



Beaverton
South Cooper Mountain
The Region's Next Great Community

CONCEPT PLAN

Final Draft - November 2014





The Best of Oregon

Funding for the South Cooper Mountain Concept & Community Plans was provided by Metro Community Planning & Development Grants, private contributions, and the City of Beaverton.



Contents

EXECUTIVE SUMMARY

- A Vision for South Cooper Mountain
- Background
- Land Use
- Transportation
- Natural Resources
- Infrastructure
- Implementation

CONCEPT PLAN

Introduction	3
Process	5
Principles, Issues and Ideas that Shaped the Plan	7
Guiding Principles.....	7
Planning Area Conditions	9
Scenarios: Development and Testing of Concepts.....	14
The Concept Plan	23
Big Ideas: Concept Plan Overview	23
Land Use Framework	24
Transportation	36
Civic Uses.....	48
Natural Resources	52
Infrastructure.....	56
Implementation Measures	61
Guidance to Future Planning	61
Governance and Urban Services	61
Future Urban Growth Boundary Expansions	61
Infrastructure Funding	62

APPENDICES

- Appendix A: Acknowledgements
- Appendix B: Implementation Plan
- Appendix C: Infrastructure Funding

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Beaverton

South Cooper Mountain

The Region's Next Great Community

EXECUTIVE SUMMARY

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A Vision for South Cooper Mountain

Create livable, walkable, sustainable new communities

Ensure an enduring legacy of natural resource protection and connections

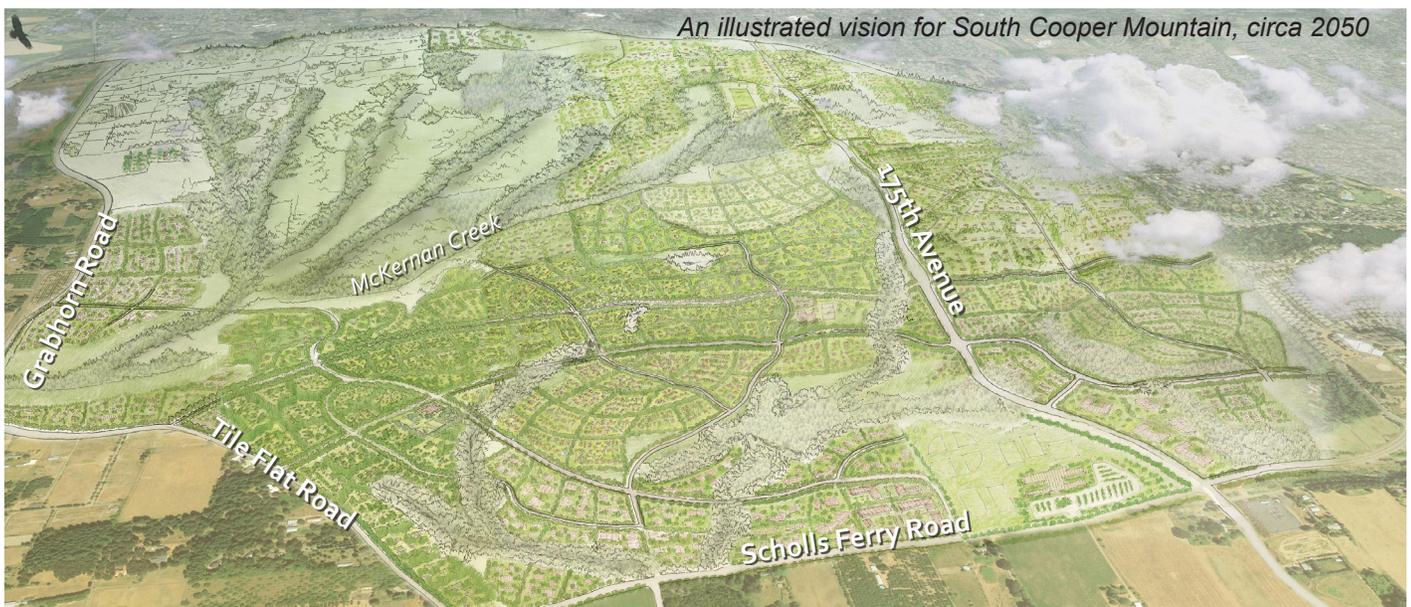
Implement balanced solutions for regional and local transportation

Shape growth and preservation to fit and honor the unique landscape

Work together to deliver feasible infrastructure solutions

Key features of the Concept Plan include:

- The South Cooper Mountain Community Plan Area - a sustainable and livable urban community
- North Cooper Mountain Community Plan Area - new growth is focused where services are available while retaining existing neighborhood character in other areas
- The Urban Reserve Area - future land uses are matched to landscape conditions, existing rural residential development patterns and infrastructure capabilities
- 600 acres of open space centrally-located around McKernan Creek and crowned by Cooper Mountain Nature Park
- A natural resources framework of resource protection, enhancement, and linkages
- Walkable neighborhoods anchored by parks and schools as focal points
- A Main Street with neighborhood shops and services
- A planned variety of housing types providing choices for a range of income levels
- A trails plan connecting neighborhoods, the Nature Park and adjacent areas
- A plan to disperse and balance regional traffic by connecting 175th and 185th Avenues, improving Tile Flat and Grabhorn Roads, and fixing key safety problems
- A well-connected collector, neighborhood route and local street network
- Focused densities and destination uses that help the area become transit-ready
- Water and sanitary sewer plans that can be phased over time
- A storm water management strategy that incorporates regional and site-specific approaches, promotes tree retention and anticipates evolving water quality standards
- An Infrastructure Funding Plan that matches revenues to project costs for water, sewer, storm water, and park facilities.
- A transportation funding strategy to bridge the funding gap, set project priorities, and coordinate long term funding



An illustrated vision for South Cooper Mountain, circa 2050



Background

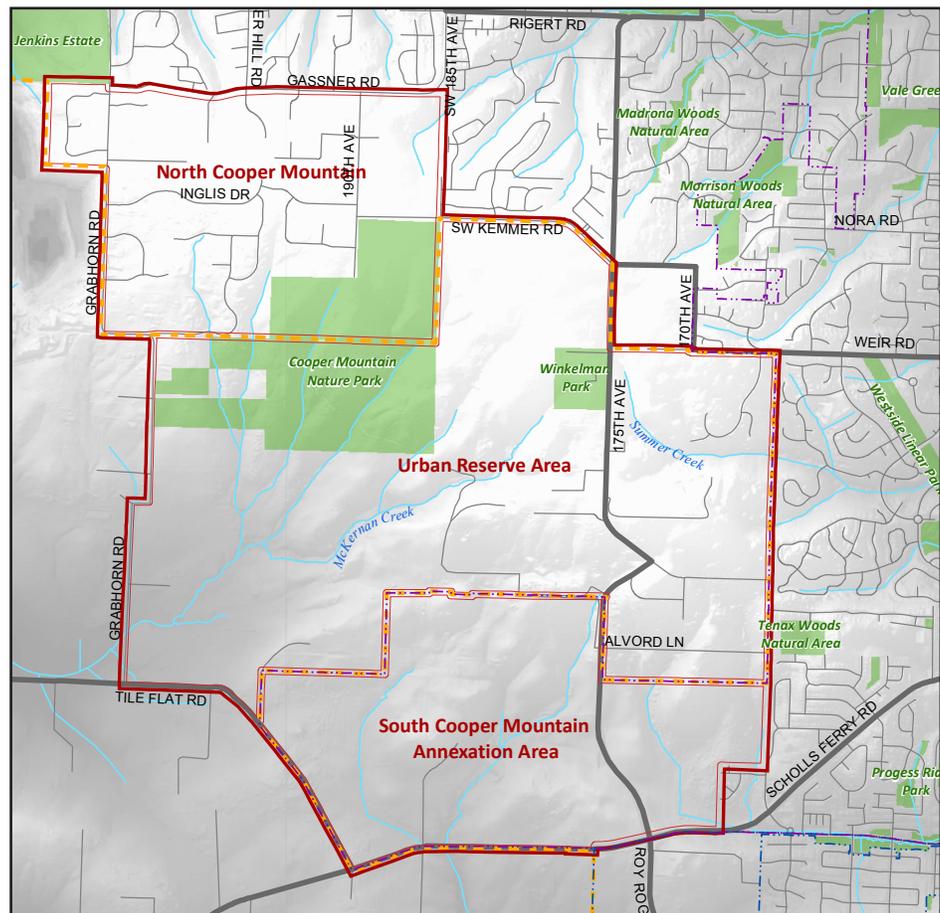
PURPOSE

The purpose of the South Cooper Mountain (SCM) Concept Plan is to:

1. Establish a vision for future growth, natural resource preservation and enhancement, and development in the 2,300-acre planning area of South Cooper Mountain;
2. Guide city and county comprehensive planning in the Urban Growth Boundary expansion areas.

The SCM Concept Plan area covers nearly 2,300 acres of land intended for future urban development over the next 50 years: two subareas inside the Urban Growth Boundary (UGB) and one subarea area that is designated as Urban Reserve.¹ The Concept Plan recognizes the unique needs of the three distinct subareas while providing a holistic vision of how the three areas could integrate and grow sustainably.

South Cooper Mountain Subareas

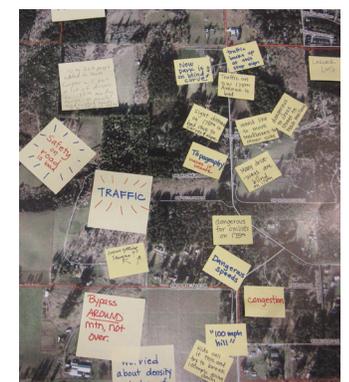


¹ Urban Reserves are the Portland region's 50-year supply of future urban land. They are the first priority areas considered during UGB expansions and are intended to become or contribute to compact, mixed-use, walkable and transit-friendly urban communities. The Urban Reserve adjacent to the Community Plan area was called Urban Reserve 6B during the Urban and Rural Reserves designation process. For more on the Urban and Rural Reserves program, visit <http://www.oregonmetro.gov/index.cfm/go/by.web/id=26257>.

PROCESS

The Concept Plan was developed through an 18-month planning process that included a variety of opportunities for input from stakeholders and the general public. A Technical Advisory Committee (TAC) composed of staff from affected jurisdictions, agencies, service providers and districts provided input and guidance to the project team about technical aspects of the planning process. A Citizens Advisory Committee (CAC) composed of community representatives including residents, property owners, businesses, developers, city and county planning commissioners, citizen involvement organizations, advocacy groups, and other affected stakeholders provided feedback to the project team throughout the planning process. In addition, the City of Beaverton's City Council and Planning Commission provided direction at key milestones during the planning process. The general public was engaged at key points and invited to participate through open houses, online workshops, and community outreach meetings. Focus groups and intergovernmental coordination meetings were held throughout the project. The major phases of the process included:

- Establishment of Guiding Principles for the project and study of existing conditions and future needs in the planning area.
- Visioning, scenario development and analysis of alternative scenario options.
- Preparation of a Preferred Concept Plan scenario, which formed the basis for this Concept Plan.
- Preparation of implementing Community Plans and codes.
- Preparation of an Infrastructure Funding Plan as the Concept Plan was being developed, including an "early funding analysis" that was prepared concurrently with scenario analysis.





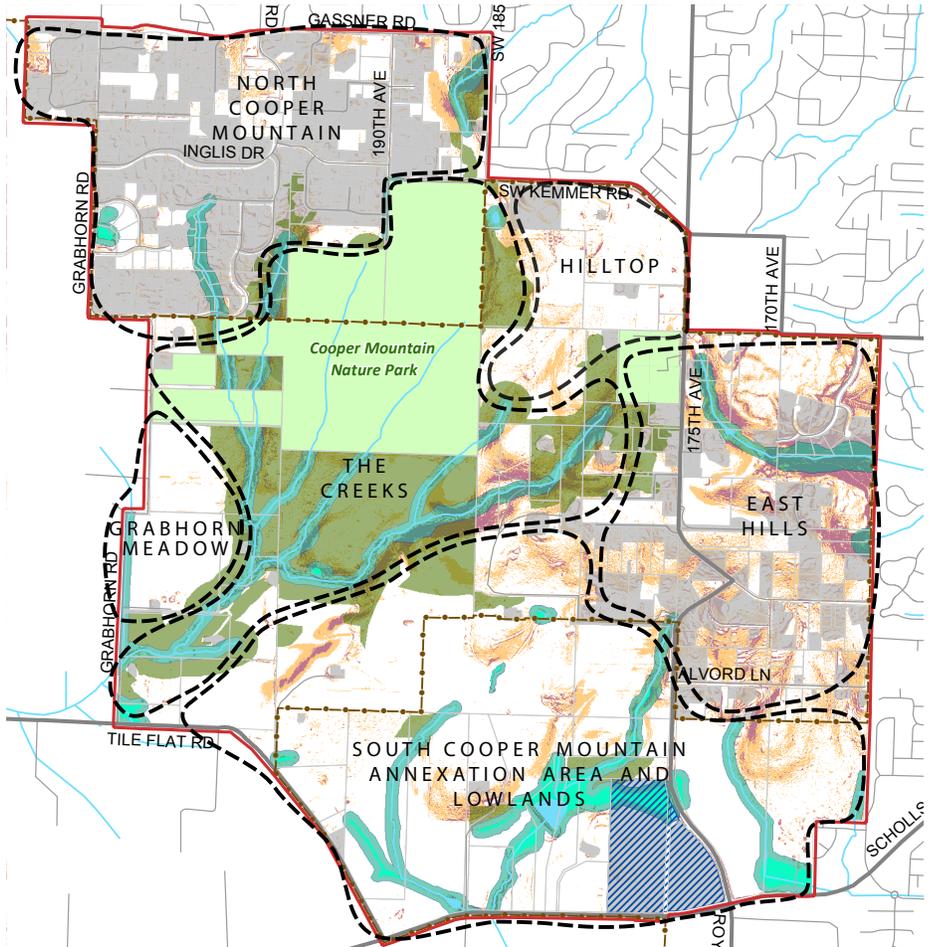
Land Use

FRAMEWORK OVERVIEW

The SCM land use framework is inspired by the distinctive landscapes that comprise South Cooper Mountain. Based on the community dialogue and early mapping for the project, a vision emerged to fundamentally shape, define, and integrate future urban growth and open space preservation based on the physiographic characteristics and natural resources of the mountain. From the hilltop views, to the McKernan Creek tributaries, to the vineyards and agricultural history of the area, it is the land itself that is the foundation for the land use framework. Land uses have been planned utilizing six landscape areas, as summarized below.

