Powell Butte's natural resources must be protected through sensitive design and operation of the water treatment facility Specific design recommendations include

- Locate the water treatment plant adjacent to the original 50 million gallon reservoir, to minimize disturbance to other areas of the Butte,

- Minimize construction impacts, and restore the natural character of the Butte following construction A construction period of three years is anticipated for this facility;

- Keep the facility as low profile as possible, by burying structures where possible and maintaining low profile above-ground structures with an architectural style compatible with the Butte's rural, agrarian history;

- Install noise control measures for mechanical features of the plant,

- Control noise from truck traffic by trip scheduling, or by access through buried tunnel to facility Minimize the number of staff trips by using longer shifts,

- Transport, utilize and contain water treatment chemicals according to federal, state and local regulations to ensure the safety of users and neighbors,

- Consider some type of enclosure around the water treatment plant to prevent human access and provide protected wildlife habitat,

- Prevent airborne emissions, and

- Minimize exterior plant lighting which is not essential for plant safety and security

POTENTIAL STORAGE AT ELEVATION 600'

Background

As discussed elsewhere in this report, this Master Plan addresses both planned and potential water facility needs for the City and the region Water storage at an elevation of 600' on Powell Butte is a potentially necessary facility; however, there is a great deal of uncertainty concerning need, timing and amount of storage required The objective of this Master Plan is to preserve the option for this facility in the event a need is identified and the appropriate studies are done to answer the major questions about the reservoir

This facility can be characterized as a regional water facility, as it may provide benefit to areas outside Portland, as well as to City customers In general, the functions of this storage reservoir would be

- To provide increased service to areas of high elevation around Powell Butte which cannot currently be served by gravity from existing storage There are alternate methods of providing storage to these areas, including the use of pumping or storage at other high elevation points (i e Jenne Butte) in the area Before storage would be constructed for this purpose, an engineering evaluation would be conducted to determine the cost of this option relative to other options

- To provide increased service to areas west of the Willamette River, via the Washington County Supply Line (WCSL) The WCSL is a major pipeline, brought on-line in 1983, which currently carries up to 60 million gallons per day to Portland's west side and to Washington County from the existing Powell Butte reservoir at elevation 530' Storage higher on the Butte would increase the delivery capacity of this pipeline to nearly 100 mgd Similar to the financing of the WCSL, this project would be financed primarily by the customers who benefit from the project

- To provide a connection between the Bull Run system and the Clackamas River system Storage at 600' elevation would be able to deliver water to the Clackamas basin by gravity, via an interconnecting (and as yet unbuilt) pipeline

- Finally, as an incidental benefit, this facility could generate revenue through the generation of hydropower It is anticipated that storage at 600' would receive Bull Run water directly from the watershed through Conduit 5 (described earlier in this section) when it is completed, and via the existing Conduit 4 prior to that time Water from the 600' tank would in turn flow by gravity to the major reservoirs at elevation 530' In the process of flowing from 600' storage to 530' storage, hydropower could be generated by the 70' elevation drop of a maximum of 170 million gallons of water per day in winter An accompanying pump station/turbine facility would be required for this purpose

There is increasing interest in providing connections between water systems in the region, both as a cost-effective mechanism to handle increasing demand, and as an efficient way to ensure supply in the event of emergency Portland's reliance on an unfiltered surface water supply makes the system vulnerable to water quality upsets caused by storms or natural disasters in the watershed, which did occur in the past winter Also, the pipelines carrying water from the Bull Run to Powell Butte are subject to disruption by landslides and other natural events, which also occurred last winter

There is no agreement currently between Portland and Clackamas River water providers to create such an intertie, although active discussion is underway Before storage and associated pipelines would be constructed for this purpose, study would be required to evaluate the economics and usefulness of this arrangement, as well as the appropriate location for transmission interconnections

Design Constraints

Although considerable uncertainty exists about the ultimate size and timing of this

facility, assumptions were made to allow design alternatives to be developed and considered by the project committees The primary technical constraint was the need to locate the reservoir outlet at elevation 600' A storage capacity of 20 mg was assumed for planning purposes

Discussion and design efforts focused on the ability of the finished reservoir to "blend in" with the natural landscape, and on strategies to minimize the impacts of construction Four alternative locations were identified by the technical team as having the appropriate elevation However, only one site was acceptable in terms of the ability to restore natural contours over the buried reservoir, and minimizing impacts to heavily-used areas of the Butte The recommended location is shown in Figure 4-8 Reservoir inlet and outlet piping would extend due east to make the connection with Conduit 5

Recommendations

A 20 million gallon buried reservoir can be constructed in a way that is consistent with the Vision Statement and Decision Criteria The project committees developed recommended design and operational constraints Their major recommendations are

- A buried reservoir should be designed to minimize visual impact This includes restoration of contours which blend with the natural topography, revegetation of reservoir surface consistent with desired habitat, and design of reservoir appurtenances such as hatches and vents to be as unobtrusive as possible

- Construction impacts, including the disposal of excavated material, should be minimized The anticipated duration of construction is eighteen months The project committees recommended that most of the excess excavated material be disposed off-site Some excess material could be used for re-contouring the area affected by soil disposal from the original Powell Butte reservoir That fill area has an "engineered" appearance that could be softened and made to look more natural by the application of additional earth Appropriate topsoil and vegetation should be applied over the surface of the affected area

- Stockpiling of excavated material during construction should be minimized The stockpile location should be carefully selected at the time of construction, in order to minimize impact to the park. Only material needed to backfill the reservoir should be stockpiled, the rest should be hauled off the site immediately

- The selected reservoir location intrudes into the compacted, impermeable area created by disposal of fill material from the original reservoir While this compacted area offers a poor quality of habitat, it has created the advantage of seasonally ponded wet areas which harbor wetland plant and animal species Design of the 600' reservoir should include the creation of new seasonally wet areas These new wet areas should be created with better vegetation, to improve their habitat value

- The access road to the 600' reservoir should be maintained as a single-lane, naturally surfaced roadway

POTENTIAL REGIONAL TRANSMISSION PIPELINE

Background

This pipeline was alluded to in the previous section which described a potential intertie between the Bull Run and Clackamas water systems This potential transmission pipeline would connect the Powell Butte facilities and an as yet undetermined point to the southeast The objective of this Master Plan is to preserve the option for this facility until the appropriate studies are done to answer the major questions of need, timing and sizing

Design Constraints

The design process assumed a pipeline capable of delivering 50 to 100 mgd, with a maximum diameter of 66" The pipeline would originate at the 600' reservoir Design efforts focused on feasible pipeline paths to deliver water to a point due south of the Butte, recognizing that its ultimate destination is as yet undetermined

Two alternative pipeline paths were evaluated and compared with respect to economic and environmental criteria, as shown in Figure 4-9 One possible path was identified as leading due south from the proposed 600' reservoir, shown on Figure 4-9 as Alternative No 1 This pipeline route was rejected due to unacceptable environmental impacts to the meadow, and unacceptable technical obstacles involved in crossing (possibly tunneling beneath) the forested fringe of the Butte A more reasonable path was identified, following the proposed inlet/outlet piping associated with the 600' reservoir directly off the east side of the Butte This route is indicated on Figure 4-9 as Alternative No 2 Once off the east side, the pipeline would follow an approximately southeast path The ultimate path of this pipeline, if it is ever constructed, will be determined by Water Bureau acquisition of easements and property rights, and by location of ultimate users of the pipeline

Recommendations

The Regional Transmission Pipeline can be constructed in a way that is consistent with the Vision Statement and Decision Criteria The project committees developed recommended design and operational constraints Their major recommendations are

- The pipeline should be designed to minimize visual impact This includes restoration of contours which blend with the natural topography, revegetation of pipeline pathway consistent with desired habitat, and design of pipeline appurtenances to be as unobtrusive as possible

- Construction impacts, including the disposal of excavated material, should be minimized An anticipated construction period is six months, for the portion of pipeline on the Butte The project committees recommended that most of the fill material be disposed off-site Construction of the pipeline could be timed to coincide with other facility construction, to minimize the period of disturbance

- Stockpiling of excavated material during construction should be minimized The stockpile location should be carefully selected at the time of construction, in order to minimize impact to the park.

POTENTIAL PUMP STATION

Background

A pump station may be required to enhance the capacity of the existing Conduit 4, and of Conduit 5 when it is constructed A pump station would be required to pump water from the lower reservoirs (elevation 530') to the higher reservoir (elevation 600') in the summer months This same pump station could be used to generate hydroelectric power in the winter months, when a maximum of 170 million gallons of water from the Bull Run would flow directly to the 600' reservoir, and would then run through two turbine generators to final storage at 530'

Design Constraints

A pump station capable of handling anticipated summer pumping requirements and equipped with turbine generators for hydropower generation in the winter months would require an area of approximately 100 by 30 feet Potential locations for this facility are still being evaluated Locations outside the boundaries of the Powell Butte property are under consideration Whether the facility is within the boundaries of

Powell Butte itself or not, the facility would be designed to minimize impacts on the surrounding environment The footprint of this facility is small relative to other water facilities discussed in this Master Plan, therefore topographic and construction impacts will be less significant The primary impact of the facility will be noise created by the pump and turbine generators and by cooling fans and motors

There are many design techniques which have been successfully used for noise reduction at pumping facilities Techniques include burying the structure itself, installing ventilation sound traps, using sound-absorbing wall design and controlling the direction of sound waves away from sensitive areas The equipment itself can also be selected to lessen noise, by requiring low speed motors and fans which discharge air at low velocity

Recommendations

The pump station can be constructed in a way that is consistent with the Vision and Decision Criteria The project committees developed recommended design and operational constraints Their major recommendations are

- The pump station should be designed to minimize visual impact This includes restoration of contours which blend with the natural topography, revegetation consistent with desired habitat, and design of appurtenances to be as unobtrusive as possible

- The pump station should be designed to minimize noise This includes burying the facility and implementing the noise control measures described in the previous section

- Construction impacts, including the disposal of excavated material, should be minimized An anticipated construction period is eighteen months The project committees recommended that most of the excavated material be disposed off-site

MINOR WATER FACILITIES AND ACTIVITIES

Planned Seismic Upgrade of Existing Reservoir

The existing Powell Butte reservoir was constructed in 1979 using accepted seismic design criteria as defined in the Uniform Building Code (UBC) for that period Seismic building design requirements are continually becoming more stringent, as lessons are learned and theories are developed regarding structural failure in earthquake

events In the nearly twenty years since the reservoir was designed, several revisions to the UBC have been made It is appropriate for critical water facilities to be upgraded to ensure their reliability

It is anticipated that the Powell Butte reservoir will require seismic strengthening within the next five years This work could be timed with other facility construction on the Butte, to reduce impacts The project would entail digging a four to six foot deep trench around the existing reservoir and strengthening the then exposed reservoir walls Construction impacts would be similar to laying a pipe around the exterior of the reservoir The conduct of this work would follow the guidelines expressed by the project committees for the major water facilities An estimated construction period is six months

Planned Upgrade of Existing Ammoniation Facility

During normal operations, the Water Bureau adds chlorine to the Bull Run supply at its origin in the watershed Ammonia is added farther downstream at the Bureau's Lusted Hill facility, to create a longer-lasting disinfectant residual In times of water quality emergency, such as storms in the watershed which raise the turbidity of the Bull Run supply, groundwater is pumped from the Columbia South Shore Wellfield to Powell Butte reservoir Groundwater is blended with Bull Run surface water to lower its turbidity before distribution to the City and region In this case, ammonia is added to the blended water at the outlet of Powell Butte reservoir

Previously, the Water Bureau maintained ammonia storage tanks and metering pumps in the outlet vault of the existing reservoir However, it was found to be inefficient to maintain this equipment, and its location created difficult working conditions The upgrade to the ammoniation system will transfer chemical storage and associated equipment to four mobile trailers The equipment will be tested at the site once per year, and used as needed The Water Bureau has coordinated this work with the Oregon Department of Transportation and the City's Planning Bureau

Associated improvements will require better Water Bureau access to the reservoir service roads The Water Bureau will evaluate the feasibility of using the existing Powell Valley Road Water District service road which branches off the main access road to the west, or upgrading the existing Bureau service road

Planned Emergency Overflow and Dechlorination Facility

A reservoir overflow and drain pipeline was put in place at the time of existing reservoir construction The existing overflow line is 48 inches in diameter, and discharges to Johnson Creek. The Water Bureau recognizes the potential

environmental impact of discharging treated water to the Creek, along with the potential to exacerbate flooding in this already troubled area

The Bureau is committed to finding an alternative to surface water discharge for water facilities located on Powell Butte An engineering study, to be performed by the Water Bureau, will first identify an acceptable alternative for disposal of reservoir cleaning water The existing reservoir is cleaned about once every five years, by draining the two halves of the reservoir in sequence and rinsing them with high-pressure hoses A feasible alternative may be discharge to sanitary sewer, if solids flushed from the reservoir can be separated prior to discharge and if cleaning water can be retained and metered at an acceptably low flow rate to the sewer This alternative will be explored in more detail by the Water Bureau

The engineering evaluation will also develop a method for retention and disposal of overflow water, or water which must be released quickly from facilities on the Butte An engineering study will determine the required capacity and location of retention, based on predicted overflow and probability of occurrence

Finally, the Bureau commits to practice dechlorination for all discharges to Johnson Creek, if they occur in the future This may be accomplished by application of a chemical which destroys the chlorine residual in treated drinking water (a dechlorinating agent) and/or by retaining the water until the chlorine residual naturally dissipates The location and design of this facility must be determined

Planned Communication Equipment

The Water Bureau may install a microwave communication dish on the Butte, to relay information on water facility operations to the Bureau's Water Control Center (on Interstate Avenue, just east of the Broadway Bridge in Portland) The microwave system could also be used to relay video signals, and could be a means of significantly increasing security in the Park Center area of the Butte