The SCM Annexation Area and adjacent Lowlands – Comprised of gently rolling fields, hummocks, and three small tributaries, this area is relatively free of constraints to development. Land has been acquired for a new high school and infrastructure is adjacent and being upgraded to serve SCM and the adjacent River Terrace community plan area to the south. Together, these conditions render the area suitable for development of a sustainable urban community. The Concept Plan organizes the land uses into six new

Figure ES-1 - South Cooper Mountain landscape areas



neighborhoods that are walkable, anchored by parks and schools, have easy access to neighborhood shops and services, and are connected to nature.

The Creeks – Cooper Mountain Nature Park and the set of drainages and uplands within The Creeks, totaling nearly 600 acres in the central portion of the plan, comprise the primary natural resource areas and best opportunities for an enduring green legacy for the area. Providing infrastructure to the developable portions would have costs and impacts disproportionate to the housing benefits. It is therefore planned for natural area preservation, transfer of development rights, and careful transitions from resource areas to future development in adjacent areas.

The East Hills – The East Hills are a mixed area of tree groves, developable areas, steep slopes, existing rural residential development, and natural resource areas. Infrastructure is close by and can feasibly be extended to serve the area. Creating a more connected local street / Neighborhood Route network that reduces the need to use 175th Avenue for local trips is a key need for the area. The vision for the East Hills is carefully planned and connected single-family neighborhoods in the hillside setting. A small compact neighborhood area is shown east of 175th where topography is relatively level.

The Hilltop – Located at the top of the mountain, with flat to gently rolling conditions, and offering some of the best views of the Tualatin Valley, the hilltop is a distinctive and buildable area within South Cooper Mountain. Development can be served by new trunk sewer and water lines that connect to existing systems. The land use framework designates this area for both compact and single-family neighborhood development, with lower densities adjacent to Kemmer Road, the Nature Park, and natural resource areas. Public viewpoints will be the hallmark of this area, and the Cooper Mountain Regional Trail will be a key public amenity.

North Cooper Mountain (NCM) – NCM is largely built out, characterized by large-lot single-family residential neighborhoods. Cooper Mountain Nature Park, purchased through Metro's regional natural area bond program, occupies 230 acres along the southern and eastern boundary of NCM. The Nature Park is a treasured amenity in the community and provides habitat for a wide variety of wildlife. There are two distinctly different conditions that influence future growth and development potential in the area. The northern portion of NCM is readily served with sanitary sewer and has some remaining developable land. In contrast, the southern and western portions of NCM are nearly fully developed, difficult to serve with sewer and proximate to an active gravel quarry. The plan responds to these conditions, and extensive community input, by planning the northern portion for low density infill development and the southern and western portions to retain their existing very low density character and development pattern.

Grabhorn Meadow – Gently sloped, easily accessed from Grabhorn Road, and generally unconstrained, this area is suitable for new compact neighborhoods. However, water and sewer evaluations have demonstrated that substantial infrastructure expansion is required to provide urban services to this area. The plan anticipates that Grabhorn Meadow will likely be the last area to develop in South Cooper Mountain, when services become available in the long term.





ABOUT THE LAND USE DESIGNATIONS

“Near Term” vs. “Future” Land Use

The Land Use framework identifies a vision for development in SCM that will play out over the course of several decades. The concept plan map identifies “Near Term (0-20 Year) Land Use” and “Future Land Use”. “Near Term” land uses are identified in areas within the UGB – the SCM Annexation Area (SCMAA) and NCM. The SCMAA was annexed to the City of Beaverton in January 2013 and is anticipated to be developed in the near term. Potential development within the northern portion of NCM is also characterized as near term, although the timing depends on property owner initiative. The southern two-thirds of NCM is also considered near-term, but only in the sense that new zoning would reflect existing large lot development patterns that do not require sanitary sewers (extension of public sanitary sewers to this area is not assumed in the next 20 years). All of the Urban Reserve Area (URA) shows conceptual “Future Land Use” because urban development cannot occur until Metro, in partnership with the region and subject to state review, expands the UGB to include some or all of this area. The timeline for development to occur in the URA is less predictable than in the UGB, and will likely span several decades.



Summary of Designations

- **Urban Neighborhood / Future Urban Neighborhood:** Primarily made up of apartments/condos and townhomes, with some small-lot single family homes
- **Compact Neighborhood / Future Compact Neighborhood:** A mix of single family homes on small lots and townhomes.
- **Single Family Neighborhood / Future Single Family Neighborhood:** Single family homes on standard size lots, with some range of lot sizes.
- **Future Cluster Neighborhood:** Primarily applied in places with high quality upland habitat; houses are grouped together on more buildable portions of a property and can share views of and access to nearby natural areas.
- **Low Density Neighborhood:** Single family homes on lots that are generally on the larger side for typical suburban development.
- **Very Low Density Neighborhood:** Single family homes on lots around one to two acres, similar to the existing development pattern in North Cooper Mountain.
- **Main Street Commercial:** Street-oriented ground floor retail, with potential for office and/or residential units on the second floor of some buildings. All of the commercial uses are intended to serve day-to-day needs of residents.



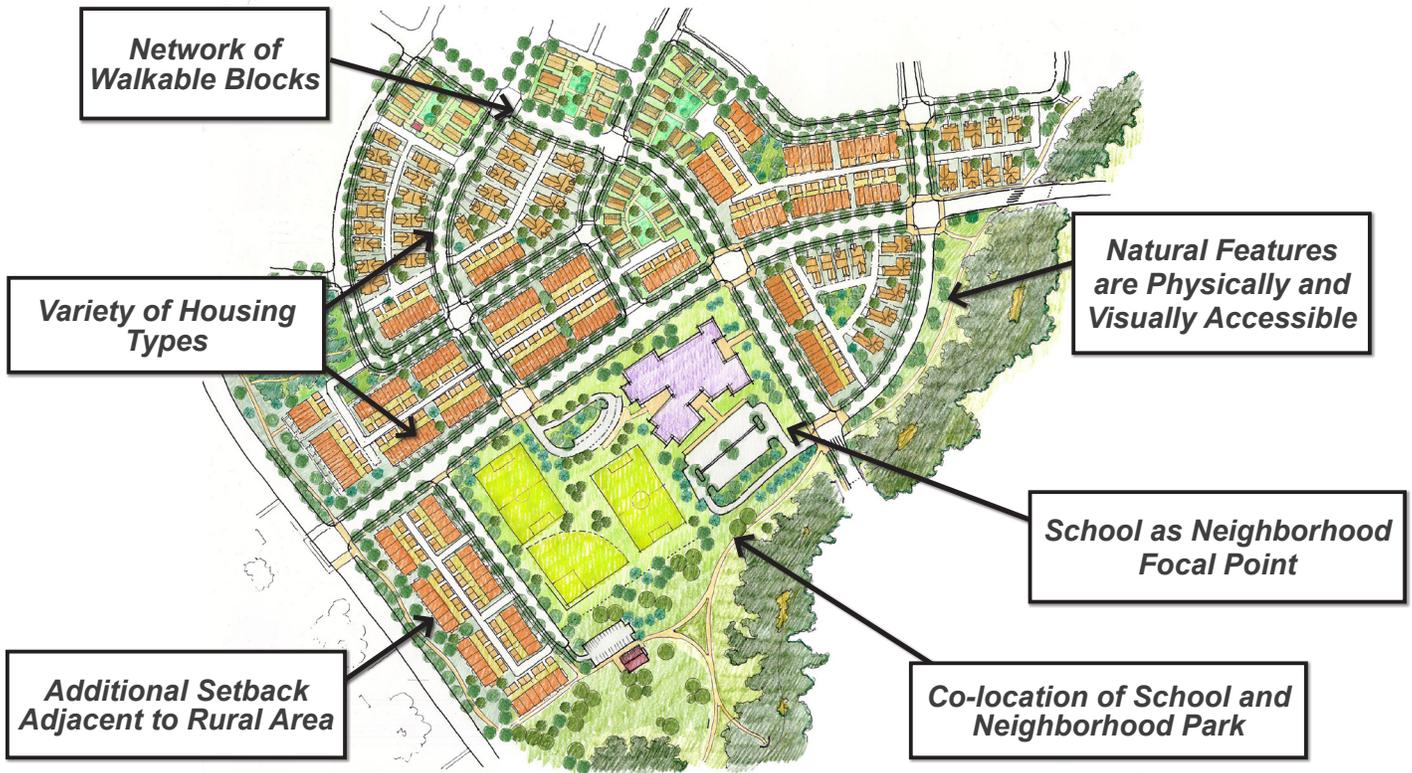
COMMUNITY DESIGN CONCEPTS

The following community design concepts are intended to guide site-specific design treatments that will be essential to quality development and achieving the overall vision. They are intended to guide future development in South Cooper Mountain as well as future comprehensive planning and implementation measures.

- **Neighborhoods and Neighborhood Focal Points:** Development should create walkable neighborhoods, not disconnected subdivisions. Future schools and parks to serve South Cooper Mountain should, to the extent possible, be sited to provide focal points for neighborhoods and to be centrally located to walkable destinations and service areas. Co-location of parks and schools is desirable.
- **Housing Variety:** Neighborhoods should include a variety of housing types, providing choices for a range of income levels, designed and configured to provide compatibility.
- **Integrated Affordable Housing:** There should be a variety of options and locations where affordable housing development is possible, especially in locations with good access to amenities and services. Affordable housing choices should be available throughout the community.
- **Views:** Scenic vistas of the Chehalem Ridge and Tualatin Valley are part of the unique character of South Cooper Mountain, and should remain available after development for the enjoyment of the adjacent neighborhoods and the broader community.
- **Walkable Streets:** New development within SCM should be designed to offer a “friendly face” with physical and visual connections to the street in order to promote walking and biking, healthy lifestyles and a sense of community.
- **Open Space Edges:** Development adjacent to natural resource areas should be designed to provide public views of and access to the resource areas.
- **Habitat-Friendly Development:** Future development in SCM adjacent to protected open space areas, habitat priority areas, or both should be designed to maximize open space preservation, habitat functions and values, and connectivity of habitat areas that preserves wildlife movement corridors.
- **Main Street Character:** The Main Street should be developed as a community focal point and potential future transit node. Buildings should provide a pedestrian-oriented storefront character with parking located behind buildings wherever possible, and multi-story buildings are encouraged in order to provide an urban scale.
- **Rural Edges:** A multi-use path with a landscaped setback area is proposed to help provide a buffer between urban development in South Cooper Mountain and the Rural Reserve to the west.
- **Interim Agricultural Use:** Provisions should be put in place to ensure that on-going agricultural use is allowed to continue even as urbanization begins and progresses.



Figure ES-2 - Neighborhood Design Principles



HOUSING CAPACITY

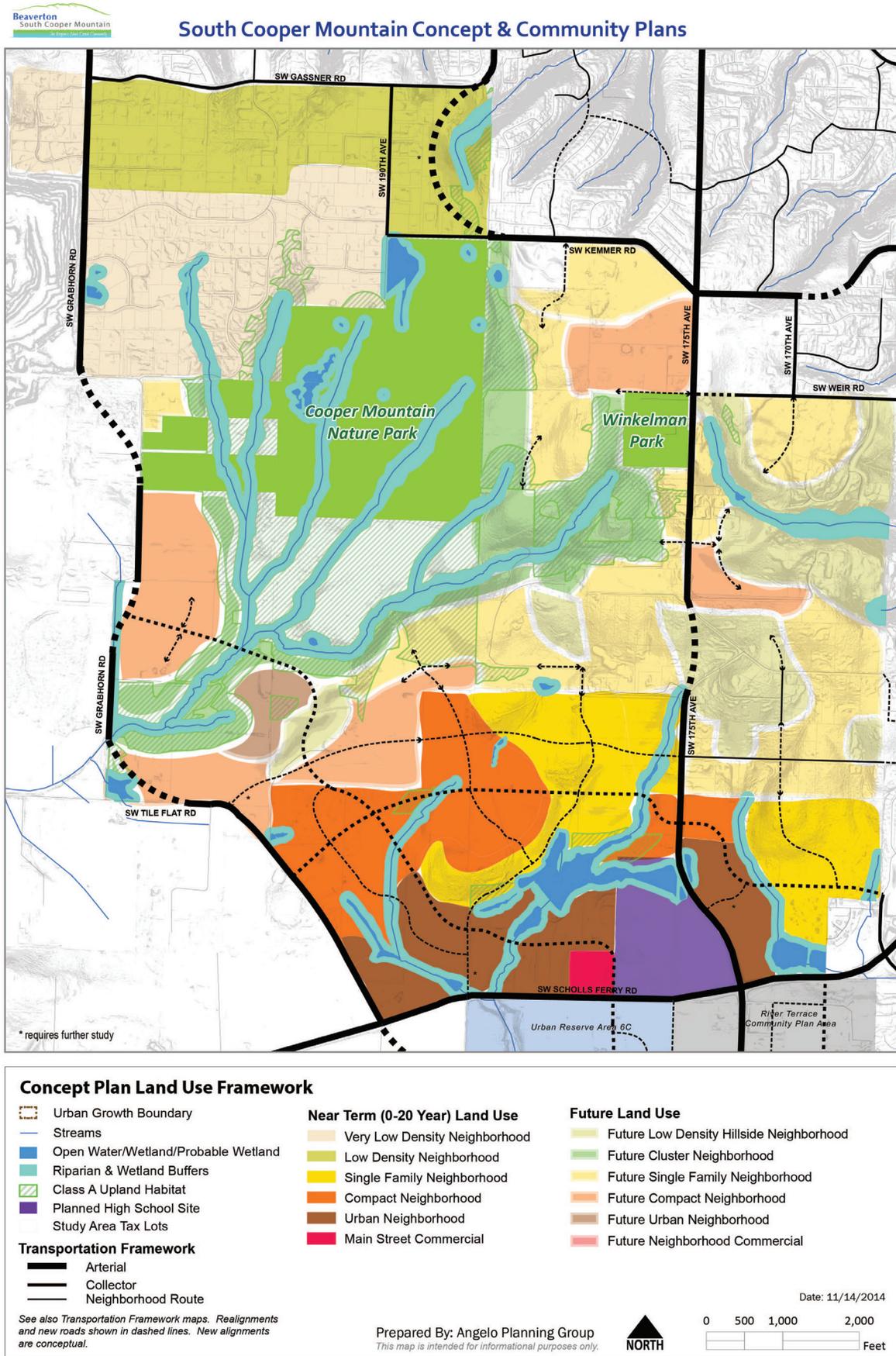
The housing capacity and density displayed in Table 1 demonstrate a balance between efficient utilization of land within the UGB, and protection and enhancement of public lands and natural features in the area, consistent with Metro requirements.² The highest densities are in the SCMAA (in the UGB), and in portions of the URA (Grabhorn Meadow and the Lowlands) that have the greatest future urbanization potential based on characteristics of the land and feasibility of infrastructure provision. The overall net density for the 2,300-acre planning area is over 11 dwelling units per acre.

Table ES-1 - Housing Capacity and Density by Subarea – New Dwellings

Subarea	Capacity (Housing Units)	Net Density
SCM Annexation Area	3,430	14.5
North Cooper Mountain	300	3.9
Urban Reserve Area	3,760	10.6
Total	7,490	11.2

² Metro Ordinance No. 11-1264B, Exhibit B, conditions on Land Added to UGB, adopted by the Metro Council October 20, 2011.

Figure ES-3 - Concept Plan Land Use Framework



Transportation



South Cooper Mountain has a rural road network that serves urban transportation needs. The key challenge for the Concept Plan is how to plan for growth and ensure solutions are delivered for multiple inter-related needs: high volumes of regional through-traffic; intersections and road sections with known safety and capacity issues; almost no existing pedestrian and bicycle system; and the vision to provide transportation options serving a sustainable community. The Concept Plan provides solutions through the strategies summarized below.

Disperse and Balance Regional Traffic – It is well documented that north-south traffic is over-reliant on one corridor: the 175th to 170th Avenue corridor. The solution is to reduce that reliance and disperse regional flows through a combination of improvements and new connections that result in a more complete network. Key projects include: (1) improving 175th at high priority locations such as the “kink” and the Kemmer/175th Avenue intersection; (2) connecting 175th Avenue to 185th Avenue via Kemmer Road and a new road east of 190th; (3) upgrading Tile Flat and Grabhorn Roads to arterial status and realigning the three 90-degree corners; (4) improving Scholls Ferry Road to 5 lanes west to Tile Flat Road; and (5) connecting Tile Flat Road to Roy Rogers Road (long term).



Provide a Well-Connected Local Street Network – The Concept Plan’s Transportation Framework sets the stage for a connected, walkable local street system that provides transportation choices in incorporates active transportation elements. This will not only help address the transportation needs of the area, but is an integral part of the vision for highly livable community. The plan specifies the “point A to point B” collector streets and neighborhood routes, and provides flexibility for the site-specific alignments.

Provide a Diverse, Connected Pedestrian and Bicycle Network – South Cooper Mountain’s pedestrian and bicycle network is a key component of a balanced transportation system that provides many travel option. The network will be built incrementally over time. The overall strategy is to provide many types of facilities that will achieve the vision and can be feasibly implemented. The specific strategies and recommendations are to: (1) ensure all streets are “complete” and provide for pedestrians and bicycles as well as vehicles; (2) plan for multi-use paths that parallel one side of perimeter arterials that frame the area wherever conditions allow; (3) connect neighborhoods in the SCM Annexation Area with multi-use paths; (4) plan for a system of nature trails that connect to Cooper Mountain Nature Park; (5) provide a regional trail along the southern edge of the McKernan Creek corridor; and (6) connect to the River Terrace Trail, the Westside Trail, the future Reedville Trail, and other adjacent paths and bikeways.

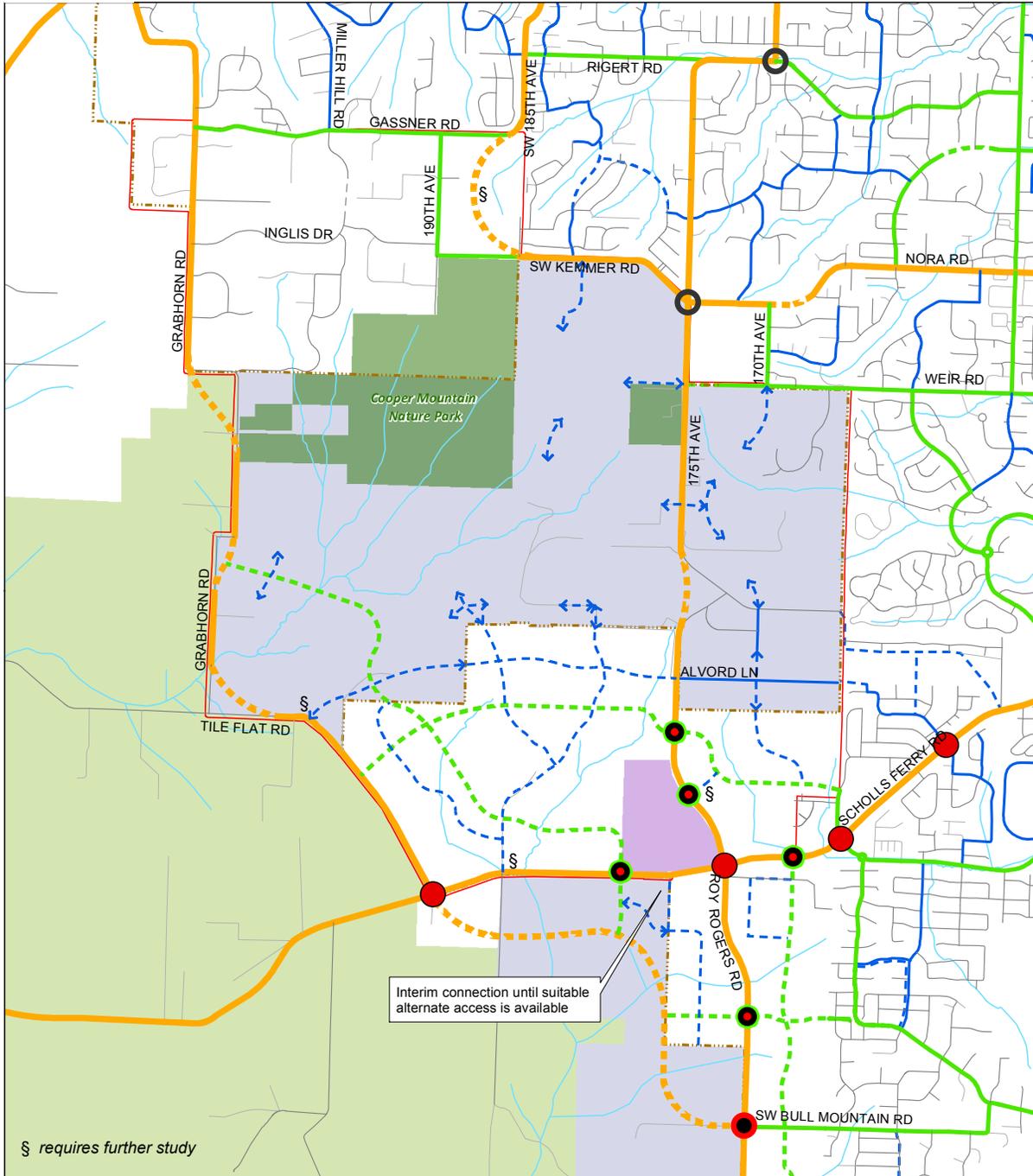


Be Transit-Ready – The Concept Plan focuses its highest density urban neighborhood designations near the high school and Main Street - in the southern part of the planning area - as one strategy to help the area support transit service in the future. The plan also anticipates longer-term, limited-stop commuter-oriented transit service from Sherwood to Hillsboro along Roy Rogers Road and 175th Avenue.

Set Transportation Priorities as Part of the Funding Plan – A pervasive challenge is the limited funds available for transportation needs. Developed through a collaborative process with the City, County, service providers and private sector, the Concept Plan includes an Infrastructure Funding Plan which sets forth three coordinated strategies for bridging the transportation funding gap: (1) increase local revenues through a supplemental system development charge; (2) focus locally generated Transportation Development Tax revenues on local projects; and, (3) identify and coordinate transportation priorities with Washington County and neighboring cities, including MSTIP³ candidate projects. The funding plan combines these strategies into a high level capital improvement plan for meeting near-term and future transportation needs for the entire 2,300-acre Concept Plan area.

³ MSTIP is Washington County’s Major Streets Transportation Improvement Program. More information is available at <http://www.co.washington.or.us/LUT/TransportationFunding/what-is-mstip.cfm>

Figure ES-4 - Transportation Framework Map



Concept Plan Transportation Framework with Intersection Treatments

- Proposed Functional Classification***
- Arterial
 - Collector
 - Neighborhood Route
 - Local
 - Private
- 0 500 1,000 2,000 Feet
- NORTH

- Intersection Treatments**
- Existing Signal
 - Planned Signal
 - Possible Signal**
 - Possible Signal or Roundabout**
- Study Area**
- Urban Growth Boundary
 - Rural Reserve
 - Urban Reserve
 - Existing Parks
 - Planned High School Site
 - Streams

* Realignments and new roads are shown in dashed lines. New roads east of study area are based on Washington County's Transportation System Plan; new roads and intersection treatments within UGB south of study area are based on current River Terrace Community Plan transportation planning. All new road alignments are conceptual.

** Subject to approval by Washington County. Signalization of any intersection will be determined based on warrants via a TIA for development.

Prepared By: Angelo Planning Group

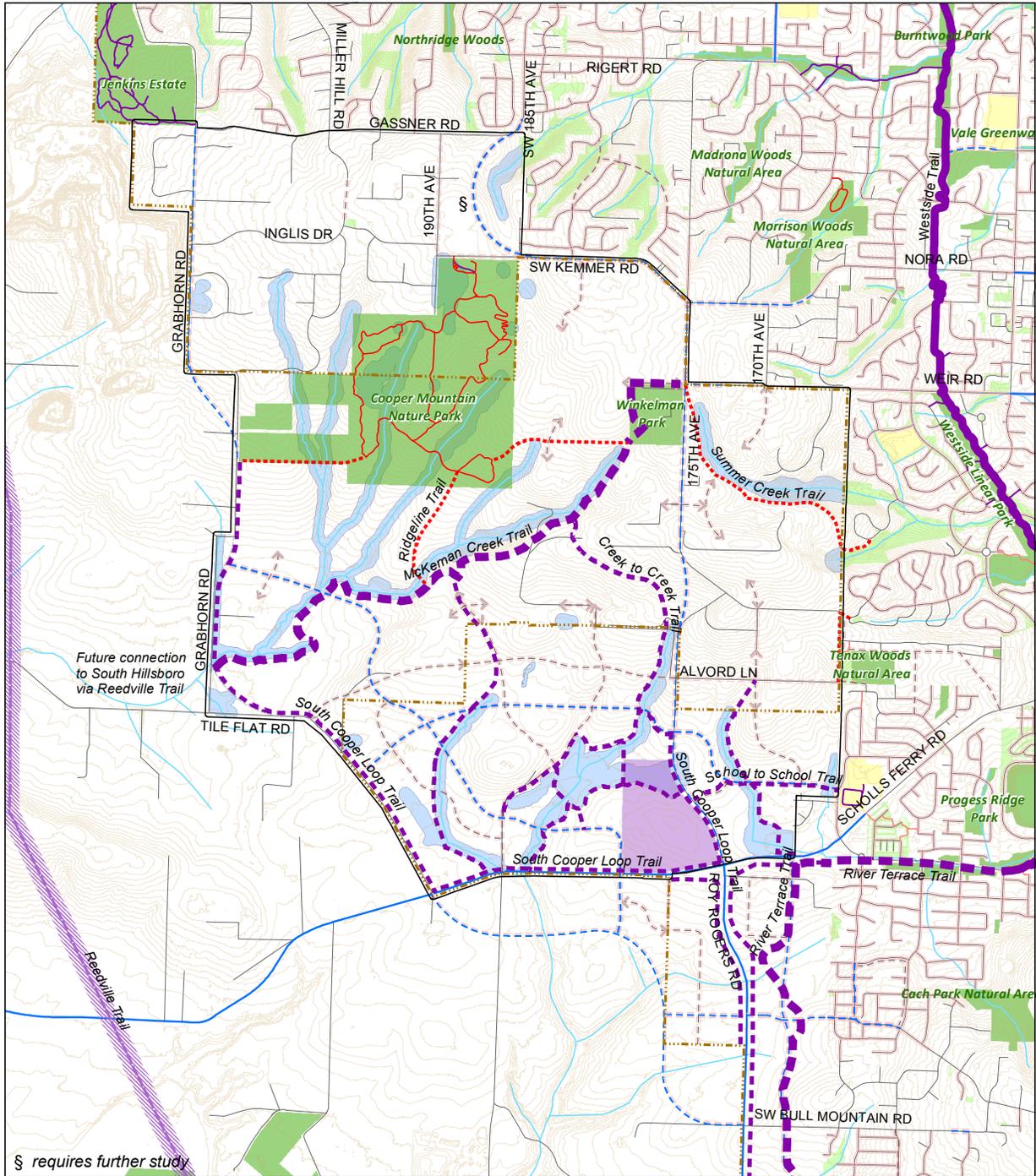
Date: 11/11/2014

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl

DISCLAIMER

This map is intended for informational purposes only. While this map represents the best data available at the time of publication, the City of Beaverton makes no claims, representations, or warranties as to its accuracy or completeness. Metadata available upon request.