Placement of the dish will be determined by the need to obtain a "line-of-sight" to the Water Control Center, and will be as unobtrusive as possible

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LEGEND

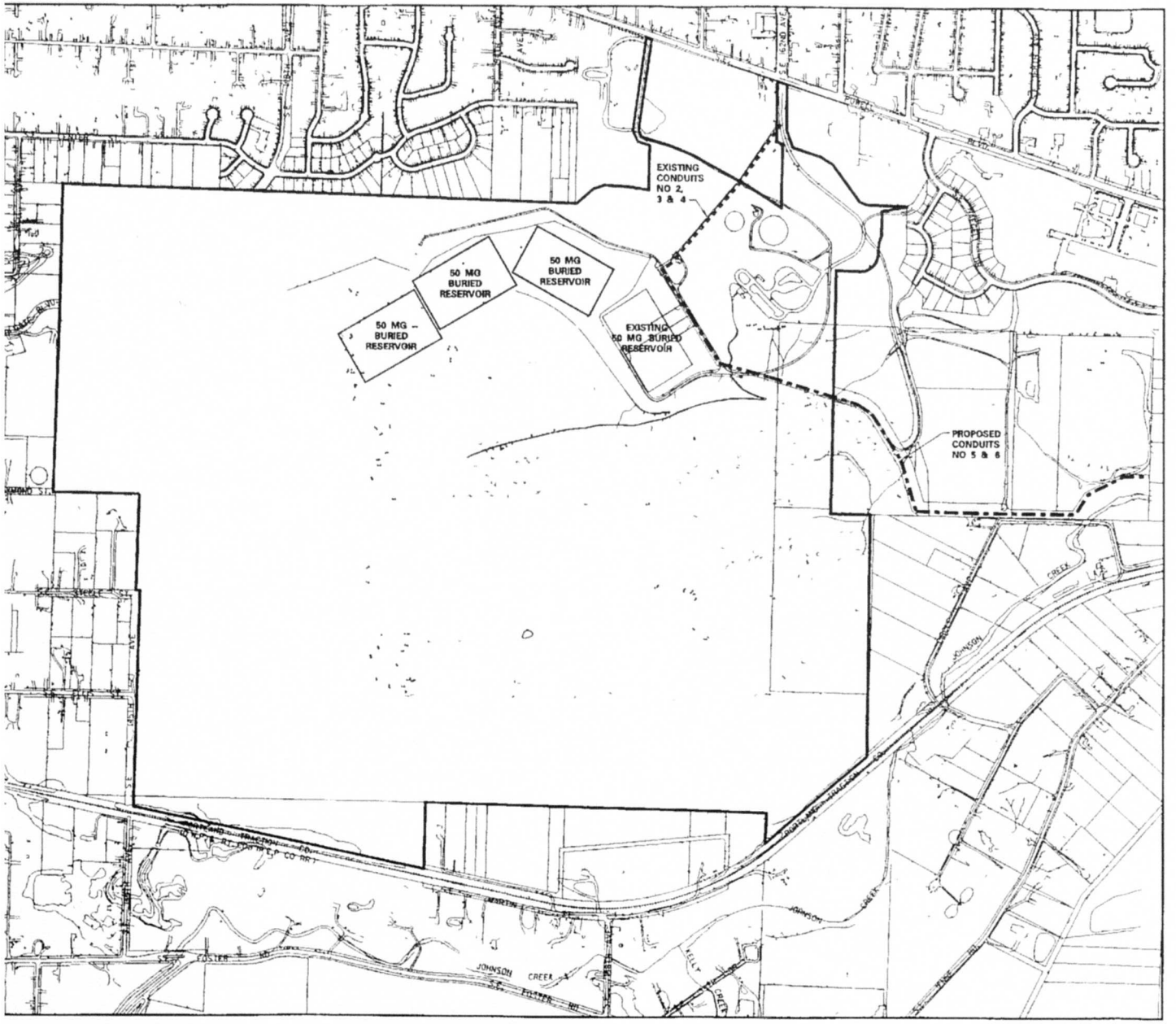
- PROPERTY LINE
- EXISTING VEGETATION
- EXISTING FACILITY
- PROPOSED FACILITY

N

POWELL BUTTE MASTER PLAN
RESERVOIR LAYOUT

FIGURE 4-2

MONTGOMERY WATSON
Portland Oregon



LEGEND

- PROPERTY LINE
- EXISTING VEGETATION
- EXISTING FACILITY
- PROPOSED FACILITY
- CONDUITS NO. 5 & 6
- EXISTING CONDUITS NO. 2, 3 & 4

POWELL BUTTE MASTER PLAN
CONDUIT PATHS

FIGURE 4-3

MONTGOMERY WATSON
Portland Oregon

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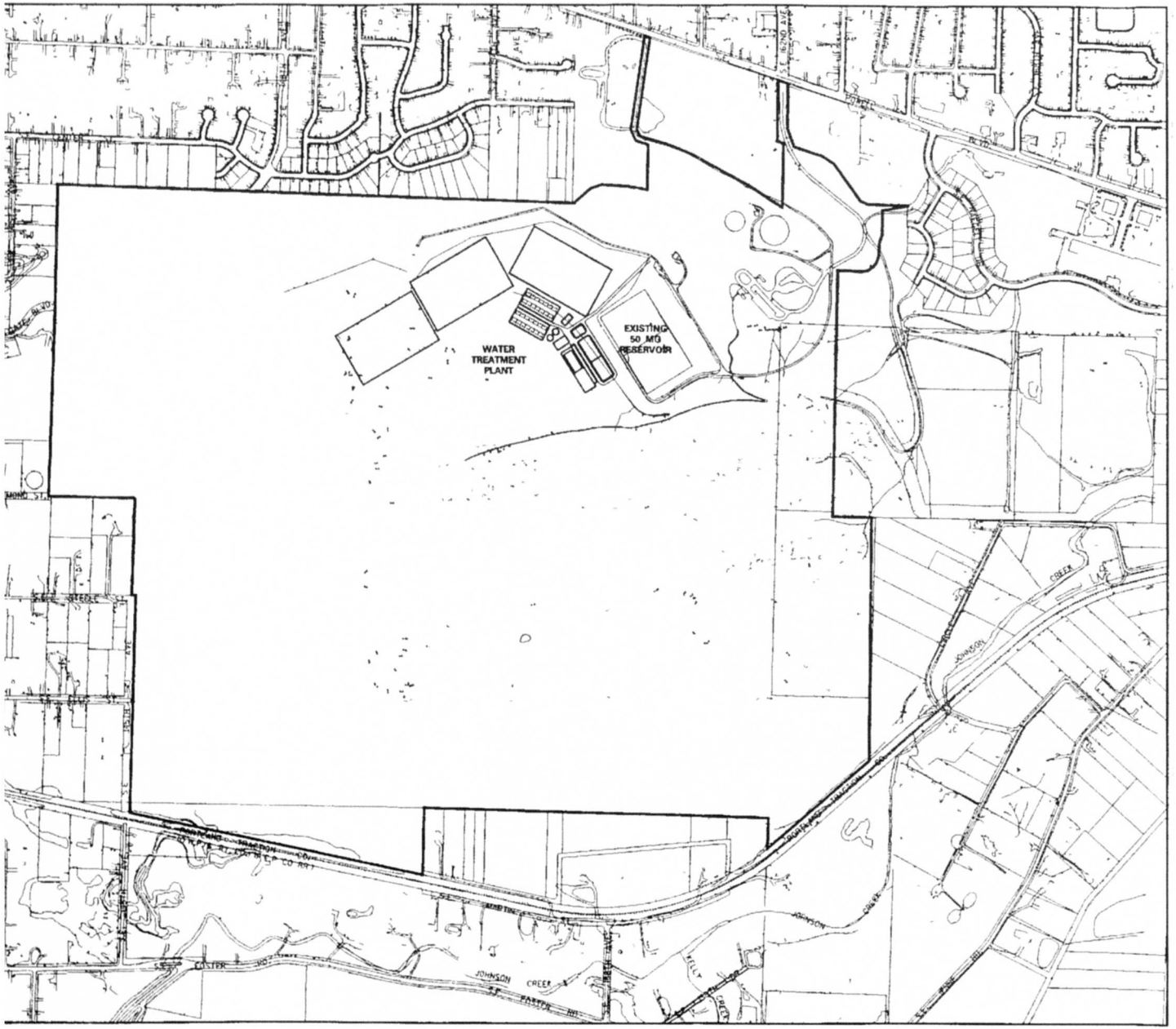

LEGEND

- PROPERTY LINE
- EXISTING VEGETATION
- EXISTING FACILITY
- PROPOSED FACILITY

POWELL BUTTE MASTER PLAN
WTP LAYOUT

FIGURE 4-4

MONTGOMERY WATSON
Portland Oregon

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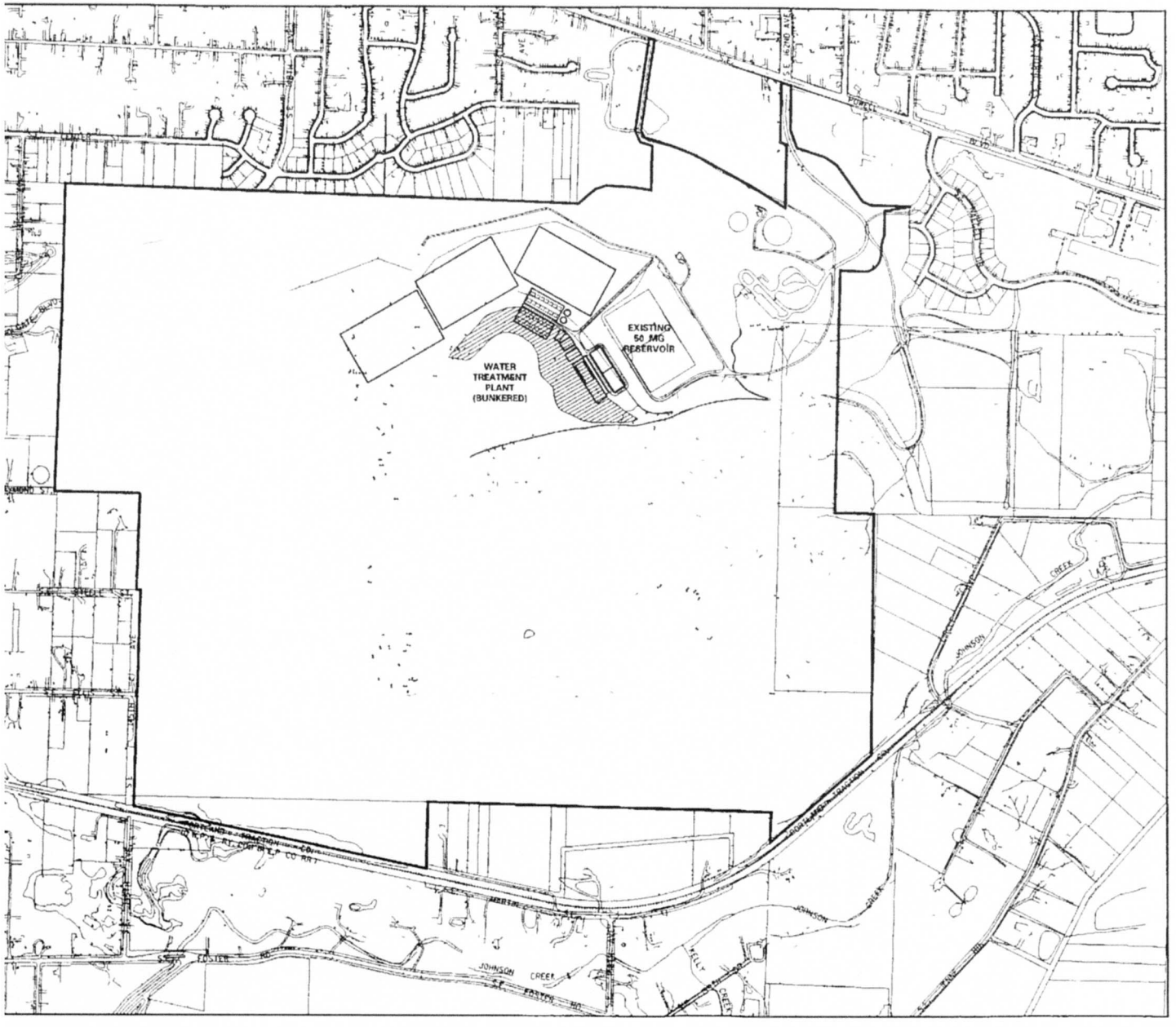

LEGEND

- PROPERTY LINE
- EXISTING VEGETATION
- EXISTING FACILITY
- PROPOSED FACILITY
- MODIFIED TOPOGRAPHY FOR WTP BUNKERING

N

POWELL BUTTE MASTER PLAN
WTP LAYOUT - BUNKERED

FIGURE 4-6

MONTGOMERY WATSON
Portland Oregon

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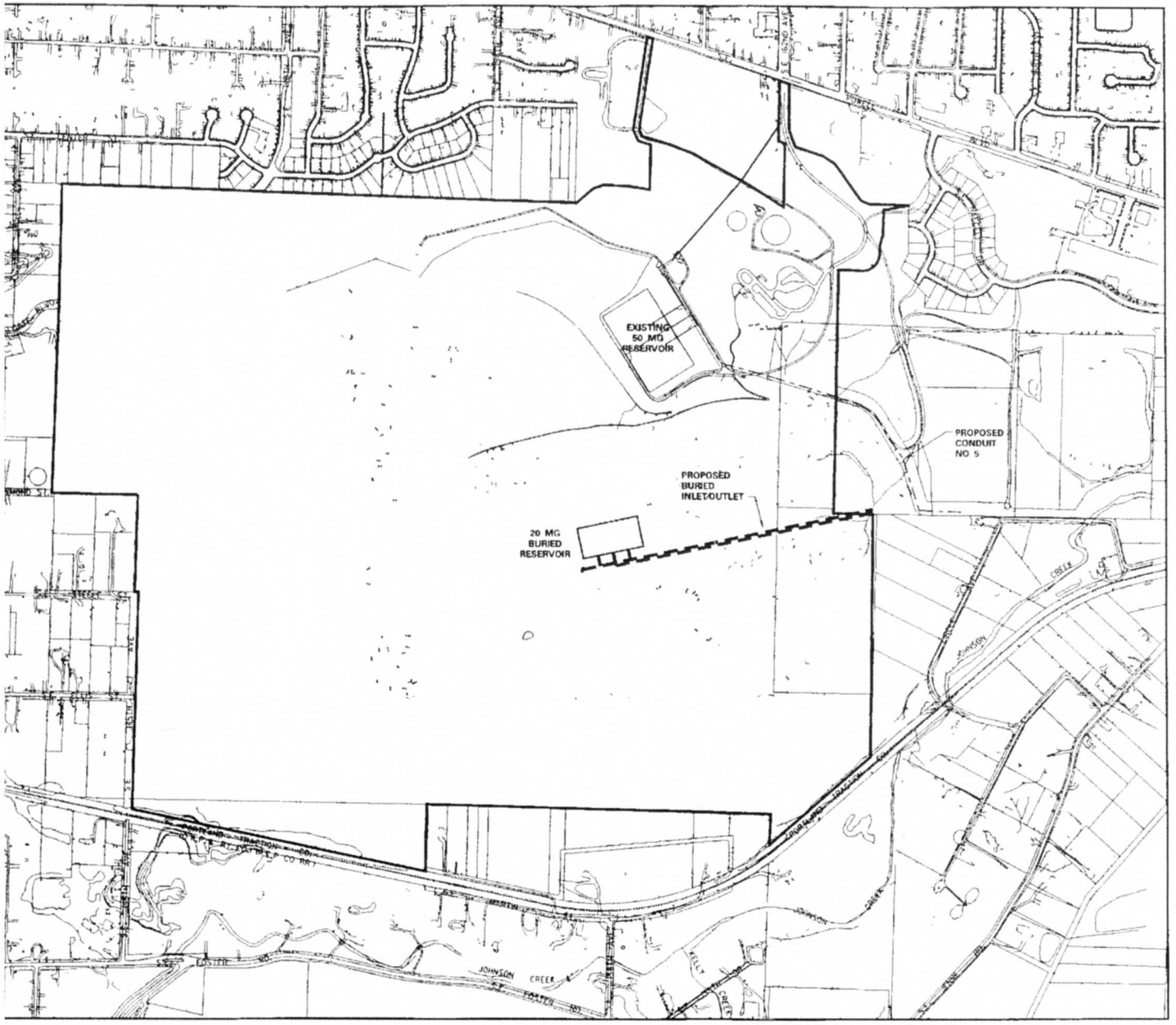

LEGEND

- PROPERTY LINE
- EXISTING VEGETATION
- EXISTING FACILITY
- PROPOSED FACILITY
- PROPOSED CONDUIT NO 5
- PROPOSED INLET/OUTLET PIPING

CITY OF PORTLAND OREGON

POWELL BUTTE MASTER PLAN
600' RESERVOIR SITE

FIGURE 4–8

MONTGOMERY WATSON
Portland Oregon

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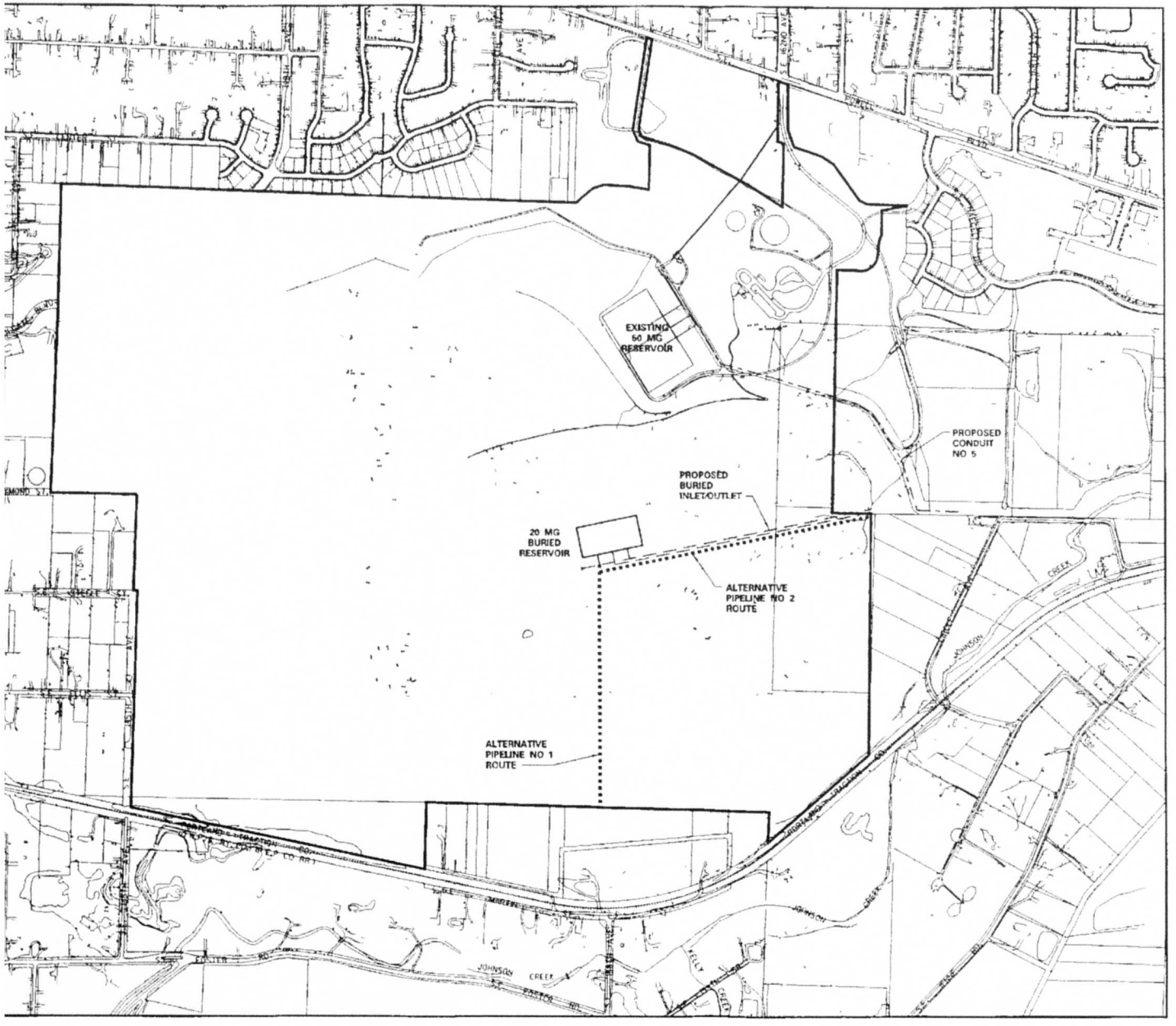


LEGEND

- PROPERTY LINE
- EXISTING VEGETATION
- EXISTING FACILITY
- PROPOSED FACILITY
- PROPOSED CONDUIT NO 5
- PROPOSED INLET/OUTLET PIPING
- REGIONAL TRANSMISSION PIPELINE ALTERNATIVE NUMBERS 1 & 2

POWELL BUTTE MASTER PLAN
REGIONAL PIPELINE PATH

FIGURE 4-9

MONTGOMERY WATSON
Portland Oregon

PARK FACILITIES AND ACTIVITIES

This section discusses the major elements of park design, and the significant opportunities for the environmental enhancement of Powell Butte which are offered by this Master Plan

NATURAL RESOURCES CONTEXT FOR THE PARK PLAN

Powell Butte is a unique upland area, rich in natural resources Few places in the region provide such expansive vistas, with an impressive Cascade backdrop including Mt St Helens, Mt Rainier, Mt Adams, Mt Hood and the Clackamas, Sandy and Bull Run watersheds The forests on the north, west and south slopes effectively screen the eastern vista from urban activities and contributes to the natural and scenic qualities of the site

The Butte contains a diversity of wildlife habitat comprised of an expansive grassland meadow, a shrub scrub transition area and then a mid-serial stage forest area The combination of these habitats and seasonal wetlands provide forage, perch, roost and nest opportunities for birds, mammals and reptiles

RECOMMENDED PARK FACILITIES AND ACTIVITIES

Project participants considered an exhaustive list of potential facilities and activities to begin the design process Facilities and activities were reduced by considering each with respect to the Vision and decision criteria established earlier in the planning process For park design, the primary criteria was to maintain Powell Butte as a nature park, with resource-based recreation Therefore, facilities which encourage active recreation, or activities which could damage wildlife habitat were eliminated

The complete list of facilities which were considered in the design process is listed in Table 5-1 Those facilities which were found by the project committees to be consistent with the Vision and decision criteria are shown in bold type All other facilities were eliminated from the master planning process. The project committees recommend that constructed facilities be clustered in the Park Center, to avoid disruption of the Butte's natural character in other areas

The complete list of activities selected by the project committees for inclusion in park design are shown in Table 5-2 Those activities which were found to be consistent

PARK DESIGN

Major Elements of Park Design

Natural Features

Throughout the master planning process, the project committees and stakeholders consistently reinforced the vision for Powell Butte as a natural area with natural resource-based recreation. This characterization results in a park design which emphasizes the natural features of the Butte. Figure 5-1 illustrates the primary natural features which are showcased in this park design.

In the recommended park design, the expansive meadow, forest and wetland habitat are preserved and enhanced. The large rolling meadow is a distinctive natural feature identifying the Butte. The meadow's character of subtle topography in an open setting contributes to many of the activities enjoyed by park users. Panoramic vistas of the surrounding landscape are experienced from the meadow to the forest edge, vast horizons, clouds, and sky. The existing mountain finder at the high point of the meadow identifies landmarks of the region, from Mt. Rainier to adjacent Jenne Butte.

The natural drainage patterns on top of the Butte are defined by the open rolling topography. Drainage of gentle swales into seasonal wet ponds and meadows can enhance wetland habitat. The existing concrete drainage channels which currently route much of the runoff directly to Johnson Creek may be modified to permit more "natural" infiltration. Concrete drainage channels will be retained on the north side of the Butte, to protect the steep north sides from erosion due to rainfall runoff. Increased on-site retention of stormwater may provide water quality benefits to Johnson Creek. Opportunities exist to expand the wetlands and meadow into the encroaching nonnative scrub of Hawthorn and Himalayan Blackberry. Some amount of Hawthorn is desirable to provide berries, however its vigorous growth must be managed. Control of shrub scrub and re-contouring disturbed areas can provide a greater diversity of habitats.

The open meadow landscape and forest edge is a rich habitat for flora and fauna. This transition area of plant communities provides the park user opportunities to observe wildlife, understand habitats, and realize the delicate balance between meadow and forest. Forest habitat is abundant on the steep slopes of the Butte, and the dense vegetative canopy and small watercourses offer a striking contrast from the open meadow.

An access-limited wildlife area in the southeast portion of the park is proposed. Park user access to this approximately 100-acre area would not be permitted, allowing

wildlife and plant communities to be left undisturbed by park visitors A habitat corridor connection to Johnson Creek on the south will be enhanced by this designated wildlife area, which will in turn enhance the biological diversity of the East Buttes region

Trail System

The objective of the park's trail system is to protect natural resources while providing access to those resources Park users have complained of use conflicts on the trail system, while trail signage has typically been ignored or vandalized The total length of trails recommended in this Master Plan has been modified only slightly from the 1986 Master Plan Rather, the focus is on improving the experience for all users, primarily by separation of uses and by improved trail construction Separating the three major user groups - hikers, bicyclists, and equestrians, is a strategy to avoid user conflict, and an opportunity to design a variety of experiences and challenges for each user Separation of use is not a change in policy for Powell Butte park- it has always been in place, although largely ignored The difference in this Master Plan is an increased effort to make the system work The effectiveness of this policy will be reviewed as part of ongoing management activities

A series of loop trails and entry points provide user access to a large portion of the park, as illustrated in Figure 5-1 Hikers are allowed on all trails, but will be encouraged to use the designated hiker-only and multiuse trails Bicyclists and equestrians are designated for specific trails and multiuse trails The Orchard Loop Trail near the top of the Butte is the central connecting link in the overall trail system, providing users several alternative ways to access the Butte A second access to the Springwater Corridor is proposed on the east side of the Butte This multipurpose trail goes from the Anderegg Trail to an exit on Circle Avenue An existing connection to the Springwater is in use at the southwest property boundary of the Butte

Trail construction, materials, drainage and alignment will address the various user groups and their desired needs Unauthorized trails are abundant in the Park and will be eliminated or reduced by education, signage, and/or enforcement Clear sign designation is critical in maintaining proper use of the trails and improving user experience

Existing trails and facilities in the park do not meet current Americans with Disabilities Act (ADA) standards, although some access may be possible The existing asphalt path which extends from the Park Center to the orchard met some ADA standards at the time of its construction and may provide some access to disabled and elderly users, but does not meet current standards The project committees have recommended that the existing asphalt path be upgraded to meet current standards The upgrade would

require minor regrading to achieve required width and creation of level rest areas The Orchard Loop trail at the top of the Butte, and the Meadowland trail with access to the mixed forest are other potential candidates for upgrading to meet ADA standards, should this be desired Trail surfaces do not need to be paved to meet desired access standards