Figure ES-5 - Bicycle and Pedestrian Framework Map



Concept Plan Bicycle & Pedestrian Framework

- █ Proposed Regional Trail
- - - Proposed Community Multi-Use Trail
- - - Proposed Nature Trail
- █ Regional Multi-use Trails
- █ Community Multi-use Trails
- █ Local Multi-use Trails
- - - Existing Pedestrian-Only Nature Trails
- - - Private Paths
- - - Conceptual Future Trails
- - - Existing Sidewalk
- - - Existing Bike lane
- - - Streets
- - - Other Planned Roads
- - - Planned Sidewalks*
- - - Planned Sidewalks & Bike Lanes
- - - Planned Sidewalk (one side) & Bike lanes
- - - 10' contours
- - - Streams
- - - Riparian & Wetland Buffers
- Study Area
- Urban Growth Boundary
- Planned High School Site
- Existing Parks and Natural Areas
- Preserved by Home Owners Assns.
- Existing Schools

The location and classification of all transportation facilities outside Beaverton City Limits are preliminary and subject to change. Proposed trail locations inside Beaverton City Limits are approximate and subject to further refinement.

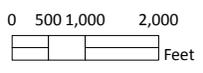
* New local streets (not shown) will have sidewalks.

Prepared By: Angelo Planning Group

This map is intended for informational purposes only.



Date: 11/25/2014



Natural Resources



As noted above, South Cooper Mountain's unique landscape is a key theme for the Concept Plan and the organizing element for planning land use, open space, transportation and infrastructure. The most significant natural resources in the planning area include the large creek complex in the Urban Reserve Area, containing roughly 600 acres extending from Cooper Mountain Nature Park to where McKernan Creek flows under Tile Flat Road. "The Creeks" area spans public land, private land, forested riparian corridors, high-quality upland forest, farmed meadows, and a few rural homes. It is the core area that establishes a legacy of extensive and accessible natural resource areas virtually next door to the future urban communities of South Cooper Mountain.

The high resource value of The Creeks is supplemented by conditions in adjacent areas: the forested tributaries that extend into North Cooper Mountain; the significant tree canopy surrounding rural homes and drainages in the East Hills; and the open meadows of the Hilltop and Lowlands. The South Cooper Mountain Annexation Area provides the greatest opportunities for habitat restoration where a number of wetlands and waterways have been degraded by agricultural activities. Primary opportunities include protecting and enhancing native vegetation (in wetlands, riparian areas, and wildlife corridors) and enhancing stream functions and values for fish and other species.

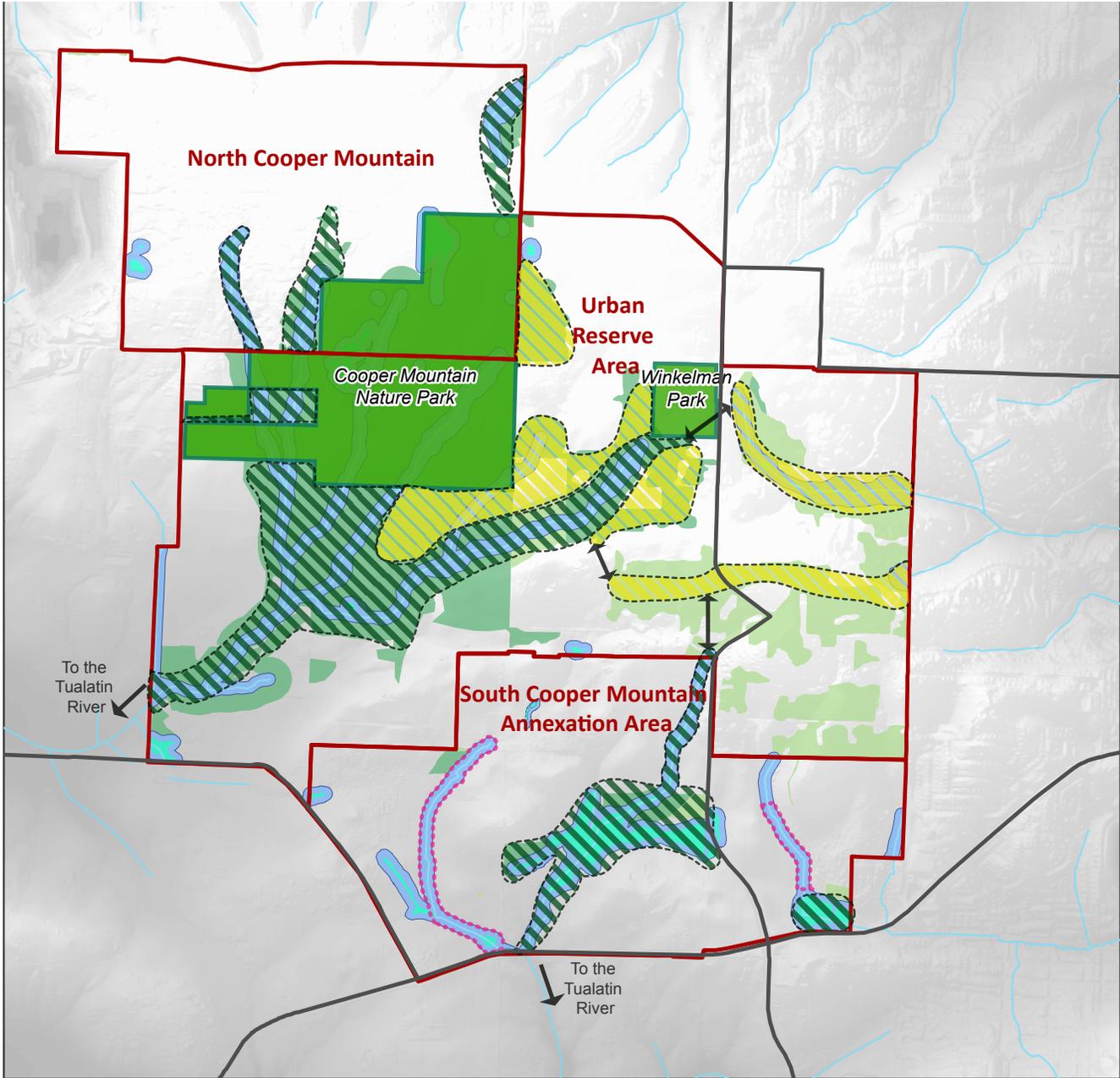
Mechanisms to protect and to encourage enhancement of natural resources may include Significant Natural Resource Area designation, Tree Grove designation, tree protection standards, hillside/slope protection standards, development regulations that allow some increased

flexibility or development potential on the buildable portion of the site in exchange for protection and enhancement on the constrained portion, public acquisition of valuable resource land, or other strategies.

On the Natural Resources Framework Map, Tier 1 habitat conservation priority areas represent the best habitats within the planning area and those most important to fish and wildlife. Within areas identified as Tier 1 conservation priorities, disturbance should be kept to the minimum possible, with little or no additional development allowed and carefully sited and designed road crossings. Tier 2 habitat conservation priority areas may have a greater level of human disturbance or play a less crucial role in wildlife movement than Tier 1 areas, but they include valuable upland habitats, riparian habitats, or both that provide important ecosystem services. Some limited degree of disturbance should be allowed, but the fundamental habitat value and ecosystem services should not be lost or excessively compromised. Within areas identified as restoration priorities, stream restoration may be paired with trail construction and storm water management facilities to improve these channels to a state where they can be both ecologically healthy and attractive neighborhood amenities. The identified priority habitat connections represent key links between stream corridors and priority habitat conservation areas. They are not intended to preclude development, but safe wildlife passage should remain possible wherever feasible.



Figure ES-6 - Natural Resources Framework Map



Concept Plan Natural Resources Framework

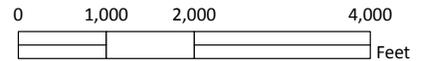
Legend

- | | | |
|------------------------|---------------------------------|---------------------|
| Wetland & Open Water | Highest Preservation Priority | SCM Planning Area |
| CWS Vegetated Corridor | Secondary Preservation Priority | Planning Area Parks |
| Class A Upland Habitat | Stream Enhancement Priority | Streams |
| Class B Upland Habitat | Priority Wildlife Connection | Arterials |

August 2014

Prepared By: Angelo Planning Group, David Evans and Associates, Inc.

This map is intended for informational purposes only.



WATER

As with other planning strategies for South Cooper Mountain, the water system for near-term and future land uses was conceptually planned by evaluating the area as a whole. The water system expansion into South Cooper Mountain will be based on the largest single point demand in the area: fire service flow. Although providing domestic and irrigation services to the area is essential, the water system expansion will be developed to provide sufficient fire flow while maintaining a minimum water pressure. Key facilities include:

- The new 24-inch water line in SW Scholls Ferry Road.
- A new 24-inch water line is planned to extend along SW 175th Avenue, ultimately connecting to a future five-million-gallon tank to be located near the intersection of SW 175th Avenue/SW Weir Road. By supplementing the existing system with this new five million-gallon storage tank, there will be adequate water storage to serve the entire planning area. It is scheduled to be constructed by 2020.
- Other major water lines planned in large loops within the existing or future right-of-ways.
- Plans to locate a future reservoir and large diameter distribution line in the concept plan area are being evaluated by the Willamette Water Supply study presently underway.

SANITARY SEWER

An existing 21-inch gravity sanitary sewer located in SW Scholls Ferry Road can serve some of the area east of 175th Avenue and north of Scholls Ferry Road as well as the planned High School site. Most of the East Hills portion of the Urban Reserve can also be served either with connections to existing sewer lines to the east or with sewer line extensions in SW 175th Avenue that will gravity flow to the existing line in SW Scholls Ferry Road.

With the exception of the high school site, much of the area west of SW 175th Avenue -- including a portion of the East Hills, the Hilltop, and the eastern portion of the URA Lowlands as well as most of the SCMAA -- will be conveyed towards the low point in SW Scholls Ferry Road

(at the creek crossing near SW Vandermost Road) and eventually be conveyed to the new River Terrace Pump Station (in operation, 2015).

A new Tile Flat Road Pump Station will be needed to serve future development on the west side of the Urban Reserve Area, including Grabhorn Meadow and the western part of the URA Lowlands, and southern two-thirds of North Cooper Mountain.

STORM WATER

Conceptual storm water management planning was conducted during the evaluation of scenarios for the Concept Plan.⁴ The work identified a preference by the City of Beaverton and Clean Water Services (CWS) for an approach that uses Regional Stormwater Facilities (RSFs). The regional approach is preferred because it is consistent with planning in other newly urbanizing areas; it provides planned, comprehensive flow control in a cost-effective manner; and it provides the highest level of certainty of meeting the flow management guidelines being established by CWS. In addition, RSFs will meet water quality requirements (capture and treatment of stormwater pollutants) as well as preserving the stream health of the receiving channel by avoiding hydrographic modification.

However, RSFs require a high level of coordinated implementation. Therefore, the Plan recommends that options be available so that flexibility is available to apply site-scale storm water management facilities in lieu of, or in combination with, RSFs. With water quality regulations set to change in the near future, further planning for stormwater in South Cooper Mountain, including the creation of a Storm Water Master Plan for the Community Plan area, is warranted.

⁴ For the scenario level evaluation, please see *Stormwater and Water Quality Scenario Summary*, David Evans and Associates, December 19, 2014.

Implementation

GUIDANCE TO FUTURE PLANNING

The SCM Concept Plan will guide future comprehensive plan and development code amendments that implement the Concept Plan in both the city of Beaverton and in Washington County. Detailed next steps for this process are identified in the South Cooper Mountain Implementation Plan, a non-regulatory document intended to inform and guide city, county, and service provider collaboration and coordination on plan implementation over the next several years.

GOVERNANCE AND URBAN SERVICES

As required under Metro's Title 11, areas of the SCM URA that are added to the UGB must be annexed to a city prior to or simultaneously with application of urban land use designations. The City of Beaverton will be the city responsible for annexations of and comprehensive planning for UGB expansion areas within the SCM URA. Urban services will be provided to those areas of the SCM URA that are brought into the UGB by the City of Beaverton in coordination with service providers including THPRD for parks, CWS for sanitary sewer and stormwater management, and TVWD for drinking water.

INFRASTRUCTURE FUNDING

The South Cooper Mountain Infrastructure Funding Plan describes a plan and strategy for how infrastructure in the South Cooper Mountain area could be funded. The document is intended to identify the types of infrastructure projects that appear to have adequate funding from existing sources, and the types of infrastructure projects that appear to require new funding tools and inter-jurisdictional collaboration. The Funding Plan lays out the estimated funding needs and strategies to meet them for parks, water, sanitary sewer, stormwater, and transportation facilities. The Funding Plan will guide future public and private investments in infrastructure and future collaborations and coordination among service providers to extend and enhance the infrastructure and services needed to support urban growth in South Cooper Mountain.