Park Center

Park facilities are concentrated in the currently developed northeast area of the Butte, allowing for a larger portion of the Butte to be maintained with a minimum of development The Park Center is the main entrance to the park, and provides access for users arriving by car, as well as for maintenance and operations staff Recommended road access is a paved two-way circulation system, with parking clearly defined in a paved striped area for efficient use Equestrian and bus parking is sited below the car parking and tucked into the hillside, reducing visual impact from the Park Center above The proposed circulation and parking system closely follows the existing gravel system, minimizing the impact on the site Paving is recommended to control dust and noise and to reduce maintenance expenses Speed on the access road can be controlled by speed bumps, if desired

It would be possible to create an additional parking area below the proposed lot if desired, without any expansion of the existing developed area Further updates of the Master Plan will review the need for additional parking The parking plan is illustrated in Figure 5-2

The restrooms, interpretive / education area, and entrance is the hub of the Park Center The caretaker's residence will be relocated to provide better security for the Park Center area The caretaker's house could be reinstalled in the new location with no further changes, or the style of the house could be modified to be more compatible with the rural character of the park Minor elements within the Park Center include a small amphitheater for gathering of small groups, picnic tables, and split rail fencing Native plantings will screen the parking area, restroom structure, and caretaker's residence from the vistas above on the Butte Plantings will also be used to screen encroaching residential development from park vistas In general, improvements to the Park Center will be coordinated with other construction, to minimize the period of disturbance to the Butte

A maintenance shed and storage yard will be shared by the Park and Water Bureaus, located adjacent to the existing Powell Valley Water District storage tanks The current maintenance storage shed shares the restroom building As additional facilities are put in place on the Butte, the level of required maintenance will increase A new maintenance shed will be constructed at the time it is needed The small space

left vacant in the restroom building could be remodeled to serve as an interpretive facility Alternatively, a new building to house the interpretive area and restrooms will be considered, based on design and cost considerations

The existing parking and visitor area does not meet ADA standards, although some access may be possible The recommended improvements to the Park Center will make this area ADA-accessible by paving, inclusion of a drop-off area and modifications to restrooms

Cost Estimates

The recommended park improvement costs are divided into site work, trails, and Park Center improvements The site work addresses large scale meadow and wetland enhancements, and minor earthwork in reducing existing water facility impacts A figure of $850,000 is estimated for these improvements Trail costs include rehabilitation of existing trails and construction of proposed trails The estimated cost for trail work is $350,000 which also includes abandonment of selected trails, and interpretive and directional signage on the Butte The Park Center is the most intensively developed area The Park Center includes the caretaker's residence, parking and roadway systems, restroom/interpretive area, and maintenance facilities The estimate for Park Center improvements totals $600,000 The Master Plan preliminary cost estimate for park improvements totals $1 8 million

ENVIRONMENTAL ENHANCEMENT OPPORTUNITIES

The diversity of habitat and wildlife species on Powell Butte described in Appendix B depicts the ecosystem as it occurs today However, this ecosystem is changing Plant communities develop through a process of succession, defined as a change in community composition and structure over time Succession has been a significant factor and influence on the species composition and resulting landscape of Powell Butte Most of the changes in vegetation, habitat and wildlife have been directed by human influences, including logging, farming and the introduction of nonnative species

Maintaining and enhancing Powell Butte's ecosystem will require active development efforts and increased management Left unchecked, the invading Hawthorns and Himalayan blackberries will take over the meadow, and the forest habitat will eventually dominate over all The meadow as we know it today will return to forested habitat through natural succession of plant communities

A fundamental, ongoing question is how to enhance and manage the continued succession of the vegetation, habitat and wildlife on the Butte This fundamental question needs to be combined with an understanding of human impacts and influences on the

natural environment, in order to balance environmental protection and human use The implementation of this Master Plan will offer some important opportunities to address these issues Some of these opportunities are described below

Created Wetlands

Powell Butte contains multiple wet areas associated with land depressions and drainages Many of these wet areas are very small and most are seasonal A naturally-occurring spring has successfully been transformed into a wetland pond on the south side of the meadow, which has created year-round habitat for ducks Increasing the distribution and quality of wetlands could effectively increase the diversity of wildlife that utilize Powell Butte

An opportunity exists to create larger and more permanent wetland areas on the Butte Many of the existing drainages are within or near soil types that are conducive to the creation and enhancement of wetland conditions The updated nature park design described in the previous section includes the creation of two large "wet meadow" areas on the west side of the Butte A view of one of these areas as seen from the mountain finder is given in Figure 5-3 Creation of new wet meadow habitat would be achieved by reclaiming meadow area currently being invaded by hawthorn and other undesirable plant species The wet meadow enhancements proposed in this Master Plan would effectively expand the current meadow area, and improve the quality of habitat Creation of these wet areas may also improve the quality of stormwater drainage to Johnson Creek, and may have some effect on the quantity of stormwater drainage as well Creation of these areas will also serve to offset the increase in impervious surfaces proposed as part of this Plan, for both park and water facilities

Seasonal wet areas may also be created on the east side of the Butte, as part of the construction process for the 600' reservoir, described in Section 4 of this report The facility plan for this element includes utilization of excavated material to create impermeable areas, which would retain water and attract wetland species

Meadow Management and Reclamation

The predominantly grassy meadow is a distinguishing characteristic of Powell Butte for most recreational users The meadow, which was created by logging and then maintained by continuous farming and grazing, is subject to invasion by undesirable vegetation if left un-managed

Management techniques that have been attempted to control the hawthorns and Himalayan blackberries include revegetation of disturbed areas, controlled burns and

hand clearing These techniques have had some positive benefits for maintaining the meadow, but generally have been too limited in scope Hand clearing is extremely difficult and becomes impractical due to the large amounts of hawthorn and blackberries that need to be removed

A concentrated effort is needed to focus on alternative management measures to preserve the meadow and control invasive species This Master Plan contains a plan for implementation of the measures needed for success Implementation is discussed in more detail in the next section

Land Acquisition

Development in southeast Portland is expected to accelerate over the next twenty years, which will remove properties rich in habitat from the Johnson Creek corridor and from private parcels on Powell Butte itself High density residential development is already spreading from the base of the Butte to its crown on the eastern slope This area of the city already has limited park and open space for the current population, and increased urban growth will mean additional pressures on Powell Butte

In order to further the goals and objectives of this Master Plan, it is recommended that properties having connectivity with Powell Butte be considered for immediate acquisition and addition to the park. Potential properties should be evaluated as assets to Powell Butte for environmental enhancement, water facility management or parks use

Acquisition in the area to the south of the Butte, in the Johnson Creek corridor, has the potential for flood mitigation and water quality enhancement These improvements would be consistent with the Johnson Creek Resources Management Plan and the Bureau of Environmental Service's goals for Johnson Creek

Ongoing acquisition efforts should be coordinated with the Parks Bureau, which is already actively pursuing property in the Powell Butte area Priorities expressed by the Parks Bureau for land acquisition should be recognized and supported In general, acquisition should be prioritized considering the following factors (not ranked)

- presence of significant forested slopes,
- presence of ecological corridors,
- geophysical significance,
- potential for development, and
- water facility needs

Trail Modifications

There currently exists an uncontrolled mix of permitted and "volunteer" trails on Powell Butte While the major trails are planned and maintained, many have been created by park users who have decided that the existing trials are inadequate for their particular recreational use

A concentrated effort is needed to effectively manage the trail system Abusive trail use, coupled with the blatant creation of "personal trails" has caused significant erosion and habitat disturbance throughout the Butte As more people use the Butte, this problem will increase

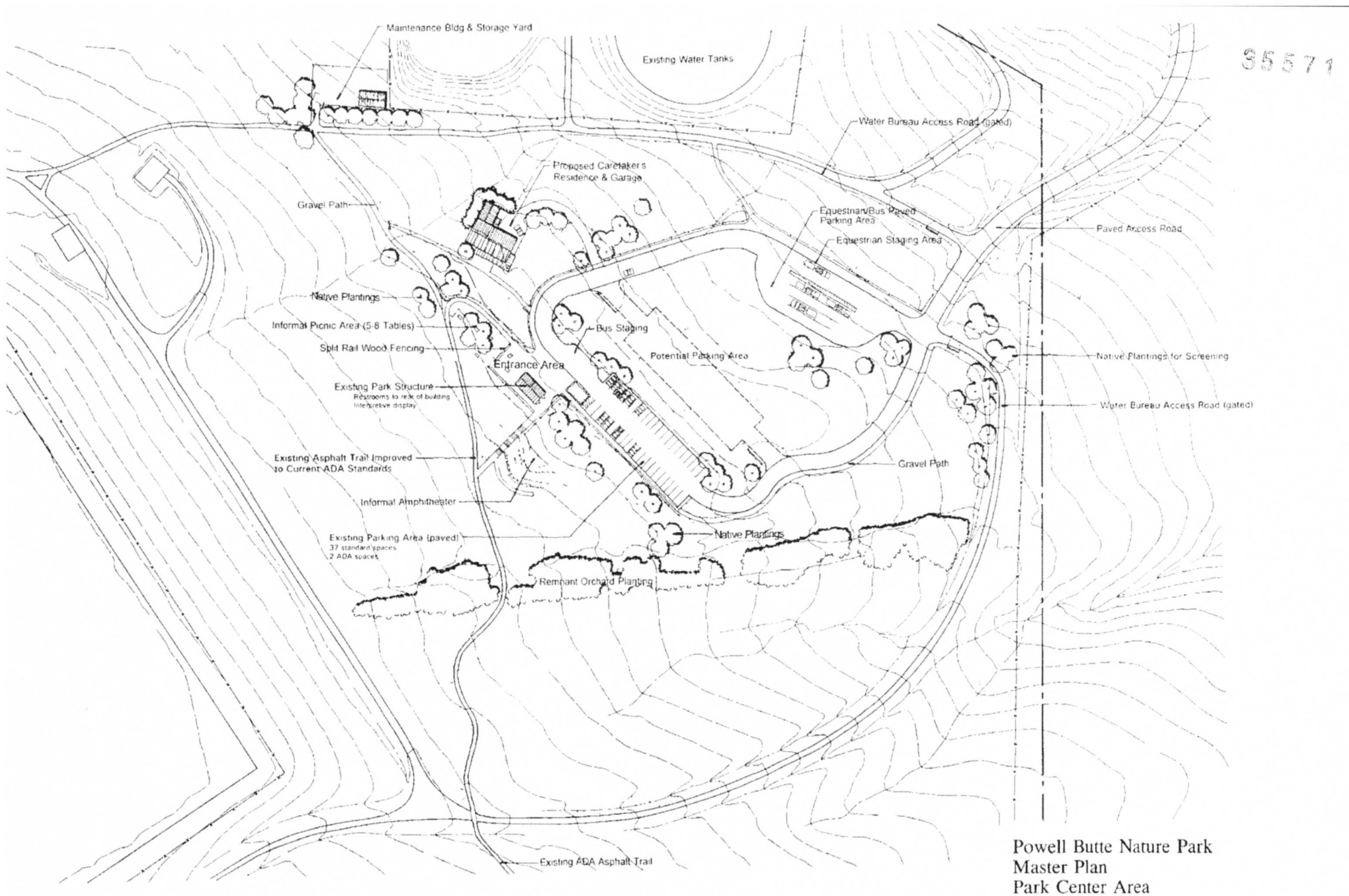
The park design recommends separation of use on the major trails, with surfaces and construction methods appropriate for the use, in order to reduce erosion Trail separation and curtailment of undesignated trails will be encouraged by signage and education If necessary, these efforts may be enforced through the Implementation Plan Similarly, abandonment of volunteer trails will be carried out The Implementation Plan, discussed in the next section, will focus on evaluating recreational impacts to the park and on developing methods to respond to these impacts The success of the trail use separation system and management techniques to improve trail condition will be evaluated on an ongoing basis

Access-Limited Wildlife Area

Wildlife is sensitive to human activity As more people come to Powell Butte, it will be increasingly important to provide undisturbed habitat for species which may be especially sensitive to park users This is of particular concern for wildlife during vulnerable life stages such as nesting, early rearing and wintering This Master Plan recommends the creation of an approximately 100-acre area set aside exclusively for wildlife habitat, designated in the southeast corner of the park and shown in Figure 5-1 Visitor access to this protected area should be limited

Management and Maintenance

In order to ensure that the multiple planned uses on Powell Butte can coexist, management and maintenance of the park must increase substantially Abuses and vandalism of the natural landscape and park amenities (trails, signs, picnic areas, etc) and unwanted activity in the Park Center have been ongoing Active management and observation of park users on an ongoing basis will be necessary to create an atmosphere that is conducive to people having a positive recreational experience on Powell Butte



Powell Butte Nature Park
Master Plan
Park Center Area

Portland Water Bureau
Portland Parks and Recreation

0 25 50 100 200 300

Scale 1:50
Contour Interval 5 feet

FIGURE 5-2

IMPLEMENTATION PLAN

The purpose of the Powell Butte Implementation Plan is to ensure that the recommendations included in this Master Plan will be carried out and sustained well into the future The Implementation Plan addresses major aspects of operation and maintenance of the Powell Butte Nature Park, including long-term protection of natural resources, public education and involvement, funding and other implementation issues

MANAGEMENT STRUCTURE

Implementation of the Master Plan will build on the cooperative working relationship between the Water Bureau and the Parks Bureau, which led to the creation of the Powell Butte Nature Park in 1986 This tradition will continue, in order to provide for the effective management of the Park

Joint Management Committee

Decisions will be made by a Joint Management Committee consisting of four City staff members Two of these will be selected by the Water Bureau and two will be selected by the Park Bureau The primary responsibility of the Joint Management Committee will be to develop an annual workplan and budget for performance of activities described in the Implementation Plan Costs related to management and operation of Powell Butte will be included in the regular operating budgets of the two Bureaus, there will not be a separate budget and review process specific to Powell Butte

On an annual basis, the Joint Management Committee will conduct a review of the workplan and budget A review process will be developed by the Committee, which will include interest groups, wholesale water customers of the City and community groups As a property and water facility owner on the Butte, the Powell Valley Road Water District will be contacted for review and comment The Committee will include the Water Bureau's wholesale customers in the review process, through presentation to the Water Managers Group The Friends of Powell Butte will be the primary public contact point for the Committee The Friends group has a history and understanding of the Butte that makes it a logical candidate for this role Stakeholders outside the Friends group should be notified in advance of meetings with the Joint Management Committee, so that other interests can be represented

The second major function of the Committee will be to implement the public information program Support for the activities of the Joint Management Committee will be shared between the two Bureaus

Areas of Bureau Responsibility

As described above, the Park and Water Bureaus will share in the responsibility of developing the annual workplan and budget, and in implementing the public information program described in this Plan

The two Bureaus will develop a more coordinated approach to the operation and maintenance of Powell Butte As stated in the City Charter, expenditures by the Water Bureau must provide benefit to the water system The Water Bureau will provide support for above-ground and below-ground facilities and amenities on Powell Butte, when support is required as an element of mitigation for construction of planned or potential water facilities on Powell Butte The Water Bureau may provide this support through some combination of its own staff, allocation of funds to the Park Bureau or funding contracts with a third party to perform work As the City agency responsible for the property, the Water Bureau will also provide a basic level of property maintenance, consistent with Water Bureau standards at other facilities

Depending on mitigation requirements and responsibilities, areas of Water Bureau support could be

- *Facilities maintenance, for both park and water uses* The Water Bureau can reasonably contribute to the maintenance of park and water facilities which are constructed by the Water Bureau Park facilities may be constructed by the Water Bureau as an element of mitigation for future water facilities on Powell Butte The Park Bureau should continue to maintain existing park facilities until major park improvements are made The Water Bureau should continue to maintain existing water facilities on the Butte

- *Security, for both park and water uses* The Water Bureau can reasonably assume greater costs for provision of park security at the time the Park Center improvements are made Increased security may be provided for water facilities as needed, at the time of their construction Security contributions provided by the Water Bureau could be in addition to those currently provided by the Parks Bureau

- *Maintenance of natural areas, including meadow, forest, wetlands and habitat areas* A program to manage these areas will be developed by the Joint Management Committee The Water Bureau may reasonably contribute to the maintenance of these areas as park amenities, as an element of mitigation for

the construction of future water facilities The Joint Management Committee should establish a basic level of property maintenance which is appropriate for the Water Bureau to perform, as the property owner That is, the Water Bureau would have certain obligations to maintain its property, even in the absence of the current park A baseline level of maintenance could be established based on Water Bureau practices and standards at other facilities The Water Bureau should assume responsibility for this basic level of maintenance, through its own staff or by transfer of funds to Parks This basic level of maintenance would not be included as a mitigation measure for future water facilities

- *Maintenance associated with recreational uses and impacts* A program to manage recreational uses and their impacts on the Butte will be developed by the Joint Management Committee The Water Bureau may reasonably contribute to management activities which may be required, as an element of mitigation for the construction of future water facilities

- *Land acquisition for park expansion* The Joint Management Committee will identify opportunities for land acquisition which benefit both park and water uses of Powell Butte on an ongoing basis Criteria for property acquisition have been listed in Section 5 of the Master Plan The Committee will also identify funding opportunities by agencies outside city government, including the Metro Greenspaces program and the Federal Emergency Management Act (FEMA) program The Water Bureau has in the past contributed to the purchase of properties adjacent to the Butte for the benefit of the water system, and will continue to do so in future, as appropriate The Water Bureau may also reasonably purchase, or contribute to the purchase of additional properties which benefit the park, as a significant element of mitigation for construction of future water facilities Land acquisition is a significant mitigation strategy for planned and potential water facilities on the Butte As discussed earlier in this Master Plan, the need and timing of many of the potential facilities are very uncertain However, land acquisition opportunities exist now, and may be all but gone by the time facility decisions are made To avoid the loss of this mitigation opportunity, the Water Bureau may choose to purchase land in advance of facility construction In this event, the Water Bureau should consider a "land banking" arrangement Land banking would allow purchase of the property, and then "storage" until it officially becomes part of the park at a selected time Land banking allows the Water Bureau to establish a clear responsibility for performing the mitigation, by better linking two events which may be separated by many years

The Joint Management Committee should develop a plan which allocates task and funding responsibilities between the two Bureaus, as one of its first functions The

lead agency should be defined as the agency having primary funding responsibility The lead agency will not necessarily be the one that performs the bulk of the work

As the agency responsible for recreation and the public use of natural areas, it is recommended that the Bureau of Parks and Recreation assume primary responsibility for implementation of educational and interpretive activities on Powell Butte The Water Bureau should assume primary responsibility for education related to the water system The Park Bureau should also continue to perform tasks related to public use of the park, such as maintenance of recreational programs, issuance of recreational permits, contact with user groups and coordination with regional park planning

Process for Master Plan Update

The Joint Management Committee will review the Master Plan every five years, and will determine if an update to the Plan is appropriate Until such time as the Master Plan is updated, the two Bureaus agree to carry out the recommendations of the Master Plan, and to be guided in their decisions by the Vision and Decision Criteria set forth in the Master Plan

PUBLIC INFORMATION AND INVOLVEMENT

Background and Discussion

An on-going program to inform the public of activities and decisions that impact Powell Butte is recommended The visibility of Powell Butte, coupled with a strong public interest in protecting its natural resources provides an atmosphere for active public involvement Public interest and awareness of management issues may increase in the future as private tracts surrounding the Butte are developed with high-density urban housing Some of this housing will actually be located on the Butte, along the north slope and eastern property boundary As the population density increases around Powell Butte, public use levels on the Butte will also increase along with the potential for negative impacts to the resource Thus, the future will likely bring increased complexity of issues and needs for management of Powell Butte The public will expect to be an active participant in determining how these needs and issues will be addressed

An ongoing public information program which informs interested users about management activities on the Butte and educates park users is recommended In addition, major management decisions and construction projects should use more intensive public involvement Project-specific public involvement will be required to address concerns associated with construction projects, which may include construction of water facilities as well as creation of the seasonal wet meadows and Park Center improvements Active public involvement is recommended whenever a major change in use is proposed by the Joint Management Committee Major management decisions

may be developed as part of this Implementation Plan, to protect the health of natural areas or to manage recreational impacts

Recommended Actions

The recommended public involvement program for Powell Butte consists of a three-tiered approach, which includes ongoing public information and action-specific public involvement The recommended actions for each approach are described below

Level 1 Ongoing Public Communication

The purpose of this effort is to

1) Ensure that the interested public is informed of management activities and developments on the Butte, and

2) Provide a means for identifying emerging community concerns

Recommended actions

- Regular attendance by a representative from the Joint Management Committee at Friends of Powell Butte meetings, to provide updates and receive input,
- Communication with neighborhood associations, Sheriff's Posse, organized recreational groups such as PUMP, and other key stakeholder groups as appropriate,
- Issue a newsletter one to two times per year to a mailing list which includes key stakeholders and contacts gained during the Master Plan process, and
- Issue a press release to coordinate with newsletter release

Level 2 Project-Specific Public Involvement

The purpose of this effort is to inform and involve key stakeholders in the decision-making process, for specific facilities or uses that may impact users or neighbors of the Butte.

The Joint Management Committee will be responsible for developing a project-specific public involvement plan, in advance of facility design or major changes in management practice Factors to consider in the development of specific programs should include the potential significance of the project and its degree of impact on stakeholders The

Joint Management Committee should work with key stakeholder groups to refine the proposed public involvement approach

A project-specific public involvement program should include a forum for information sharing, discussion and consensus-building on alternatives and proposed actions in the project This forum could be an advisory committee or a task force Stakeholder groups which should be considered for representation include

Friends of Powell Butte,
Friends of Springwater Trail,
Portland Audubon Society;
40 Mile Loop Land Trust,
Centennial Neighborhood Association,
Powellhurst-Gilbert Neighborhood Association,
Pleasant Valley Neighborhood Association,
Metro,
Johnson Creek Watershed Management Organization,
Bureau of Environmental Services,
Portland United Mountain Pedalers,
Centennial School District,
David Douglas School District,
Portland Public Schools,
Multnomah County Sheriff's Posse,
Powell Valley Road Water District,
City of Gresham,
Tualatin Valley Water District, and
Water Managers Group (wholesale customers of Water Bureau)

Depending on the facility or management issue, a workshop or series of workshops with targeted stakeholder groups may be appropriate

A project-specific public involvement program should also provide an opportunity for broader public review and comment on the issues involved and/or the proposed plan of action for facility construction or park management Depending on the specific project and stakeholders, this could include an open house, or could require coordination with the neighborhood associations

Finally, project-specific public involvement should include full public information through project-specific mailings, such as newsletters and fact sheets, and through the news media Project information may be posted at the park itself, in the visitor's kiosk area

Level 3: Public Information During Construction

The purpose of this program is to inform users and neighbors of the Butte about ongoing construction, and provide an opportunity to receive comments from the public on project progress.

- Post information on the ongoing project at the Park Center. Information should state the purpose of construction, projected duration and area of impact. Material may also provide information on construction management efforts.

- Elements of the Level 2 program conducted during construction will provide this information to interest and community groups.

OPERATIONS AND MAINTENANCE

Park and Water Facilities Maintenance

Water Facilities Maintenance

Currently, the Water Bureau's routine maintenance of water facilities on Powell Butte is limited to periodic cleaning of the existing 50 million gallon reservoir. The existing reservoir is cleaned once every five years. The cleaning process entails draining each 25 mg cell in sequence, and rinsing the inside of the reservoir with high pressure hoses. The cleaning operation takes one to two weeks to complete. On an as-needed basis, Water Bureau staff calibrate and repair instrumentation associated with the reservoir, including alarms, switches and telemetry.

Future maintenance could include a more intensive maintenance program for the existing reservoir, as well as the added responsibilities of new facilities.

The Powell Valley Road Water District currently maintains a regular cleaning schedule for its existing 7 million gallon, 3 million gallon and 0.2 million gallon reservoirs. No change in maintenance responsibilities is anticipated in the future.

A maintenance schedule should coordinate activities for both park and water facilities. It will be the responsibility of the Joint Management Committee to annually identify operation and maintenance tasks and budget associated with operation of the park.

Park Facilities Maintenance

The future health of the nature park will depend on effectively managing recreational uses and on adequately maintaining facilities and park amenities. Necessary operations

and maintenance tasks have been sorted by the Park Bureau into six program areas park facilities (parkscape), natural areas, trail maintenance, interpretation, environmental education, and security Currently, Powell Butte is staffed with less than one full-time person to oversee these functions An increase in staffing to two and three-quarter full time employees (FTE) is recommended Staffing needs are discussed in more detail below

Park Facilities (Parkscape) Needs

Parkscape maintenance currently includes maintaining restrooms, trash receptacles, picnic tables, and other Park Center facilities The Park Bureau currently manages a contracted caretaker position for performance of these duties, as well as to provide limited security A paid, full-time caretaker position is recommended Tasks would include regular maintenance of the parkscape, and possible responsibility in other areas including natural areas management, trail maintenance, education, etc

Natural Areas Needs

Natural areas on Powell Butte include three distinct habitats meadow, forest, and wetlands Currently, there is no management plan for the natural areas Isolated management projects performed with volunteer labor have attempted to control nonnative vegetation and restore wetland habitat

A natural resources manager at halftime is recommended, for development of habitat management workplans for the natural areas of the park A natural areas program would manage and prioritize restoration and habitat preservation projects in the park. Crews could be hired seasonally to assist volunteers with natural resource improvement projects Volunteer groups and summer work programs, such as EnviroCorps and Youth Conservation Corps could assist in achieving identified goals More detailed discussion of natural areas management is given later in this Implementation Plan

Trail Maintenance Needs

Currently, trail maintenance activities operate at half the level that the Park Bureau regards as necessary to sustain the current trail system A large percent of the labor for maintaining the trail system is currently performed by volunteer groups, and there is a need for additional park staff to coordinate this work.

One-half of a FTE for trail maintenance, and up to three-quarters of an FTE in the summer construction season is recommended A critical component of maintaining the trail system is use of volunteer groups and summer programs Implementation of the Powell Butte Master Plan will increase maintenance requirements to upgrade trail surfaces above current levels Continued monitoring of trail usage and the elimination

of undesignated trails will need constant attention

Education and Interpretation Needs

Current interpretation and environmental education programs on Powell Butte are limited, with only a few interpretive park signs and tours conducted by volunteers Interpretation is defined as an informal approach to understanding the Butte through the use of signage and brochures that inform the user Environmental education is a more defined program that calls for a greater commitment by the park user, to meet specific educational goals

One quarter of an FTE be devoted to interpretative activities and environmental education on Powell Butte is recommended This position could be shared with other resource parks, including Leach Botanical Gardens, Johnson Creek, Beggar's Tick Marsh and Kelly Butte Interpretation at the Butte should include both park and water facilities A more detailed discussion of interpretation and education is given later in this Implementation Plan

Security

At present, one-quarter time Park Bureau staff person is provided for Park Center reconnaissance It is recommended that this position be increased to halftime Further measures are also appropriate to increase the safety of persons and property on the Butte Security is discussed in more detail later in this Implementation Plan

Natural Areas Management

Background and Discussion

A fundamental objective in managing Powell Butte is to maintain and enhance the natural areas on the Butte, consistent with the vision and criteria expressed in this Master Plan The value of the Butte to park users and wildlife is directly dependent on the health of the natural landscape In order to preserve the health of these natural features, an effective and proactive management approach is recommended This section discusses several basic programs which could be implemented for the protection of the natural resources on the Butte

Biological Monitoring

As park uses increase, the impacts on wildlife and their habitat will need to be assessed. Further, as management approaches are taken to address natural areas such as controlled burns, etc , these actions will need to evaluated to determine their success The type, distribution and population trends of plants and animals will need to be evaluated on a regular basis to determine the need for changes in management strategy.