Beaverton

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The Region's Next Great Community

CONCEPT PLAN

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Introduction

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- 1. Establish a vision for future growth, natural resource preservation and enhancement, and development in the 2,300-acre planning area of South Cooper Mountain;**
- 2. Guide city and county comprehensive planning in the Urban Growth Boundary expansion areas.**

The SCM Concept Plan area covers nearly 2,300 acres of land intended for future urban development over the next 50 years: two subareas inside the Urban Growth Boundary (UGB) and one subarea area that is designated as Urban Reserve.¹

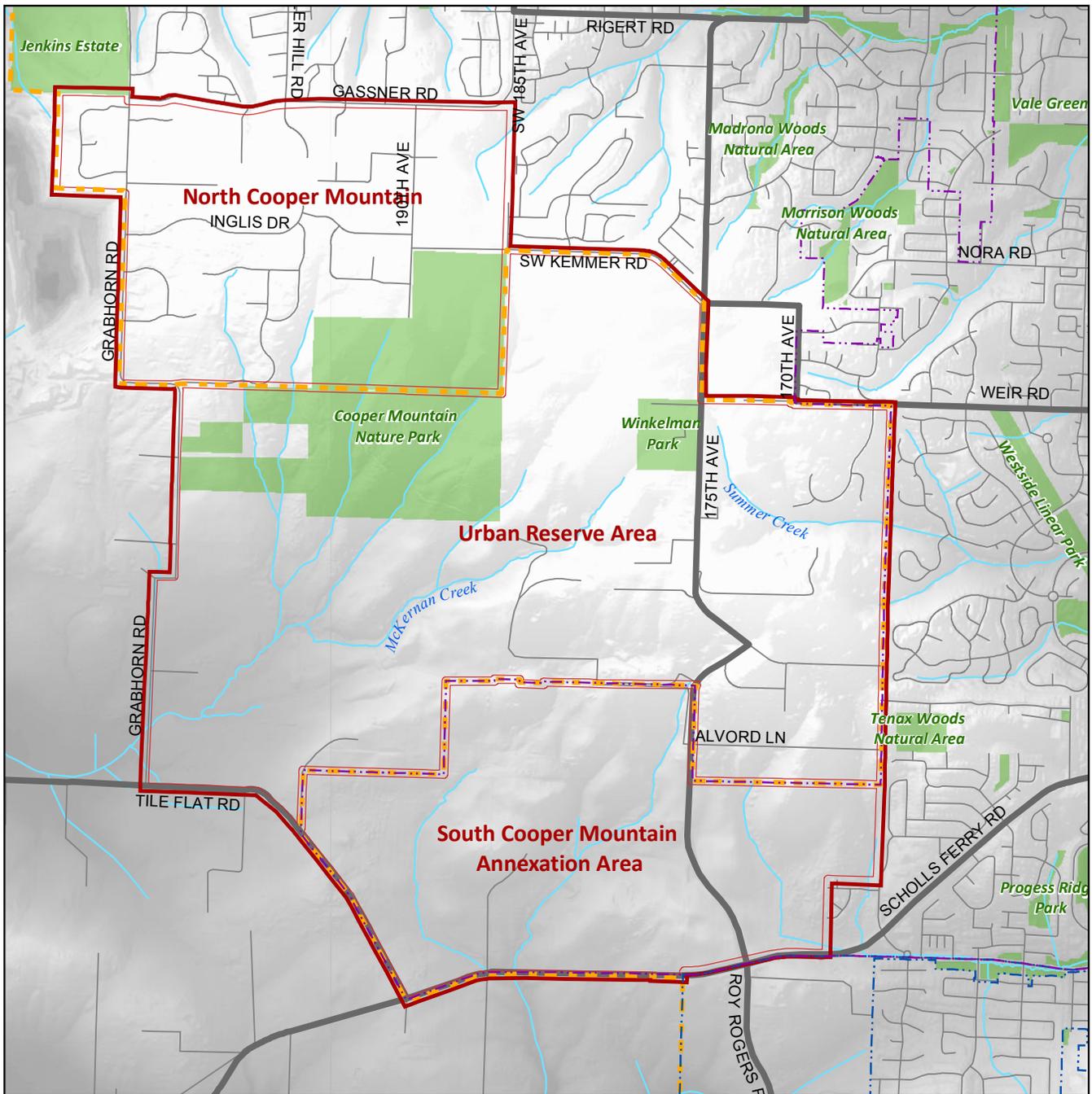
The 544-acre South Cooper Mountain Annexation Area (SCMAA) was added to the UGB in 2011 and annexed to the City of Beaverton in 2013. The largely developed 510-acre North Cooper Mountain (NCM) area in unincorporated Washington County was added to the UGB in 2002 but a concept plan was never adopted for that area. The 1,232-acre Urban Reserve area (URA) between North Cooper Mountain and the South Cooper Mountain Annexation Area was designated by Washington County and Metro in 2011 as part of a comprehensive analysis of lands outside the UGB to identify priority locations for future urban lands and areas for long term resource and rural land use. The Concept Plan recognizes the unique needs of the three distinct subareas while providing a holistic vision of how the three areas could integrate and grow sustainably.

The SCM Concept Plan implements regional requirements in Title 11 of Metro's Urban Growth Management Functional Plan. The overarching purpose of Title 11 is to "ensure that areas brought into the UGB are urbanized efficiently and become or contribute to mixed-use, walkable, transit-friendly communities". The plan achieves this purpose by providing a long term (50-year) and comprehensive guide for land use, housing needs, natural resources, transportation, public facilities, infrastructure funding and intergovernmental coordination. The Concept Plan also fulfills Metro conditions (as further adopted by Washington County) to plan the area as a whole, enhance and protect public lands and natural features, implement Main Street and Neighborhood designations, provide housing capacity, and enhance compatibility between urban uses and adjacent agricultural and forest practices.²

¹ Urban Reserves are the Portland region's 50-year supply of future urban land. They are the first priority areas considered during UGB expansions and are intended to become or contribute to compact, mixed-use, walkable and transit-friendly urban communities. The Urban Reserve adjacent to the Community Plan area was called Urban Reserve 6B during the Urban and Rural Reserves designation process. For more on the Urban and Rural Reserves program, visit <http://www.oregonmetro.gov/index.cfm/go/by.web/id=26257>.

² For the specific conditions, see Metro Ordinance No. 11-1264B, Exhibit B, and Exhibit A to the Intergovernmental Agreement between Metro and Washington County to Adopt Urban and Rural Reserves.

Figure 1 - South Cooper Mountain Subareas



South Cooper Mountain Planning Area and Subareas

Legend

- South Cooper Mountain Study Area
- Urban Growth Boundary
- Parks and Natural Areas
- South Cooper Mountain Subareas
- Major Roads
- Local Roads
- Beaverton City Limits
- Streams
- Tigard City Limits

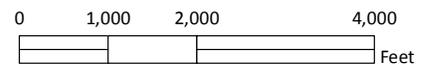
Prepared By: Angelo Planning Group

Date: 8/29/2014

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl

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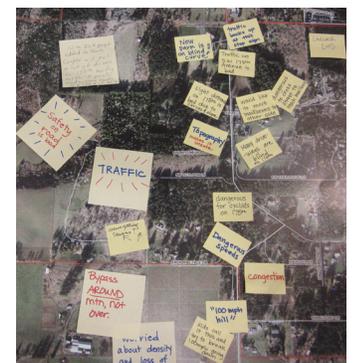


Process

The Concept Plan was developed through an 18-month planning process that included a variety of opportunities for input from stakeholders and the general public. A Technical Advisory Committee (TAC) composed of staff from affected jurisdictions, agencies, service providers and districts, provided input and guidance to the project team about technical aspects of the planning process. A Citizens Advisory Committee (CAC) composed of community representatives including residents, property owners, businesses, developers, city and county planning commissioners, citizen involvement organizations, advocacy groups, and other affected stakeholders provided feedback to the project team throughout the planning process. In addition, the City of Beaverton's City Council provided direction at key milestones during the planning process. The general public was engaged at key points and invited to participate through open houses, online workshops, and community outreach meetings. Focus groups and intergovernmental coordination meetings were held throughout the project.

The first phase of the planning process included establishment of Guiding Principles for the project (see page 7) and study and documentation of existing conditions and future needs in the planning area. The project team studied land use, transportation, the real estate market, water and sewer infrastructure, stormwater, natural resources, parks, and energy. Key findings from this work are included in this Concept Plan, beginning on page 9 (the Existing Conditions and Future Needs Summary Report, dated June 6, 2013, provides additional background information).

The second phase of the project began with a visioning workshop, attended by roughly 60 people, with another 20 people participating through an online version of the workshop. This workshop solicited input on priorities and preferences for future land use and transportation in the Concept Plan area. Results of this workshop were used to develop three initial Concept Plan "scenarios" addressing future land use and transportation for the planning area. These three scenarios were vetted by the project's TAC and CAC and then fully analyzed for the transportation, infrastructure, park, school, natural resource, and land use implications. Based on the findings from the scenario evaluation, two hybrid scenarios were created that combined the best-performing elements of the three original scenarios. The two hybrid scenarios were discussed by the TAC and CAC and shared with the public at an open house and community outreach meetings. Based on input from those





meetings, a preferred scenario was developed. That preferred scenario became the basis for this Concept Plan. During the scenario development process, an “early funding analysis” was also done to identify funding gaps and begin to identify sources and strategies to pay for infrastructure.

In the final phase of the project, the Preferred Scenario was further refined to become this Concept Plan, and draft implementing Community Plans for the SCMAA and NCM were developed to identify the policy and code measures necessary to implement the Concept Plan. An Infrastructure Funding Plan was also prepared to identify funding sources and strategies to implement the infrastructure recommendations associated with the plan. The draft Concept and Community Plans were shared with the public at an additional open house and outreach meetings. The Final Concept Plan will be acknowledged by the City of Beaverton and Washington County.





Principles, Issues and Ideas that Shaped the Plan

GUIDING PRINCIPLES

The Guiding Principles established the foundation for and helped shape the South Cooper Mountain Concept Plan. They were initially prepared following a visioning exercise at a joint meeting of the CAC and TAC, then refined and adopted as the goals and broad criteria for the project.

3. Create Beaverton's next great community.

Create a community that is walkable, family-friendly, livable, and includes quality neighborhoods, great green spaces, community focal points, a Main Street, and well-designed development.

4. Create a sustainable community.

Create a community that meets the needs of Beaverton and the South Cooper Mountain area today and tomorrow, while minimizing negative environmental, social, and economic impacts. Support low-carbon economies and lifestyles, energy efficiency and security, health and well-being, and ecosystem stewardship; and enable future residents and the broader community to meet their own needs.

5. Prepare a realistic financing plan for infrastructure and feasible implementation strategies.

Examine financial strategies early in the process and work closely with all implementing parties. For regulatory implementation, use existing codes where possible and appropriate; consider new/modified codes as needed.

6. Provide housing choices.

Plan for a variety of housing types and densities to provide options for a range of income levels. Provide housing choices consistent with the overall housing needs of Beaverton.



7. Provide transportation options.

Plan a well-connected transportation network that promotes options for all modes of travel, and encourages walking, biking and future transit service. Address north-south, east-west, and other regional travel issues in coordination with neighboring cities, Washington County, Metro, Tri-Met and Oregon Department of Transportation.

8. Provide appropriate protection, enhancement and access to Cooper Mountain's natural resources and public lands.

Avoid and minimize impacts, protect key natural resources, and design new growth so that it is integrated with natural areas and other open spaces. Provide appropriately located access to natural areas and open space.

9. Implement regional requirements and plans.

Address Metro Title 11 requirements and conditions for Urban Growth Boundary expansion areas and Urban Reserves. Coordinate transportation planning with the 2035 Regional Transportation Plan and Regional Transportation Functional Plan. Promote connections from South Cooper Mountain to the area's regional trails and green spaces.

10. Coordinate with other planning in the area.

Coordinate with the River Terrace and South Hillsboro Community Plans. Coordinate with planning for regional water facilities. As additional planning projects in the area are identified, provide information and promote coordination with the South Cooper Mountain Concept Plan.

11. Ensure that the plan complements existing neighborhoods and commercial areas so that South Cooper Mountain is a part of greater Beaverton.

Ensure the public involvement process provides opportunities for participation by existing residents as well as neighbors and businesses in adjacent areas, so their needs and concerns can be addressed. Evaluate Main Street options in the South Cooper Mountain Annexation Area to serve local needs and complement existing and planned commercial centers near South Cooper Mountain.

12. Plan new civic uses so they are focal points for the community.

Ensure schools, parks and other civic uses are centers of community activity. Integrate the planned new high school with neighborhoods and other development within the plan.

13. Promote compatibility with adjacent rural areas.

Evaluate ways to enhance compatibility between urban uses and agricultural/forestry uses outside the Urban Growth Boundary. Recognize elements of the area's agricultural heritage in the plan.

PLANNING AREA CONDITIONS

The Land

Landscape Context

South Cooper Mountain is a part of the elevated hills (Cooper, Sexton, and Bull “Mountains”) that separate the urbanized areas of Beaverton and Tigard from the rural and agricultural flats of the Tualatin Valley to the west. In this context, South Cooper Mountain is a “top of watershed” location and transition area of the regional landscape. South Cooper Mountain itself spans a topographic transect of rolling lowlands, creeks and drainages, east hills, and hilltop areas.

Existing Land Use

Existing development and rural uses within the project area include working farms, forestry, rural residential housing, and parks. The NCM subarea is largely developed with homes on one- to two-acre lots, but also contains a few small farms, small undeveloped areas, and Cooper Mountain Vineyards. The URA contains the bulk of the Cooper Mountain Nature Park, Winkelman Park, larger working farms, forested areas used for logging, and some rural home sites (mostly on the eastern side of the subarea). The SCMAA is a mix of farms and forestry with scattered farm buildings and a few home sites.

Adjacent Land Uses

The land uses surrounding the planning area include:

- single family neighborhoods in the City of Beaverton to the east,
- single family neighborhoods in unincorporated Washington County to the north,
- planned development in Tigard’s River Terrace community to the southeast,
- designated Rural Reserve areas with a mix of active farms and rural homesteads to the southwest and west, and
- an active aggregate extraction site to the northwest.