Meadow Management

Natural plant succession, if left unchecked, will cause the meadow to disappear over time Currently, the meadow is being invaded by nonnative grasses and vegetation including hawthorns and Himalayan blackberries Left unattended, these two less desirable plant species will take over major portions of the meadow in the near future A meadow management plan should be developed that identifies goals for the meadow, a monitoring program and management techniques to attain stated goals In particular, controlled burning should be considered as a basic management tool Past experience indicates a good potential for meadow management using this technique

Forest Management

Forest habitats also are subject to change over time Currently, the forested area on Powell Butte is experiencing an intrusion of English ivy and Himalayan blackberries, primarily along the south side These nonnative species can effectively choke out natural understory vegetation, and ivy is known to grow up into trees and weaken them so they are subject to windfall and diseases Further, the trees on the Butte are subject to insect infestation, lightning strikes and storm damage over time It would be prudent to develop a forest management plan that establishes management objectives, a monitoring program and recommendations to protect and improve forest resource qualities

Wetlands Management

There are several drainages on the Butte that could be used to increase wetland habitat This would increase species diversity by providing more seasonal and year-round wet conditions for selected species The Johnson Creek Resources Management Plan identifies a need for a wetland pond within the forested area to the south of the Butte for purposes of enhancing riparian habitat along and in connection to Johnson Creek. The fill area east of the orchard has become a wetland which has attracted ducks, frogs and other wetland species This area could be enhanced Further, there are areas on the northwest side of the Butte that could also be developed and protected for wetlands

Biological Connections and Corridors

Most wildlife thrives in interconnected areas of diverse habitat These connections or corridors should be wide enough for large mammals such as deer to feel secure while they are moving within the corridor Powell Butte provides an upland habitat adjoining the Johnson Creek corridor A program which establishes goals and measures for increasing biological corridors is recommended Connections could be enhanced by

purchasing additional property, resulting in an increased depth of forested habitat within the corridor or a wider connection between Johnson Creek and Powell Butte

Habitat Preservation

A designated wildlife area has been included as a recommendation in this Master Plan This set-aside area will severely limit human access and is closely connected to the Johnson Creek corridor It would be beneficial to monitor the habitat within this area and compare it to other areas on the Butte that allow human activities, in order to gain an understanding of the impact that park users may be having on wildlife

Residential Development

The Outer Southeast Community Plan identifies increased housing densities for private lands immediately surrounding Powell Butte Some of this development is currently happening on the north and east sides of the park and is actually encroaching on the upper east side of the Butte This increased residential development triggers the need to educate future park users about the need to take special care of the natural features of their "back yards" Of particular concern are the impact of domestic pets on wildlife, outdoor lighting, the use of backyard herbicides and the invasion of non-native plant species from homeowner's yards growing onto the Butte These neighbors should be contacted and provided with information about how to live compatibly in close proximity to a nature park

Education and Enforcement

Achieving compatibility of park uses with the natural environment will require a better appreciation of the fragile nature of the habitat by park users Park users will need to become better educated about the impact they have on the park in order to modify behaviors that are harmful to wildlife and habitat Enforcement of park rules should be used, when education fails Enforcement may also be needed to manage the health of natural areas, if it becomes clear that user levels or specific activities must be curtailed

Recommended Actions

The discussion above describes a program which requires three major components monitoring, management and education/enforcement The following yearly project schedule is recommended to implement these major areas

Year 1

- Establish management goals for meadow, forest, and wetland Establish goals for habitat preservation and enhancement, and establishment of biological connections and corridors These goals will provide direction for future management actions in these natural areas

- Develop a biological monitoring program for Powell Butte At a minimum monitoring should include baseline environmental data for plant and wildlife species composition, schedule for updating data and identified methodologies for monitoring The 1996 Powell Butte Master Plan provides existing data for species composition, with the exception of reptiles and amphibians

- Identify public education opportunities consistent with established management goals

Year 2

- Develop a meadow and forest management action plan which identifies specific techniques for control of invasive species and increases native species dominance and diversity, identifies sensitive areas that may be subject to overuse, and identifies approaches for controlling observed overuse (if any)

- Implement provisions of the biological monitoring program established in Year 1

- Identify areas on Powell Butte that may be appropriate for wetland creation and/or enhancement The 1996 Powell Butte Master Plan provides a baseline of potential wetland areas

- The Master Plan recommends an area on the Butte which would be appropriate for a habitat preservation set aside area The boundary must be refined Determine the best way to preserve this area from human intrusion consistent with established management goals Identify other areas which may be appropriate for human exclusion A potential may be the created pond on the south side of the Butte

- Evaluate and purchase, if appropriate based on the management goals, additional land which protects the biological connection between Powell Butte and Johnson Creek.

- Implement provisions of the public education program established in Year 1

Year 3 - Ongoing

- Implement provisions of natural areas management plans, biological monitoring program and public education program established in Years 1 and 2

Management of Recreational Impacts

Background and Discussion

Powell Butte provides recreational opportunities to a diversity of users On a typical day on Powell Butte, one can see horseback riders, joggers, mountain bikers, wildlife observers, hikers and dog walkers The attraction of Powell Butte to these users undoubtedly also will appeal to many additional park users as residential development continues in areas surrounding the park, and as population within the metro region increases Additional use of the park's resources (both authorized and unauthorized), left unchecked, will result in overuse and degradation of natural areas, as well as heightened conflicts between recreational groups

It should be noted that certain recreational uses have a higher impact on the park's natural resources than others High impact uses will require more management resources, and present a challenge to other stated goals of resource protection discussed in this Master Plan Mountain biking has been identified as a high-impact recreational use since the development of the first Powell Butte Master Plan in 1986 This Master Plan recognizes mountain biking as an accepted recreational use, but with a note of caution- only if it can be effectively managed This Master Plan contains specific recommendations for management of high-impact recreational uses

Dogs off-leash have also had a recognized detrimental impact on Powell Butte wildlife Off-leash dogs is an inappropriate use, which must be managed by effective enforcement of leash laws

The primary issue at Powell Butte is how to protect the natural resources of the park while providing compatible recreational use A secondary issue becomes how to accommodate an anticipated substantial increase in recreational use These issues can only be addressed by first determining the resource carrying capacity of the park. Resource carrying capacity has two aspects

1 The ability of natural resources to accommodate the use or intended use without unacceptably compromising resource quality and wildlife diversity; and

2 The quality of the recreational experience from the users' point of view, which can depend on both social and environmental factors

These are subjective concepts, but they provide a method for making decisions related to carrying capacity The definition of carrying capacity recognizes that different kinds of uses will consume the resource at different rates Further, it recognizes that recreational use can cause excessive impacts on resources and that, at some point, active management and restrictions on further use may be needed to protect a given resource

Based, in part, on the concept of carrying capacity and the types of uses currently allowed and anticipated on Powell Butte, the following programs are recommended for monitoring and controlling recreational impacts

Establish Carrying Capacity Measurement Factors

An analysis of carrying capacity relies on measurement of impacts to identified factors, in order to measure relative changes These identified factors need to be established and modified over time Potential measurement factors could include the number of unauthorized trails created, the increase in width of existing trails - especially during winter use as people go off-trail to avoid mud puddles, the rate of trail erosion, the area of disturbed vegetation and changes in numbers, kinds and distribution of plant and animal species present in an area Measurement factors need to be evaluated over time, either through a numerical scoring system or through a more subjective tabulation of "high, medium or low" impacts

Determine Baseline Carrying Capacity

If the concept of carrying capacity is to be used as a management tool, the present levels of use of the park need to be determined This can be done most readily by conducting a park user survey At a minimum the survey should establish the numbers of park users, types of recreational uses, the areas where they recreate, the frequency of their visits, where they are coming from and what their perception of conflicts with other user groups and resources The survey should record the day of week, time of day and average length of visit The survey should include the above information for all user groups, including hikers, equestrians, bicyclists, dog owners, group activity participants, etc

Trail Development and Improvement

Effective management of the trail system is fundamental to controlling recreational impacts in the park. This Master Plan has identified strategies to lessen recreational impacts to the Butte's natural features by· trail separation for different user groups, trail construction which is suited for each user-type, trail realignment away from sensitive habitat and high erosion areas, and better signage On-going management approaches could also include seasonal trail closures, as well as temporary or permanent trail closure to specific uses Use levels may also need to be controlled on specific trails

Education and Enforcement

Providing information to park users about resource protection, and explaining the reasons for particular management actions will encourage people to use the park more wisely and appreciate its unique value Education could include informational signs and literature, coupled with staff and volunteer interaction For example, a park ranger could present a short talk at scheduled times during high use days to educate users about the park and its resources Also, volunteers in various user groups (i e dog owners, bicyclists) could patrol the park to interact with and educate their peers

Active enforcement may be required if education fails to achieve program goals Enforcement mechanisms could include a fine or ticketing system and patrols by the Multnomah County Sheriff's Posse or Portland Police

Recommended Actions

A management program which seeks to maintain high-quality recreational experiences on Powell Butte, while controlling the impacts of recreation on natural resources must consider the carrying capacity of the park Recommended programs should be implemented in accordance with the following schedule

Year 1

- Conduct user surveys to assess levels and types of recreational use In particular, document high-impact uses Determine, if possible, the extent of compliance with existing park rules Determine, if possible, the effect of high-impact uses on other approved uses Document the areas and times of highest impact

- Develop carrying capacity measurement factors to assess user impacts to the natural environment Define tools to measure the factors They may be qualitative, quantitative or both Special attention should be paid to high-impact users in the carrying capacity analysis Identify critical times when resource impacts may be highest, such as ground-nesting bird rearing periods, amphibian egg-laying and hatching

- Establish baseline carrying capacity of Powell Butte Carrying capacity may vary with season

- Develop trail system evaluation guidelines Identify need for new trails, upgrades to existing trails and decommissioning of existing trails if necessary

- Develop education program for recreational users and groups that use Powell Butte Develop educational materials targeted to high-impact uses

- Identify steps needed to protect vulnerable resources from recreational users, in critical times of year

Year 2

- Apply established capacity analysis to a section of the Butte over the course of a year in a pilot project Adjust analysis as appropriate based on pilot study results

- Develop enforcement program framework

Year 3 - Ongoing

- Use carrying capacity analysis to identify overuse areas Initiate management actions to mitigate overuse impacts identified

- Implement enforcement program for high-impact uses Potential measures should include limits on number of high-impacts users by permit, limits in seasons of use Elimination of high impact use is a measure of last resort

- Continue implementation of education and trail evaluation programs

- Conduct follow-up users surveys Determine, if possible, extent of compliance with park rules and document trends, if any

Security and Prohibited Uses

Background and Discussion

As in many other public areas, there are some undesirable activities and uses that occur or could occur on Powell Butte These range from unauthorized camping to drug use Many of these activities can be controlled with enhanced on-site security Fire safety and the potential presence of large animals such as cougars are also security issues that must be adequately addressed to insure safety of all users on the Butte

Powell Butte has a history of prohibited uses, due to its undeveloped character This relatively unsecured public area, surrounded by residential development has been a magnet to multiple undesirable uses For purposes of this Implementation Plan a prohibited use can be defined as illegal activity, a use which does not meet the vision set forth in the Master Plan, or a use that may harm park users, their recreation experience or the environment At a minimum, prohibited uses include

campfires	drug and alcohol use
weapons	overnight camping
hunting	off-trail and wrong trail bikes or horses
unauthorized parties	dogs off-leash
gang activities	unauthorized motor vehicles
vandalism	unauthorized tree/plant cutting

Managing these and other prohibited uses on Powell Butte has been a difficult task historically Currently, one-quarter time staff person is provided for reconnaissance of the Butte, with an emphasis on the Park Center It is recommended that this position be increased to half-time Security staff would patrol the Park Center and the park boundaries that extend along the Springwater Corridor trail The caretaker can assist by observing activities in the Park Center, talking with park users and reporting incidents to the proper authority

Coupled with on-site security, it is recommended that the Multnomah County Sheriff's Posse patrol the Butte on an ongoing basis This security "presence" is likely to send a message that the Butte is not available as a playground for those looking to create nuisances and conduct vandalism The Joint Management Committee should develop a program to utilize the services of the Posse The Joint Management Committee should also discuss increased security options with the Portland Police Bureau

Fire security is also an issue of concern for Powell Butte Fires have occurred on the Butte, as either controlled burns for invasive species eradication or unintended grass fires The grass fires typically have historically been less than one acre in size and readily contained with the single fire hydrant on site

The fire hydrant was placed on the Butte in 1980, at the time of construction of the first water reservoir The hydrant is located in the meadow near the northwest corner of the existing reservoir According to the Portland Fire Bureau, one hydrant is believed to be sufficient for the typical and occasional grass fire However, this would not be sufficient for a larger fire that got out of control and burned into the dense tree layer Discussions with the Portland Fire Bureau indicate that this type of fire would be difficult to eradicate Fire in the forested areas would have to be approached from the sides of the Butte with fire equipment and hoses relying on both water trucks and hydrants located within residential areas at the base of the Butte This would be a difficult fire control situation and one that could pose a danger to park users as well as adjacent homeowners

The current status of fire management on Powell Butte indicates that this may be an

area to discuss further with the Portland Fire Chief in the future as park uses and infrastructure increases At a minimum, a fire evacuation plan should be in place in case there is ever a need to get park users off the Butte in a hurry because of fire danger It may be prudent to develop a fire management plan, specific to the meadow, scrub or forested areas of the Butte A good fire management plan could actually exploit the opportunity that an unintended fire may create, of that fire could achieve recognized habitat management goals

Recommended Actions

The primary action recommended to insure a safe experience for park users is to increase on-site security Increased security coupled with education will increase safety in the park The following schedule and activities identify a plan for implementation of these measures

Year 1

- Develop a security and fire management plan for the park.
- Identify and prioritize elements of security and fire plans
- Develop and post fire evacuation plan for the park
- Identify and post on-site list of prohibited uses in the park

Year 2

- Establish funding to support increased on-site security in the park. Identify hours for security personnel to be on site and hours to be available on-call Identify critical times for security needs, including days of the week and times of day
- Identify water sources for added fire-fighting capability, if needed

Education and Interpretation

Background and Education

Powell Butte is a unique resource located close to a large and growing residential population This presents many opportunities to educate people about the natural and cultural resources of a nature park located in their own backyard Powell Butte also provides an opportunity to educate people about the region's water supply

Communication through interpretive signage can directly address several of the issues causing impacts Interpretation is defined as an informal approach in understanding

the Butte primarily through the use of signage and displays

Environmental education is a more defined program calling for a greater commitment and interaction by the park user to achieve specific educational goals Park staff should develop a cooperative relationship with interested groups and provide technical and educational programs Volunteers and groups can develop and participate in programs to assist in cooperative management of the park, including trail maintenance, public education and safety The existing Friends of Powell Butte organization offers a strong base for support of educational activities Existing recreational groups and interest from area schools also provide opportunities for promoting educational programs

Recommended Actions

Year 1

- Provide improved maps and brochures
- Design and develop interpretive signage for Park Center area and site specific locations
- Develop educational program areas natural/cultural/water facilities
- Develop educational contacts with schools and volunteer organizations

Year 2

- Install interpretive signage
- Expand special events such as guided walks, bike rides, horse rides, bird watching, star gazing, plant identification, and orienteering
- Establish environmental education program for school-age children and adults, in cooperation with the school districts, and other providers

Johnson Creek Resources Management Plan

The Johnson Creek Resources Management Plan was adopted in 1995, and is a comprehensive plan for managing resources in the Johnson Creek watershed The plan comprises a series of actions which would result in the gradual environmental enhancement of Johnson Creek and its watershed, while solving the pressing flooding problems along the creek.

Johnson Creek is one of the last free-flowing streams in the Portland metropolitan area From its origins in the Cascade foothills to its confluence with the Willamette River, Johnson Creek flows westward 25 miles, through the Cities of Gresham, Portland, and Milwaukie, travelling past the south side of Powell Butte While the creek is not directly connected to Powell Butte, it receives runoff from several small tributaries on the Butte In total, the Creek drains a 54-square mile, partially-urbanized watershed with a population of about 130,000

Johnson Creek has not fared well in the face of development Much of its watershed has been and continues to be converted from forest into farms, cities and suburbs Urban land uses and agriculture have encroached on the stream corridor, narrowing it and converting a naturally meandering stream into an often polluted drainage channel The natural resource values of the stream are much reduced A few salmon and steelhead still return to the Creek, but they are just remnants of former runs Only a few small islands of the original riparian forest continue to provide habitat for wildlife.

Powell Butte is an important component of the restoration effort to restore Johnson Creek and its natural resources The Butte is classified as a unique upland habitat within the plan It is recognized as providing value to the Johnson Creek basin because of its rich forest and meadow habitat, in close proximity to the creek corridor Powell Butte provides forage, cover and nesting habitat to multiple species that thrive on a mix of habitats Because of the Butte's ability to enhance the natural character of the Johnson Creek corridor, the Johnson Creek Resources Plan sets forth specific management recommendations for the Butte which inclue restoration and enhancement of vegetation, including removal of non-native vegetation At Powell Butte, vegetative diversity should be maintained and additional wildlife habitat provided by the addition of dead wood and replanting with shrubs along its southern boundary

Outer Southeast Community Plan

The Outer Southeast Community Plan was adopted in 1996, and covers an area defined by neighborhood boundaries on the west (includes western most neighborhood associations of Montavilla, South Tabor, Foster-Powell, Mt Scott-Arleta and Brentwood-Darlington), City boundaries on the east and south and the Banfield Freeway and Halsey Street on the north The plan includes Powell Butte within the Mt Scott/Johnson Creek subarea

The primary purpose of the Outer Southeast Community Plan is to guide growth and development in one of Portland's fasting growing neighborhood's until the year 2015 Over the next two decades, thousands of new residents are expected to move into the 28 square mile plan area The plan provides guidelines for accommodating new housing and jobs in ways that do not increase traffic congestion, damage the livability of existing neighborhoods or degrade natural and scenic resources

Six policy areas are identified in the plan, including one which is applicable to Powell Butte The Open Space and Environment policy states

"Provide parks and open spaces to meet projected recreational needs of outer southeast residents Create a sense of connection with the natural environment Protect natural resources by reducing the impact of development on them "

The plan designates all of Powell Butte as City Parks and Open Spaces which are areas noted to be publicly owned or committed to open space use Zoning and Environmental overlay zones in the Outer Southeast Community Plan remain consistent with those adopted in the 1991 Johnson Creek Basin Plan, with Powell Butte zoned Open Space (OS) with both Protection ("p" - forested area) and Conservation ("c"- meadow area) overlay zone designations

Stated policy objectives included for the Mt Scott/Johnson Creek subarea that are applicable to future uses of Powell Butte include

- Protect and improve the Johnson Creek corridor as a natural drainage way, a wildlife corridor and a naturally forested area,
- Maintain significant open spaces in the uplands surrounding Johnson Creek and reduce storm water runoff from development,
- Create additional opportunity for higher-density housing through transfer of development rights on vacant land near Powell Butte, and

- Provide for future recreational needs as this area develops

In addition to the policy objectives to protect the natural area in and around Powell Butte, the plan identifies a large tract of land south of Powell Butte for proposed open space acquisition Also, transfer of development rights are allowed to transfer development from environmentally sensitive properties to elsewhere in the plan district This provides an opportunity for property owners who have land on and around the Butte to gain development credits for not building on these environmentally sensitive lands

Three stakeholder groups that participated in the development of the Outer Southeast Community Plan also provided input, review and comment on the Powell Butte Master Plan Representatives from the Centennial, Powellhurst-Gilbert and Pleasant Valley Neighborhood Associations helped to provide some continuity between the two planning efforts

Powell Butte is a unique upland area, rich in natural resources Few places in the region provide such expansive vistas, with an impressive Cascade backdrop including Mt St Helens, Mt Rainier, Mt Adams, Mt Hood and the Clackamas, Sandy and Bull Run watersheds The forest on the north, west and south slopes effectively screen the eastern vista from urban activities and contributes to the natural and scenic qualities of the site

The site contains a diversity of wildlife habitat comprised of an expansive grassland meadow, a shrub scrub transition area and then a mid-serial stage forest area The combination of these habitats provide forage, perch, roost and nest opportunities for hawks, falcons, owls, bats, meadow larks, deer, coyotes as well as many other birds, reptiles and mammals Specific resource values that have been identified on Powell Butte include aesthetics, scenic qualities, pollution and nutrient retention and removal, sediment trapping, recreation, education, heritage, wetlands and wildlife

Environmental Characteristics

The important environmental characteristics of Powell Butte are described below

Topography

The topography of Powell Butte is characterized by a gentle rolling landscape in the central area and steep forested slopes extending downward on all sides The Butte is oval-shaped with a summit at about elevation 629 feet above sea level This is about 325 to 375 feet above the surrounding valley floor

Figure B-1 shows the topography of Powell Butte The majority of acreage on the Butte is contained within the open meadow This area peaks to its highest point near the orchard at the west side of the summit The rolling hills give way to drainage depressions located in a radial pattern about three quarters of the way down the Butte

Powell Butte contains five distinct bench areas of relatively flat topography which are about five acres or larger in size These bench areas occur at the summit, north of the summit, south of the summit, near the western forest edge and over the existing 50 MG underground reservoir on the north side of the meadow All of these large flat areas are predominantly grassy meadow habitat with the bench on the western edges giving way to some shrub-scrub habitat

The sides of Powell Butte are marked by very steep slopes which increase in steepness with decreasing altitude These steep forested slopes encircle the Butte on the north, west and south sides

The contour lines on the topographic map indicate changes in elevation at intervals of 1 foot The areas where contour lines are close together indicates steep slopes, where the contours are further apart, as in the central and bench areas of the Butte, the slope is more gentle

Soils

The soils on Powell Butte are comprised of four distinct types The 1976 Soil Survey of Multnomah County, Oregon identifies the soil types as Multnomah silt loam, Quatama loam, Wollent loam and Latourell loam These soil types range from being moderately well drained (Latourell loam) to being poorly drained and seasonally saturated (Wollent loam)

The soils types can be directly related to on-site physical attributes of the Butte Generally, the Multnomah silt loam soils are found at the forested areas, the Quatama loam soils are predominantly located throughout most of the meadow except the summit, the Wollent loam soils are found in wet areas and drainages, and the Latourell loam soils are located at the summit and eastward to the edge of the property The physical characteristics of each soil type is described as follows

Latourell loam -This is a well drained soil found on broad terraces Typically, the surface layer is dark brown and brown loam about 16 inches thick The substratum is dark yellowish-brown loam and very gravely/sandy loam to a depth of 60 inches or more

Permeability is moderate Effective rooting depth is 60 inches or more Available water capacity is 8 to 12 inches Water-supplying capacity is 22 to 26 inches Runoff is slow, and the hazard of erosion is slight If irrigated, water must be applied slowly to prevent runoff

The vegetation expected to grow in areas not developed or cultivated is Douglas-fir, Oregon white oak, bigleaf maple, western red cedar, vine maple, western hazel, common snowberry, trailing blackberry, roses, grasses and forbs

This kind of soil can be used for urban development, farming and wildlife habitat No major limitations to construction and development have been noted

Multnomah silt loam - This soil type is well drained and typically located on side slopes of broad terraces The surface layer is usually dark brown silt loam about 8

inches thick The upper 14 inches of the substratum is dark yellowish- brown gravely silt loam Below this to a depth of 60 inches or more, the substratum is grayish-brown, dark brown, and brown gravely sand

Permeability is moderate Effective rooting depth is about 40 inches Available water capacity is 4 to 6 inches Water-supplying capacity is 17 to 19 inches Runoff is rapid, and the hazard of erosion is high

Areas that are not developed or regularly cultivated typically result in vegetation comprised of Douglas Fir, Oregon white oak, big leaf maple, western red cedar, vine maple, western hazel, common snowberry, trailing blackberry roses, and grasses

This soil type is usually used for development or wildlife It is not a good soil for agricultural production The main limitation to uses include steep slopes and coarse fragments in the surface layer

Quatama loam - These are well drained soils typically found on low terraces This soil formed in old alluvium Usually, the surface layer of this soil is dark brown loam about 9 inches thick The subsoil is dark yellowish brown loam and clay loam about 39 inches thick It is mottled in the lower part The substratum is dark brown, mottled loam and sandy loam to a depth of 60 inches or more

Permeability is moderately low Effective rooting depth is 60 inches or more Available water capacity is 8 to 10 inches Runoff is slow, and the hazard of erosion is slight A water table is at a depth of 2 to 3 feet from December through April

The vegetation in areas not cultivated is Douglas-fir, Oregon white oak, western red cedar, bigleaf maple, willow, western hazel, roses, trailing blackberries, salal,tall Oregon-grape, common snowberry, Pacific dogwood, bracken fern, forbs and grasses

This soil is usually used for agricultural production, urban development or wildlife habitat The main limitations for development are a seasonal high water table and moderately low permeability

Wollent silt loam - This is a poorly drained soil on concave side slopes of broad rolling terraces This soil formed in old alluvium Typically, the surface layer is very dark grayish brown, mottled silt loam about 10 inches thick The substratum is gray, mottled silty clay loam to a depth of 60 inches or more

Permeability is moderately low Available water capacity is 10 to 12 inches Water-supplying capacity is 17 to 19 inches Effective rooting depth is 40 to 60 inches or more Runoff is slow, the hazard of erosion is slight A water table ranges from 12

inches above the surface to 12 inches below the surface from November through May

The vegetation in areas not cultivated is western red cedar, Oregon ash, common snowberry, willow, roses, bracken fern, sedges, grasses and forbs This kind of soil is conducive for wetland development and enhancement

Geology

Powell Butte is composed almost entirely of sandstone and conglomerate of the Troutdale Formation The Troutdale Formation is composed of materials transported into the Portland-Vancouver area by the Columbia River and its tributaries during the Pliocene epoch (approximately 3 to 6 million years ago) Some of the sediment, characterized by an abundance of quartzite pebbles, was transported from far up the Columbia River Much of the formation, however, particularly south and east of Portland, was shed from the Cascade Range and transported into the area by the ancestral Sandy and Clackamas River systems

From late Pliocene to early Pleistocene time (about 3 million years to 700,000 years ago) the Troutdale Formation was intruded by basaltic lavas which erupted on the earth's surface to form small volcanic cones Rocky Butte, Mount Tabor, Kelly Butte, and Powell Butte, among many others are examples of these volcanoes These eruptions produced small cinder cones and basaltic lava eruptions of limited extent Collectively, the products of these eruptions are termed the Boring Lavas A Boring Lava vent was probably located on the northwest portion of Powell Butte where basaltic flow rock and associated ash and cinder deposits are exposed

In response to a general uplift of the earth's surface in northwest Oregon and southwest Washington in late Pliocene time, rivers and streams began eroding deeper channels on their way to the sea In the Portland area, several hundred feet of the Troutdale Formation was removed by erosion In the process, most of the Boring volcanoes were eroded also Only a small deeply weathered portion of the Powell Butte volcano now remains on the lower northwest slope of the Butte