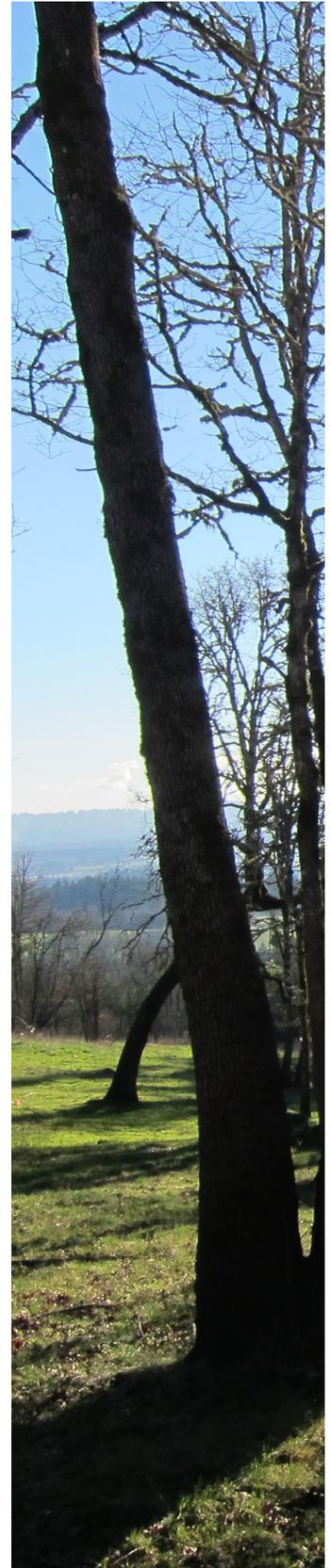
Natural Resources

The planning area contains valuable natural resources including streams, forested uplands, and a few significant wetlands. The most important natural resources in the planning area include: a large creek complex in the URA, spanning the Cooper Mountain Nature Park and private land, with forested riparian corridors separated by upland forest and meadows; and a chain of linked upland, riparian forest and wetland areas in the central part of the SCMAA that provide important habitat value.

The planning area also contains several isolated tributaries/headwaters, a number of small wetlands, and upland forest area interspersed with rural homes.

Landscape Areas

The SCM planning area can be broken down into six landscape areas that have been drawn based on topography, natural resources, and existing development patterns. The boundaries between the landscape areas are not intended to be precise or property-specific. The landscape areas and development constraints are shown on Figure 3 and summarized in brief below.



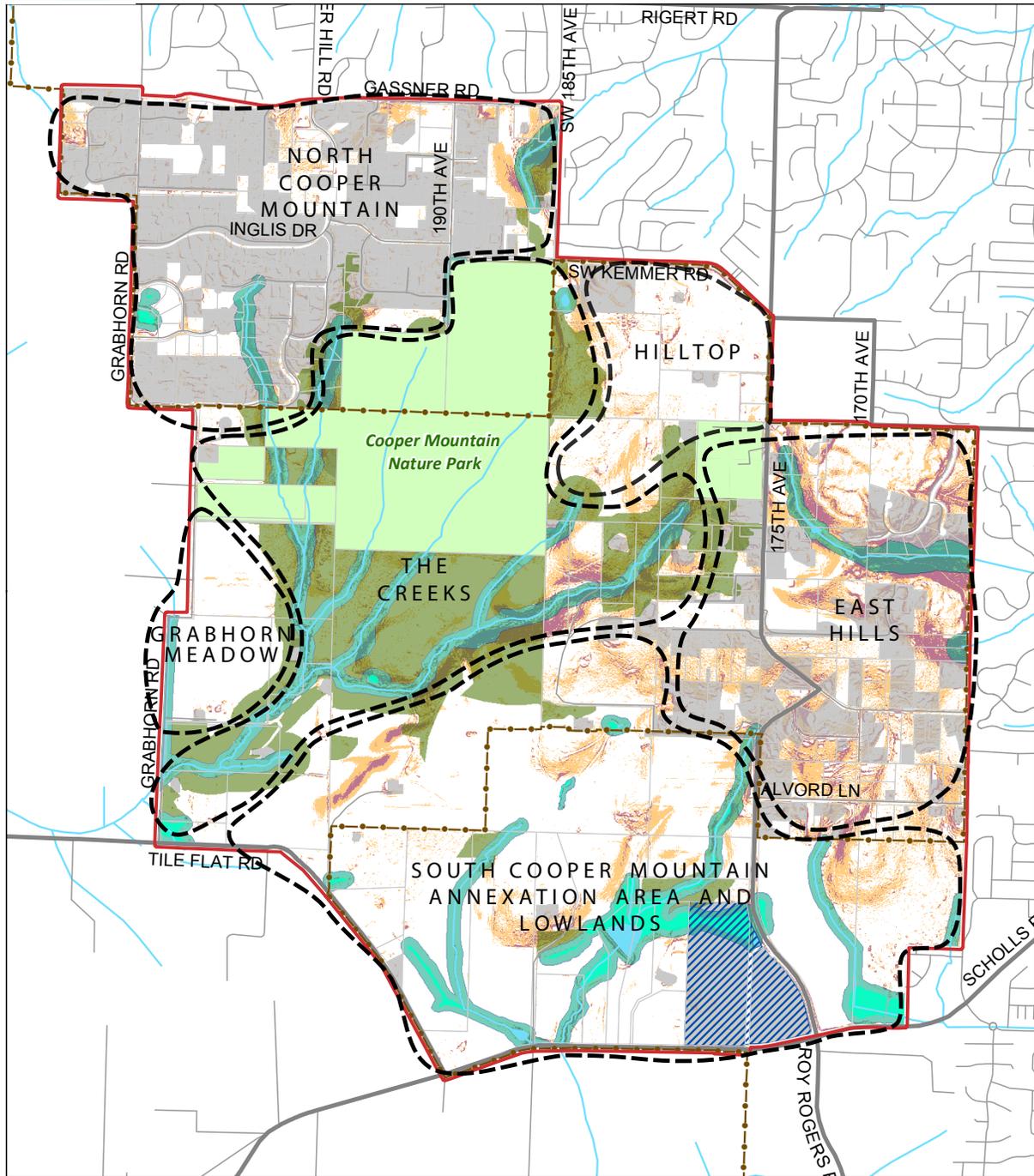


- **North Cooper Mountain:** NCM is largely built out, characterized by large-lot single-family residential neighborhoods. Cooper Mountain Nature Park, purchased through Metro’s regional natural area bond program, occupies 213 acres along the southern and eastern boundary of NCM. The Nature Park is a treasured amenity in the community and provides habitat for a wide variety of wildlife.
- **The Creeks:** Cooper Mountain Nature Park and the set of drainages and uplands within The Creeks, totaling nearly 600 acres in the central portion of the plan, comprise the primary natural resource areas and best opportunities for an enduring green legacy for the area.
- **Hilltop:** Located at the top of the mountain, with flat to gently rolling conditions, and offering some of the best views of the Tualatin Valley, the hilltop is a distinctive and buildable area within South Cooper Mountain.
- **Grabhorn Meadow:** This area gently sloped, easily accessed from Grabhorn Road, and generally unconstrained.
- **East Hills:** The East Hills are a mixed area of tree groves, developable areas, steep slopes, existing rural residential development, and natural resource areas.
- **Annexation Area & Lowlands:** Comprised of gently rolling fields, hummocks, and three small tributaries, this area is relatively free of constraints to development. Land has been acquired for a new high school and infrastructure is adjacent and being upgraded to serve SCM and the adjacent River Terrace community plan area to the south.

Development Capacity

The majority of buildable land is in the SCMAA and the URA. There are small pockets of buildable land remaining in the NCM area, but many vacant or underdeveloped parcels are already platted and may be subject to private development restrictions. There are larger pockets of buildable land in the URA, some of which are isolated from other buildable areas, as well as areas that are partially developed but have some additional development capacity. The “rolling lowlands” in and adjacent to the SCMAA provide the largest buildable portion of the planning area.

Figure 2 - Existing Conditions Map



Landscape Areas and Existing Conditions

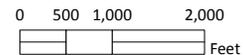
- Study Area
- Urban Growth Boundary
- Study Area Taxlots
- Major Roads
- Local Roads
- Existing Parks
- Streams
- Open Water
- Wetland/Probable Wetland
- Riparian & Wetland Buffers
- Developed Land (inside study area)
- Planned High School Site
- Upland Wildlife Habitat Class A
- 15-25% slope (buildable but challenging)
- >25% slope (unbuildable)

Prepared By: Angelo Planning Group

Date: 2/10/2014

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
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Infrastructure and Services

Roadways

South Cooper Mountain has a rural road network that serves urban transportation needs. East-west and north-south connections are limited both within and around the planning area, and several important regional roadways are nearing capacity. Scholls Ferry Road and 175th Avenue / Roy Rogers Road in particular carry a large volume of through-traffic. North-south commute patterns between Tualatin / Sherwood / Yamhill County and Washington County employment destinations rely heavily on 175th Avenue, despite its terrain, narrow width, and sharp curves. Tile Flat and Grabhorn Roads also serve more through-traffic than their current rural design and sharp curves would suggest. Tile Flat Road forms an urban/rural edge, with UGB and Urban Reserve to the east and Rural Reserve to the west.

Roads within the planning area are not currently built to urban standards, and need improvements to resolve safety issues and accommodate existing traffic demands and new growth. Virtually none of the roads within or framing the Concept Plan are built with sidewalks or bike lanes at this time because they were designed as rural roads. Other existing safety issues include the “kink” or hairpin turn on 175th Avenue at High Hill Lane, the skewed intersection at Kemmer Road and 175th Avenue, speeds on the major roads through the planning area, and the multiple 90-degree turns on Grabhorn Road.

Transportation is the most-often cited concern of area residents, including motorist safety, bicycle and pedestrian safety, and traffic congestion.

The key challenge for the Concept Plan is how to plan for growth and ensure solutions are delivered for multiple inter-related needs: high volumes of regional through-traffic; intersections and road sections with known safety



and capacity issues; almost no existing pedestrian and bicycle system; and the vision to provide transportation options serving a sustainable community.

Sanitary Sewer

Existing sanitary sewer infrastructure is located to the north and east of the Concept Plan area and is being upgraded within Scholls Ferry Road to just west of Roy Rogers Road / 175th Avenue. Sanitary sewer predominately relies on gravity. Therefore, topography and natural drainage patterns mean that sanitary sewer from the northern portion of NCM will drain to existing infrastructure north of the planning area, and most of the East Hills will drain to existing infrastructure to the east of the planning area. The southern part of NCM and much of the URA west of 175th Avenue will generally flow to the southwest corner of the planning area, away from existing infrastructure. The SCMAA generally drains to the south, towards Scholls Ferry Road.

Drinking Water

Drinking water infrastructure is available to the north and east of the Concept Plan area, and within NCM. NCM and areas to the north are served by the Tualatin Valley Water District (TVWD). Areas to the east of the Concept Plan area are generally served by the City of Beaverton; the SCMAA will be served by City facilities.

TVWD and the City of Hillsboro are in the early planning stages of an expansion of their water supply source. A future large-diameter distribution line and/or reservoir may be located in or near the planning area.

Schools

Hillsboro School District (HSD) and Beaverton School District (BSD) are the public school service providers for the planning area. NCM is fully within BSD, while the boundary between the districts runs through the center of the URA and SCMAA.

BSD is planning to build a new high school within the SCMAA, at the northwest corner of Scholls Ferry Road and 175th Avenue. The site is anticipated to be 40 acres, including ball fields and all other facilities.

Parks

The area is home to two important parks. Cooper Mountain Nature Park, a 213-acre natural area with hiking trails and a small nature-play area owned by Metro and co-operated by Metro and Tualatin Hills Park and

Recreation District (THPRD). Metro has expressed interest in expanding the Cooper Mountain Nature Park through purchases of land from willing sellers adjacent to the park. Winkelman Park is a newly-constructed 19-acre community park located in the URA along 175th Avenue is owned and operated by THPRD. The property containing Winkelman Park is not yet fully developed with park and recreation facilities; further expansion facilities may occur over time upon the remaining undeveloped portions of the land owned by THPRD at that location.

Trails

There are opportunities to connect to existing and proposed regional trails to the north (the Reedville Trail proposed through the Aloha-Reedville Study), east (the Westside Trail), and south (the planned River Terrace Trail) of the Concept Plan area. Metro has identified a future regional trail, the Cooper Mountain Trail, which is planned to run east-west through the northern portion of the planning area, connecting to the Westside Trail.

Stormwater

Stormwater management should be tailored to the unique soils and natural resources of South Cooper Mountain. Opportunities for infiltration of stormwater are limited due to slopes and soils, making the location, design, and sizing of detention facilities – in coordination with natural resource protection – especially important. Stormwater management is a key concern of area residents.

Market Analysis

A market study, informed by market research and consultation with real estate experts, identified a range of housing types that could be appropriate for the planning area, including workforce housing, apartments/condominiums, townhomes/cottages, and single-family homes on various size lots. Some neighborhood commercial development is appropriate to serve new development and provide an amenity for higher-density housing, but the size (approximately eight to 10 acres) will be limited since the area is already well-served by established retail centers at Progress Ridge, Murray Scholls Town Center, and the Murrayhill Marketplace.



SCENARIOS: DEVELOPMENT AND TESTING OF CONCEPTS

Visioning Workshop

A Visioning Workshop was held in July 2013 at which participants gave feedback on big picture land use concepts for the “landscape areas” described on page 8; transportation issues, priorities and ideas; and ways to lay out development to create a complete and sustainable community in the SCM Annexation Area. The same type of input was gathered from additional participants in an online version of the workshop.

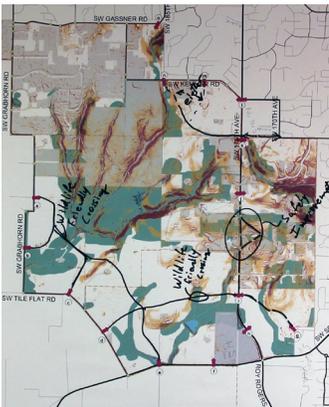
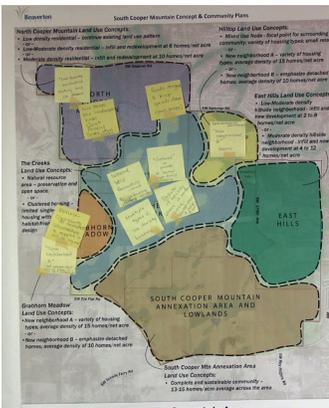
Overall comments on the big-picture land use concepts included focusing density in the Annexation Area, keeping areas near the Nature Park as open space and lower density, keeping the area as green as possible, and keeping the feeling of being close to farms.

Top transportation concerns included the following: the existing road network does not have adequate for today’s traffic and additional urban development will add to the problem; north-south transportation is particularly lacking; safety problems exist from sight distance, high speeds, tight corner, driveways and winter conditions; and facilities for bicycles and pedestrians are inadequate or absent.

Common ideas and priorities identified for transportation improvements and solutions included:

- Improve north-south roadway capacity and improve regional connections by one or more of the following: adding a new road (bypass); widening and/or extending 170th, 175th, 185th, 209th, Grabhorn-Tile Flat Road, or Murray Boulevard; focusing on how to better move traffic via Scholls Ferry; upgrading Tile Flat Road to Clark Hill, and Clark Hill to Farmington Road; extending Cornelius Pass to Clark Hill; and/or providing better connections to area freeways.
- Improve traffic and safety by: lowering speed limits and discouraging travel through neighborhoods and on some roads such as 175th; and fixing specific safety issues such as the 175th Avenue intersections with High Hill Lane and with Rigert Road.
- Improve bike and pedestrian facilities by: adding bike lanes and sidewalks, particularly on busy streets; creating an off-street trail network; and connecting gaps in existing sidewalks.

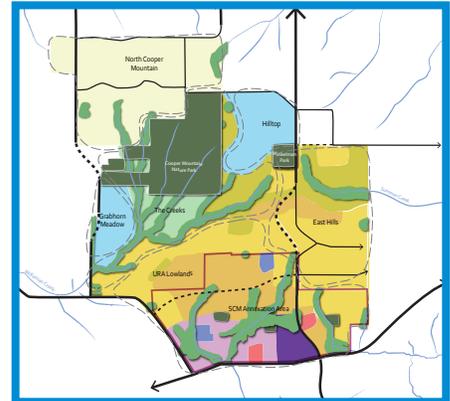
In the SCM Annexation Area, map-based activities showed a preference for a neighborhood commercial uses along Scholls Ferry Road; locating parks throughout the study area adjacent to natural resource areas; focusing multi-family housing along existing or suggested major roads, including along Scholls Ferry Road and to the east of 175th Avenue; and emphasizing standard single family neighborhoods along the north and east edges of the SCMAA.



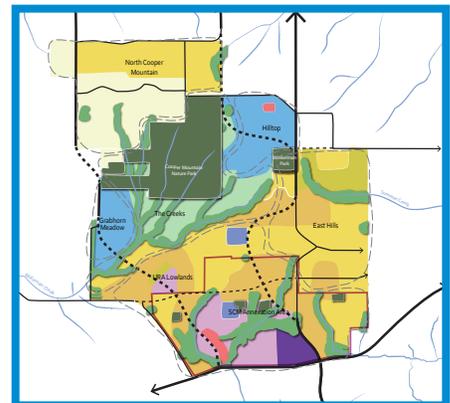
Scenario Development

Based on the ideas from the Visioning Workshop, three alternatives, or “scenarios”, for future growth of the South Cooper Mountain (SCM) Concept Plan area were created. Each scenario presented different choices about where future growth should be focused, how the transportation system should be improved, and how the South Cooper Mountain Annexation Area should be designed. The highlights of the three scenarios are summarized below.

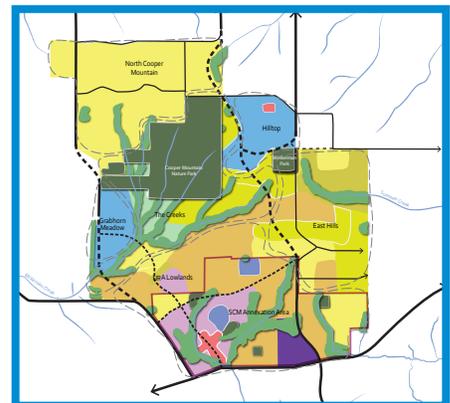
Scenario 1: This scenario placed a priority on compatibility with existing development and adjacent neighborhoods. Residential densities were generally within the range found in southwest Beaverton and nearby urban Washington County, with higher densities reserved for the southern portion of the SCM Annexation Area, and North Cooper Mountain limited to development similar to the existing pattern in the area. The transportation network focused on upgrades and safety improvements to 175th Avenue (including a realignment to avoid the hairpin turn), Tile Flat Road, and Grabhorn Road; and on improved connectivity with a new east-west collector road from Tile Flat Road to 175th Avenue, tying in to Alvord Road.



Scenario 2: This scenario focused future growth to the most buildable areas of South Cooper Mountain, primarily the SCM Annexation Area and the Lowlands, Hilltop and Grabhorn Meadow within the URA, which would all be planned for approximately 15 units per net acre. The Creeks were largely protected from development. A portion of North Cooper Mountain (closest to Gassner Road) would have densities equivalent to those to the north and east in unincorporated Washington County, while the rest would remain similar to the existing development pattern. The transportation framework included a new north-south arterial east of Grabhorn and Tile Flat Roads, a major realignment of 175th Avenue to avoid the hairpin turn, a new connection from 175th to 185th Avenue north of Winkelman Park, and a new east-west collector road extending directly from Tile Flat Road to 175th Avenue, tying in to Alvord Road.



Scenario 3: This scenario focused on maximum long term use of all buildable areas on South Cooper Mountain. Those areas with least constraints (the SCM Annexation Area and the Lowlands, Hilltop, and Grabhorn Meadow within the URA) would all be planned for approximately 15 units per net acre. North Cooper Mountain, the Creeks, and the East Hills would develop at the top end of the ranges that are feasible given their constraints. The transportation framework included improvements to Grabhorn and Tile Flat to become a new north-south arterial, a new roadway from 175th Avenue to 185th Avenue (and a link back to 175th Avenue near the top of the hill), and a new east-west collector road tying in to 175th Avenue at the hairpin turn.



In addition to the three original scenarios summarized above, several potential variations on the transportation frameworks were suggested during committee meetings and were included for evaluation of their feasibility and transportation impacts.

Scenario Analysis and Refinement - Key Findings and Solutions

The three initial scenarios were evaluated for their implications for transportation, water, sanitary sewer, and storm water management; land use and energy; and parks, trails, and open spaces. Coordination meetings were held with Clean Water Services, Washington County, the City of Tigard, City of Hillsboro, Tualatin Valley Water District, Tri-Met, Tualatin Hills Park and Recreation District, and the Beaverton and Hillsboro School Districts. Following the technical analyses, two refined scenarios were prepared incorporating the best features of each. The two refined scenarios were further discussed through and extensive outreach process that included two CAC meetings, TAC review, an open house, two neighborhood meetings in North Cooper Mountain, reviews by the Washington County Planning Commission and Board of Commissioners, presentation to CPO6 and many team meetings.

Key findings and solutions from the scenario evaluations are summarized below. The issues and ideas listed here became part of the Preferred Scenario and ultimately the Concept Plan.



Issues and Findings	Solutions and Responses
<i>Land Use</i>	
<p>SCMAA target density vs. need for single family homes: Meeting Metro’s capacity / density target for the SCMAA requires a housing mix that makes it difficult to meet the City of Beaverton’s projected need for single family homes, one of the key reasons the City annexed the SCMAA.</p>	<p>Reduce target density in the SCMAA slightly in order to allow a somewhat larger share of single-family homes, while staying close to the target set by Metro.</p>
<p>Zoning for NCM: Washington County does not currently have a land use designation that allows for a one-acre lot residential density comparable to what exists in NCM today; a new land use designation would be required in order to implement a Very Low Density Residential Concept Plan designation.</p>	<p>Work with Washington County to draft a new land use designation for lots around 1 acre for use in portions of NCM.</p>
<p>Development Near Resource Areas in The Creeks: Building housing in The Creeks would require extension of water and sewer lines through The Creeks’ sensitive natural areas. The further west housing extends, the greater the impact to stream corridors to provide services.</p>	<p>Propose Transfer of Development Rights from land north of McKernan Creek to land in the URA Lowlands under common ownership in order to preserve land within the Creeks.</p>
<p>Infrastructure cost & density in western URA: Development in the western portion of the Lowlands, The Creeks, and Grabhorn Meadow require construction of a new sanitary sewer pump station and force main. Any development in those areas should provide enough housing capacity to justify and help pay for such an investment in infrastructure.</p>	<p>Plan Grabhorn Meadow and western portions of the URA Lowlands for densities around 15 units per acre in order to spread infrastructure costs. Do not assume development within the western portion of The Creeks.</p>
<p>Main Street location: A location at the intersection of the new north-south collector road and Scholls Ferry Road will provide visibility to the relatively high traffic volumes on Scholls Ferry Road while also providing good access by all modes from the SCMAA itself. It also provides the opportunity for a more pedestrian-friendly development style that is not entirely dependent on auto access. A location further east provides proximity to the High School and the associated playing fields as well as better accessibility from River Terrace. Proximity to the High School could limit the types of businesses that would be appropriate in the Main Street, and may restrict liquor license options. Of the two locations along Scholls Ferry considered, one has some topographic challenges (grades around 7%, rather than the optimal 3%), while the other has natural resource constraints.</p>	<p>Identify the location adjacent to the High School as the preferred location in the Concept Plan.</p>
<p>Density on knolls in SCMAA: Potentially affected property owners universally expressed concerns about applying a hillside (low density) designation to land with 15-25% slopes in the SCMAA, and expressed a preference for some flexibility to adjust lot sizes to respond to topography, rather than having a lower density zone applied.</p>	<p>Remove Hillside designation from the SCMAA on the Concept Plan land use framework. Explore code measures to increase flexibility on minimum density for land with moderate to steep slopes (15-25%).</p>

Issues and Findings	Solutions and Responses
<p>SCM Community Plan land use designations: Several property owners suggested refinements to the draft land use designations map in SCM Community Plan.</p>	<p>Work with the Beaverton PC and CC to address requested modifications to the Community Plan land use maps.</p>
<p>Concern about densities in the Hilltop: Nearby residents expressed concern about the compatibility of multi-family and high density housing being located adjacent to their lower density neighborhoods, and also raised concerns about stormwater runoff from dense development at this top-of-watershed location.</p>	<p>Lowered densities in the Hilltop to include only a node of Future Compact Neighborhood development adjacent to Winkelman Park and 175th Avenue, with the remainder planned for future single family neighborhoods and future cluster housing adjacent to Cooper Mountain Nature Park.</p>
<p>Lack of infrastructure and strong preference for the status quo in southern NCM: Residents of Corrinne Heights and adjacent subdivisions expressed a strong preference for precluding future infill in their portion of NCM. This portion of NCM is largely developed, and the remaining buildable land is nearly all platted at similar lot sizes to the developed land. Public sewer availability is estimated to be many decades in the future due to the need to connect to new lines that would be constructed to provide gravity flow southward of NCM, connecting to a pump station that would also need to be built to the south along Tile Flat Road. Provision of these sanitary sewer infrastructure components is not currently feasible, and absent a health hazard situation, they will not likely be built for many years.</p>	<p>In the southern portion of NCM and the small area west of Grabhorn Road, plan for preservation of the existing one- to two-acre lot development pattern.</p>
<p>Potential for limited infill in northern NCM: There are approximately 69 acres of buildable land in the northern portion of NCM.* Existing development in the northern portion (approximately 100 homes on 1+ acre lots) is served by septic systems that may need to be replaced in the future. Over the long term, it is likely that the public sanitary sewer system will be extended into this area. Existing sewer lines are adjacent in the higher density area downslope and north of Gassner Road, making it feasible to connect properties in the northern portion of NCM to the public sewer system with new gravity lines. Property owners will be better positioned to pay for new sewers if the land is zoned to allow additional homes. There were mixed opinions about how much infill should be allowed in the northern portion of NCM, but the need for some transition to the larger lots to the south was identified.</p>	<p>In the northern portion of NCM, adjacent to Gassner Road, plan for limited infill with lot sizes similar to those in adjacent neighborhoods to the north.</p>

* See South Cooper Mountain Buildable Land Inventory, available on the project webpage, for an explanation of the methodology used to identify buildable land.

Issues and Findings	Solutions and Responses
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Concern about the urban-rural edge: Nearby residents in the Rural Reserve expressed concern about the compatibility of the densities identified for areas just east of Tile Flat Road with the rural land to the west.

Identify a combination of landscaping, a multi-use path, a rural road design, and building setbacks along Tile Flat Road to provide a visual buffer between rural homes west of Tile Flat and future urban development in the SCMAA.

Concern about compact neighborhood development in the East Hills: Nearby residents expressed concern about the feasibility and compatibility of planning for compact neighborhood development west of 175th Avenue.

Limit the Future Compact Neighborhood designation within the East Hills to the relatively flat area on the east side of 175th Avenue just north of High Hill Lane.