During the Pleistocene epoch (about 1 5 million until about 10,000 years ago), also known as the "Ice Age," wind blown silt, or loess, derived from glacial sediments in the upper reaches of the Columbia River drainage basin was carried by easterly winds and deposited on hill tops in the Portland area These loessal deposits have probably contributed to surface soils on Powell Butte also Near the end of the Ice Age, catastrophic flooding on the Columbia River system inundated the Portland-Vancouver area numerous times between about 19,000 and 12,000 years ago In at least 40 separate floods which formed temporary lakes over the Portland-Vancouver area, approximately 100 feet of sand, gravel, cobbles and boulders were deposited, burying

the Troutdale Formation below an elevation of about 250 feet These flood deposits surround the base of Powell Butte

Most of Powell Butte is surrounded by a thick deposit of residual coarse gravel in a matrix of clay, silt and sand This residual debris, or colluvium, forms an "apron" on the lower slopes of Powell Butte, and is derived from weathering of the Troutdale Formation on the upper slopes of the Butte The colluvium is thought to have accumulated mostly through mass wasting, the process where weathered rock debris is slowly transported down slope under the influence of gravity Rapid slope failures, i e mud slides and debris flows may have contributed to the deposits as well

To further evaluate geotechnical conditions, five borings were drilled on Powell Butte on August 22 and 23, 1996 The boring locations are shown on Figure B-2 The borings were drilled from 39 to 80 feet below the ground surface using a truck mounted Becker drill

All of the borings encountered similar soil conditions consisting of a dense unit of sandy silt soil which graded with depth to a denser unit of sandy gravel to gravely sand All of the borings except the one located on the south side of the Butte contained a less dense unit extending from the ground surface to depths between 8 and 13 feet, and then graded into the denser unit The soil boring on the south side indicate the less dense soils extend to a depth of about 35 feet The thicker section of less dense soils on the south side boring may be the result of deeper weathering at this location, or may be uncompacted fill placed there from the existing 50 MG reservoir

Information gathered from the geotechnical borings indicate that with respect to soils and geology, there are no limitations to siting or construction of future facilities such as water reservoirs or park amenities

Hydrology

Hydrology is the science of properties, distribution, and circulation of water on the surface of the land, in the soil and underlying rocks and in the atmosphere It is an important aspect of managing the Butte's sensitive environment It is an indicator of areas which may be prone to erosion, establishes a basis for the types of habitat that will thrive on different soil types (for example, meadow versus forest), and it will be a distinguishing factor in determining the locations of appropriate wetland habitat enhancement opportunities Hydrologic characteristics in and around Powell Butte also have a significant effect on the design and placement of facilities to insure foundation stability Hydrology will be a key factor in protection and mitigation of natural surface water drainage corridors associated with facility construction Some of the important hydrological characteristics on Powell Butte are described below·

Review of United States Department of Agriculture, Natural Resource Conservation Service weather data from 1961-1990 shows that average annual precipitation at Powell Butte is approximately 32 6 inches per year The majority of rainfall occurs in the months of November, December and January with average monthly rainfall amounts of 5 3, 6 13 and 5 4 inches respectively The lowest average monthly rainfall amounts occur during the period of June through September when rainfall amounts are less than 1 0 inch per month

The National Oceanic and Atmospheric Administration estimates that the area in and around Powell Butte receives approximately 4 inches of rainfall for a 25-year rainfall event, over 24-hour period This data is used to calculate the required holding capacity of surface stormwater detention facilities This amount of rainfall is higher than downtown Portland (3 5 inches) and less than areas just east of Troutdale (4 5 inches).

Surface drainage on Powell Butte can be characterized as following a radial pattern, with water draining off in "V"-shaped depressions As can be seen on Figure B-5, the majority of these drainages are located on the southwest, south and southeast sides of the Butte Historical drainages located on the north sides have been altered and redirected inland from the north slopes to protect residential structures, and to allow for the construction of the access road, parking lot and 50 million gallon reservoir Many of the drainages follow topographical depressions that ultimately lead to Johnson Creek A few terminate on the Butte in sump areas which exhibit hydric soil and hydrophytic plant conditions

Surface water management on the north side of the Butte has created some challenges in the past Sediment and runoff damage to nearby homes and to the newly constructed access road occurred in the late 1960's and early 1970's This problem has since been resolved by the construction of surface water drainage channels on the top of the north side of the Butte These channels redirect north-bound stormwater back onto the Butte

Depth to groundwater can generally be characterized through review of data contained within the Soil Survey of Multnomah County for each soil type on the Butte The Multnomah soils, found within the forested areas, have an available water capacity at 4 to 6 inches and water-supplying capacity of 17 to 19 inches Water runoff is rapid and the hazard of erosion is high along these predominantly steep slopes In contrast, the Quatama loam soils, located in most of the meadow except the summit, have available water capacity at 8 to 10 inches The water table is at a depth of 2 to 3 feet below the surface from December through April Runoff in these areas is slow and the hazard of erosion is slight

The Wollant loam soils, found in wet areas and drainages, have available water capacity

at 10 to 12 inches The water table ranges from 12 inches above the surface to 12 inches below the surface from November through May Runoff is slow and the hazard of erosion is slight The Latourell loam soils, located at the summit and eastward to the edge of the Butte, have a water capacity at 8 to 12 inches and water-supplying capacity at 22 to 26 inches Runoff is slow and the hazard for erosion is slight for these areas

Scenic Resources

Scenic resources are defined as "lands that are valued for their aesthetic appearance" Portlanders associate scenic places and views of mountains and rivers with Portland's identity Powell Butte is one of those places that warrants protection of its scenic resources for the future

Powell Butte contains remarkable vistas On a clear day, Mt Hood, Mt Rainier, Mt Jefferson, Mt Adams, Mt St Helens as well as most of the surrounding Boring Lava buttes can easily be seen These mountains and buttes can be identified from the mountain view-finder located at the summit, northeast of the orchard The Butte's summit of 629 feet gives way to nearly unobstructed views of many of these Cascade mountain peaks

The Butte also contains a wide open meadow with rolling hills which, in many places, can be enjoyed without interfering views of the surrounding urban landscape below the mountain The meadow's expansive acreage, rolling hills and forest fringe present a scenic quality which can effectively remove the urban influences on this otherwise natural environment The forest fringe provides a scenic backdrop to the undulating meadow fields

Recognizing the importance of protecting the scenic resources on Powell Butte, the Portland City Council adopted the *Scenic Resources Protection Plan* in March 1991 which designates six scenic viewpoints for protection on the Butte These viewpoints are identified on Figure B-3 The City defines a scenic viewpoint as "A location from which to enjoy a scenic view A viewpoint may be a generalized location, such as a butte, and include several vantage points where the view may be seen to best advantage, or a single observation point"

Four of the designated viewpoints are located on the summit of the Butte One provides a view of the Cascades to the north One provides a view of the Cascades to the north and east and the other two provide views of the forest fringe, City and foothills to the south The view of the landscape to the south includes mostly forested rolling hills

There is also a designated viewpoint from the parking lot looking to the north This view enables one to see a portion of the urban landscape with a backdrop of hills towards the Cascade Mountains The sixth viewpoint is at the southeastern edge of the Butte looking west towards the meadow This view enables one to enjoy the massive rolling meadow landscape free of urban influences

Vegetation, Habitat and Wildlife

The vegetation and habitat that exists on Powell Butte today has been significantly influenced by past historical land use practices The Butte was logged in the nineteenth century and the gentle rolling meadow of the Butte was managed for agricultural uses, including grazing, through the 1970's These uses have resulted in a land form that is predominantly comprised of an open grassy meadow and a second growth coniferous-deciduous forest fringe In addition to these predominant features, the Butte contains three other distinct vegetation types They include an old orchard located on the western portion of the summit, a shrub scrub hawthorn habitat located between the meadow and the forest, most notably in the south west corner of the Butte, and pockets of wetland vegetation associated with wet areas and drainages scattered in small areas throughout the Butte The vegetation and habitat types located on Powell Butte are identified on Figure B-4

The vegetation that characterizes the Butte attracts a diversity of wildlife Overall, the diversity of wildlife species has been reduced as urban development has encroached towards the Butte Large mammals which were once common, such as black bear, bobcat, cougar, wolf, fox, elk and coyote either don't use the Butte today or do so very infrequently The coyote has been noted on the Butte over the recent years and a cougar was spotted in 1992 Generally, wildlife within the urban area, including on Powell Butte, has been limited to those species capable of co-existing with humans and able to exploit small patches of suitable habitat within an urban or suburban landscape Typically these species include American Crow, American Robin, European starling, song sparrow, Bewick's wren, house finch, cedar waxwing, violet-green swallow, belted kingfisher, great blue heron, mallard, wood duck, bushtit, black-capped chickadee, raccoon, opossum, nutria and moles The less developed areas of Powell Butte generally support a greater diversity of wildlife species that are characteristic of farm and forest land They include western flycatcher, black-headed grosbeak, orange-crowned warbler, wood peckers, black-tailed deer, coyote, deer mouse, voles and bats All of these species have been sighted on Powell Butte

The vegetation, habitat types and wildlife that comprises Powell Butte are discussed in more detail as follows

Meadow Habitat The meadow grassland is the predominant habitat type on the

Butte covering the majority of the upland area from the summit to the forest fringe The herbaceous vegetation in the meadow includes predominantly non-native grasses, shrub clumps, small scattered trees and wildflowers Some native forest herbs can be found in the meadow along the forest fringe The predominant vegetation type in the meadow is non-native grasses (i e *Holcus lanatus)* A detailed list of plant species that have been identified in the meadow is contained in Appendix C In addition to the grasses in the meadow, multiple wildflowers are present such as oxeye daisy, wild carrot, fireweed, tall buttercup, yellow wood violet and common tansy These wildflowers present a profusion of blossoms throughout the spring and summer months Non-native hawthorns also are located throughout the meadow While these plants provide a stunning show of blossoms in the spring, they are considered a nuisance invader of the meadow Himalayan blackberries are another species which is considered an invasive weed and is found in patches throughout the meadow

Meadow Wildlife The grasses, herbs (both native and non-native) and thatch in the meadow provide a rich habitat for a diversity of species A detailed list of animal species located on the Butte is contained in Appendix D Small mammals including pocket gophers, voles and mice use the meadow for nesting and rearing The grasslands also provide nesting habitat for birds such as meadow larks and Savannah sparrows The openness of the meadow even attract flyovers at times by bald eagles and peregrine falcons The meadow in combination with the forest fringe provides qualitative forage, perch, roost and nesting habitat for hawks, falcons, owls and bats Black-tailed deer and an occasional coyote frequent the meadow to forage, take cover among the hawthorns and rest

Orchard Habitat An old orchard is located at the western side of the Butte's summit The trees are more than seventy years old and include different varieties of apple, pear and English walnut The orchard floor is predominantly a mix of orchard grass and various wildflowers Many of the fruit trees are in various stages of decline, although the English walnuts are in fair to good condition Several rare species of wildlife have been seen only in the orchard including the short-eared owl and the northern bobwhite The orchard was a part of an old homestead that was on Powell Butte Its historical value and significance could be considered by some of greater value than its habitat resource The orchard trees will continue to decay and die over time If the orchard is to be preserved, an effort to propagate and replace the trees will be necessary

Orchard Wildlife The orchard fruit trees provide habitat for numerous small mammals and birds The old decaying trees provide nesting holes for squirrels and insects for woodpeckers The tree branches at the top of the Butte allow multiple bird species to rest camouflaged among the trees amidst an otherwise open meadow

Wetland Habitat There are several small wetlands on the Butte primarily associated

with drainages and wet depressions These wet areas enable a distinct type of vegetation to thrive that would not otherwise exist on the Butte The kind of plants that are frequently found in and around wetlands are hydrophytes Hydrophytes are plants that thrive in wet conditions The species of wetland vegetation found on Powell Butte is listed in Appendix C Generally, it includes a mix of sedges, rushes, bulrushes, spikerush, spirea and dogwood

Wetland Wildlife The wetlands on Powell Butte are relatively small except for an enhanced pond on the south side While the wetlands do provide a specific micro-habitat desired by some species, there does not appear to be a draw of wildlife on the Butte that would normally be present in a typical wetland habitat This is most likely due to the small and seasonal nature of the wetlands It could also be an influence of park users including dogs which have been known to disturb ducklings in the pond. Wetland wildlife on the Butte primarily consists of ducks, morning doves and swallows If a more established wetland habitat was created on the Butte, it could attract additional wildlife including herons, shore birds, kingfishers, muskrat and even beaver

Shrub Scrub Habitat Powell Butte contains a shrub scrub micro-habitat that is comprised primarily of non-native hawthorns and Himalayan blackberries This habitat is very invasive and now predominates the southwest corner and is scattered throughout the meadow on the southern and eastern sides of the Butte Controlled burns have been conducted to try and keep these species from invading other portions of the meadow The hawthorns provide a showy bloom in the spring and provide some wildlife habitat Himalayan blackberries provide food, cover and some nesting opportunities primarily for sparrows, but are otherwise undesirable because of their invasive qualities It is not unusual for a Himalayan blackberry vine to grow several inches in a single day during the summer months

Shrub Scrub Wildlife The primary benefit for wildlife that the shrub scrub habitat provides is cover and shade for black-tailed deer and berries for several species of birds including robins and cedar waxwings This is especially important due to the size of the open meadow Deer also use the shrub scrub area for grazing (although Hawthorn and blackberries are not desirable food for deer) and in some cases for fawning Song birds are another wildlife group that will utilize this habitat for resting and sometimes for nesting

Forest Habitat The forest habitat surrounds the meadow on the Butte on the north, south and west sides Two distinct types of forest habitat exist The steep slopes and southern base of the Butte are predominantly Douglas fir which grows in almost pure stands on the very steepest terrain Big-leaf maple can be seen throughout this area as the dominant deciduous species Where there are drainages, either running above or below ground, the most common species of trees are the Western red cedar, Red alder