<i>Transportation</i>	
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North-south traffic solutions: Regional traffic makes up 50 to 80% of north-south arterial trips through the study area. Providing just one north-south arterial road is not sufficient to serve urban growth in the concept plan area. Spacing standards and north-south demand suggest an arterial is needed from Farmington Road south to Scholls Ferry Road, and ideally beyond Scholls Ferry Road. A new western arterial road would be very attractive to regional traffic, particularly if it continued south of Scholls Ferry Road to connect directly to Roy Rogers Road. Providing a connection from Roy Rogers Road to Scholls Ferry Road that continues as an arterial also much improves the 175th Avenue-Roy Rogers/Scholls Ferry intersection operationally. Simply smoothing the curves in Grabhorn Road without providing the southern connection is less attractive to regional drivers. There was general acknowledgement that dispersing traffic to more roads, specifically 185th and Tile Flat-Grabhorn, is an appropriate way to address regional traffic issues. Many people supported the idea of providing a new connection from Roy Rogers Road to Scholls Ferry Road and to Grabhorn Road in order to reduce reliance on 175th Avenue.

Long-term improvements to, and extensions of, Tile Flat / Grabhorn to provide a western arterial option are recommended as part of the package of transportation improvements for the Concept Plan.

175th Avenue to 185th Avenue connection: Providing a relatively direct connection from 175th Avenue to 185th Avenue makes that route more attractive to regional traffic, and pulls about 20% of the traffic from Clark Hill Road to that new connection. Providing a connection to 175th Avenue at Kemmer / Nora Road, which (although currently incomplete) is designated to become an arterial road and which provides a connection to the east as far as Murray Road, provides a more logical and connected system of roads than other possible connection points to 175th Avenue. Utilizing the existing Kemmer Road alignment reduces costs and property acquisition to make this connection, and was recommended by the CAC. The intersection of Kemmer Road and 175th Avenue already requires safety improvements—an improvement project could also improve capacity and be designed for a future arterial to arterial intersection.

However, nearby residents expressed concern about increasing traffic volumes on Kemmer Road, and cited existing safety concerns at the intersection of 175th and Kemmer Road, particularly in winter. Potentially affected property owners within the Hilltop expressed concerns about building a new arterial road paralleling Kemmer Road across their land. Another potentially affected property owner within NCM questioned the need for a new connection rather than improving the existing connection via 190th Avenue and Gassner Road.

Include a connection from 175th Avenue to 185th Avenue as part of the package of transportation improvements for the Concept Plan that includes arterial improvements to a portion of Kemmer Road and a curving connection from Kemmer Road at Mayberry Place to 185th Avenue at Gassner Road. Identify a need for further study of appropriate intersection design for the intersection of Kemmer Road and 175th Avenue. Consider measures such as landscaping, street trees, and access road improvements to minimize impacts to adjacent existing homes north of Kemmer Road.

Fixing “the kink”: The ‘kink’ in SW 175th Avenue needs to be removed for safety purposes, but the alignment of that improvement does not noticeably impact transportation operations. It is possible to do a realignment that removes the sharp corner and reduces steep grades to roughly 10% but significant re-grading is likely to be needed. Potentially affected property owners are concerned about the details of the design and how property and access will be affected.

Include rebuilding and re-grading 175th Ave in the vicinity of “the kink” as part of the recommended package of transportation improvements for the Concept Plan. Coordinate with Washington County to program further study of detailed alignments that minimize property impacts and construction costs in the County’s work program.

Land use regulations & new roads outside the UGB: Current state and local land use laws have stringent permitting requirements for new roadways outside of UGBs, including in urban reserves. Realignment of an existing road is more easily permitted.

Recognize that new roads through Urban Reserves will likely not be built until the affected area is brought into the UGB. Focus on phasing and timing of improvements and identifying what improvements are needed to serve growth within the SCMAA.

Issues and Findings	Solutions and Responses
<p>Concern about use of Alvord Lane as an east-west through connection: Residents of Alvord Lane expressed concern about having the proposed east-west collector road connect directly to Alvord Lane, and extending Alvord Lane to the east to connect with existing roads that link to Scholls Ferry Road. Upon further study, an option to connect the east-west collector road through the SCMAA to Loon Drive was found to be feasible and to allow improved connectivity prior to further UGB expansion into the East Hills in the vicinity of Alvord Lane.</p>	<p>Plan for the east-west collector road to run through the SCMAA and connect to Loon Drive. Plan for a Neighborhood Route connection through the northern part of the SCMAA to Alvord Lane as a secondary parallel route with lower traffic speeds and more intersections to make it less attractive to through-traffic than the collector road.</p>
<p>URA Neighborhood Routes: While topography and stream corridors create challenges to providing a connected street network to the east and west of 175th Avenue, a network of Neighborhood Routes is likely feasible, following existing private drive alignments in challenging locations.</p>	<p>Identify in the Transportation Framework the “bones” of a network of Neighborhood Routes running generally north-south through the East Hills (east of 175th Avenue) and through the Hilltop and URA Lowlands (west of 175th Avenue), with more specific alignments to be identified in future plans when those areas are brought into the UGB.</p>
<p>Support for a comprehensive trail system: There was broad public support for an interconnected network of off-street trails to supplement on-street sidewalks and bike facilities. The challenging topography was cited as a reason to provide separated facilities to allow cyclists to travel comfortably at a variety of speeds.</p>	<p>Maintain trails plan as an important component of the bicycle and pedestrian framework in the Concept Plan. With few exceptions, continue to plan for on-street bicycle and pedestrian facilities on all new and upgraded roads within the plan area as well.</p>
<p>Cooper Mountain Trail alignment: There was concern from potentially impacted property owners about the alignment of the Cooper Mountain Regional Trail through the Hilltop.</p>	<p>Work with Metro, THRPD, and property owners to refine options for trail alignments for the Cooper Mountain Regional Trail.</p>

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The Concept Plan

BIG IDEAS: CONCEPT PLAN OVERVIEW

The vision for South Cooper Mountain is to:

- Create livable, walkable, sustainable new communities
- Ensure an enduring legacy of natural resource protection and connections
- Implement balanced solutions for regional and local transportation
- Shape growth and preservation to fit and honor the unique landscape
- Work together to deliver feasible infrastructure solutions



Key features of the Concept Plan include:



- The South Cooper Mountain Community Plan Area - a sustainable and livable urban community
- North Cooper Mountain Community Plan Area - new growth is focused where services are available while retaining existing neighborhood character in other areas
- The Urban Reserve Area - future land uses are matched to landscape conditions, existing rural residential development patterns and infrastructure capabilities
- 600 acres of open space centrally-located around McKernan Creek and crowned by Cooper Mountain Nature Park
- A natural resources framework of resource protection, enhancement, and linkages
- Walkable neighborhoods anchored by parks and schools as focal points
- A Main Street with neighborhood shops and services
- A planned variety of housing types providing choices for a range of income levels
- A trails plan connecting neighborhoods, the Nature Park and adjacent areas
- A plan to disperse and balance regional traffic by connecting 175th and 185th Avenues, improving Tile Flat and Grabhorn Roads, and fixing key safety problems
- A well-connected collector, neighborhood route and local street network
- Focused densities and destination uses that help the area become transit-ready
- Water and sanitary sewer plans that can be phased over time
- A storm water management strategy that incorporates regional and site-specific approaches, promotes tree retention and anticipates evolving water quality standards
- An Infrastructure Funding Plan that matches revenues to project costs for water, sewer, storm water, and park facilities.
- A transportation funding strategy to bridge the funding gap, set project priorities, and coordinate long term funding

LAND USE FRAMEWORK

“Near Term” vs. “Future” Land Use

The Land Use framework identifies a vision for development in SCM that will play out over the course of several decades. The concept plan map identifies “Near Term (0-20 Year) Land Use” and “Future Land Use”.

“Near Term” land uses are identified in areas within the UGB – the SCM Annexation Area (SCMAA) and NCM. The SCMAA was annexed to the City of Beaverton in January 2013 and is anticipated to be developed in the near term. Potential development within the northern portion of NCM is also characterized as near term, although the timing depends on property owner initiative. The southern two-thirds of NCM is also considered near-term, but only in the sense that new zoning would reflect existing large lot development patterns that do not require sanitary sewers (extension of public sanitary sewers to this area is not assumed in the next 20 years).

All of the Urban Reserve Area (URA) shows conceptual “Future Land Use” because urban development cannot occur until Metro, in partnership with the region and subject to state review, expands the UGB to include some or all of this area. The timeline for development to occur in the URA is less predictable than in the UGB, and will likely span several decades.

Development Types

What is a Development Type?

Development types are the land use designations on the Concept Plan Land Use Framework. They are made up of multiple building types (created based on real buildings and local regulatory parameters), grouped and mixed together to represent the types of places and neighborhoods planned for South Cooper Mountain.

Summary of Development Types Identified for South Cooper Mountain

The development types found on the Concept Plan Land Use Framework are described below. Example images of some of the buildings that comprise the development type are included for illustrative purposes.

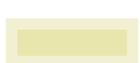
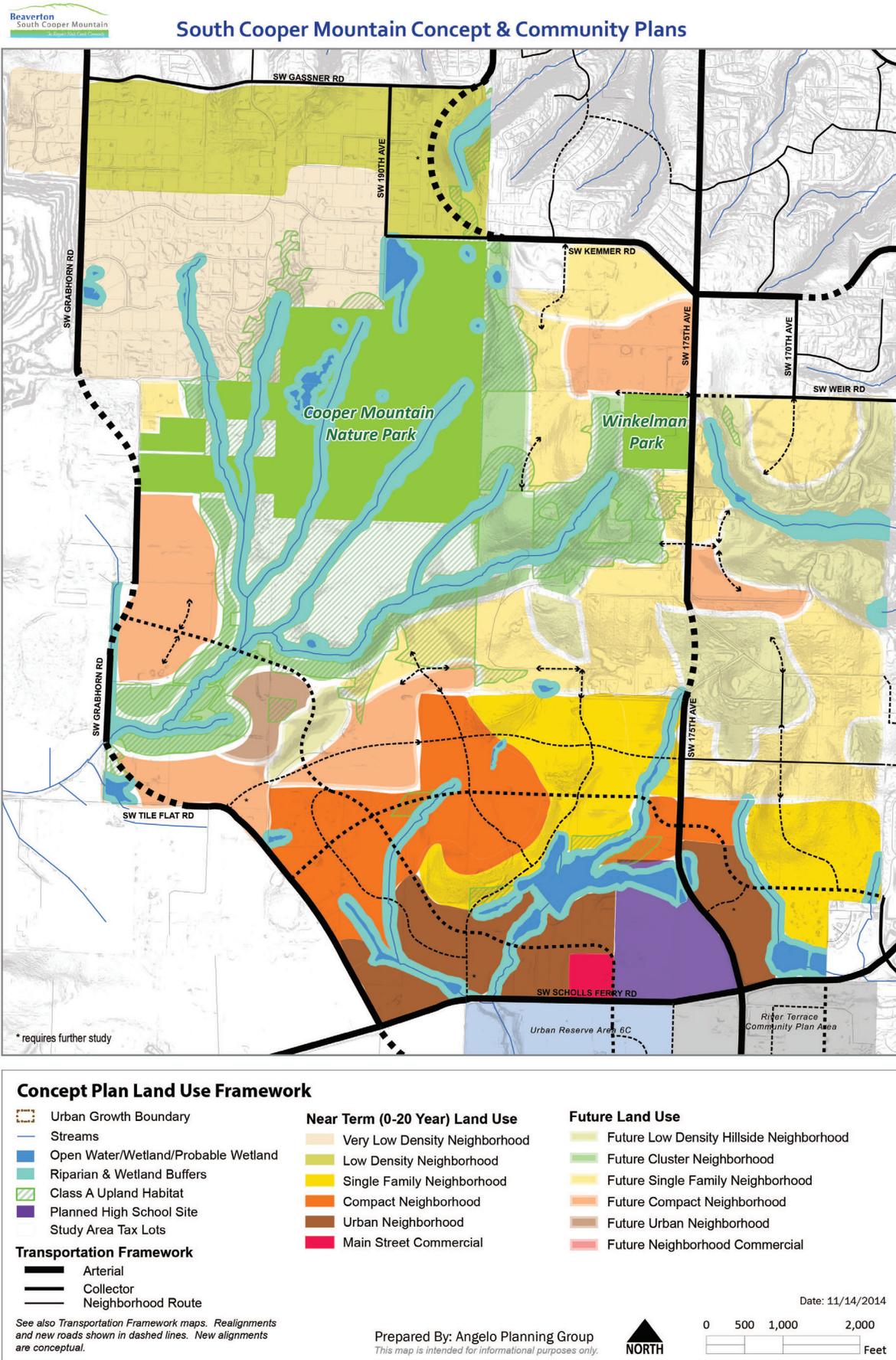
Map Symbol	Development Type	Description
	Urban Neighborhood	Primarily made up of apartments/condos and townhomes, with some small-lot single family homes.
	Future Urban Neighborhood	
	Compact Neighborhood	A mix of single family homes on small lots and townhomes.
	Future Compact Neighborhood	
	Single Family Neighborhood	Includes single family homes on lots ranging from 5,000 to about 7,000 square feet, with a small percentage assumed to be larger lots where topography or other conditions make a slightly lower density appropriate.
	Future Single Family Neighborhood	
	Future Cluster Neighborhood	Primarily applied in places with high quality upland habitat; houses are grouped together on more buildable portions of a property and can share views of and access to nearby natural areas. Lot sizes are assumed to include a range of sizes from relatively small lots to larger lots to account for topography and to provide a transition to resource areas.
	Low Density Neighborhood	Made up of single family homes on lots from roughly 7,000 to 10,000 square feet. This development type is intended to represent residential development roughly consistent with Washington County’s R-6 zone.
	Future Low Density Hillside Neighborhood	Made up of relatively large-lot single family homes to account for challenging slopes and provide opportunities for “executive”-style housing.
	Very Low Density Neighborhood	Single family homes on lots around one to two acres, similar to the existing development pattern in North Cooper Mountain, providing opportunities for “executive”-style housing.
	Main Street Commercial	Street-oriented ground floor retail, with potential for office and/or residential units on the second floor of some buildings. All of the commercial uses are intended to serve day-to-day needs of residents.

Figure 3 - Concept Plan Land Use Framework



Land Use Patterns

The patterns of recommended land use are described below by landscape area.

SCMAA

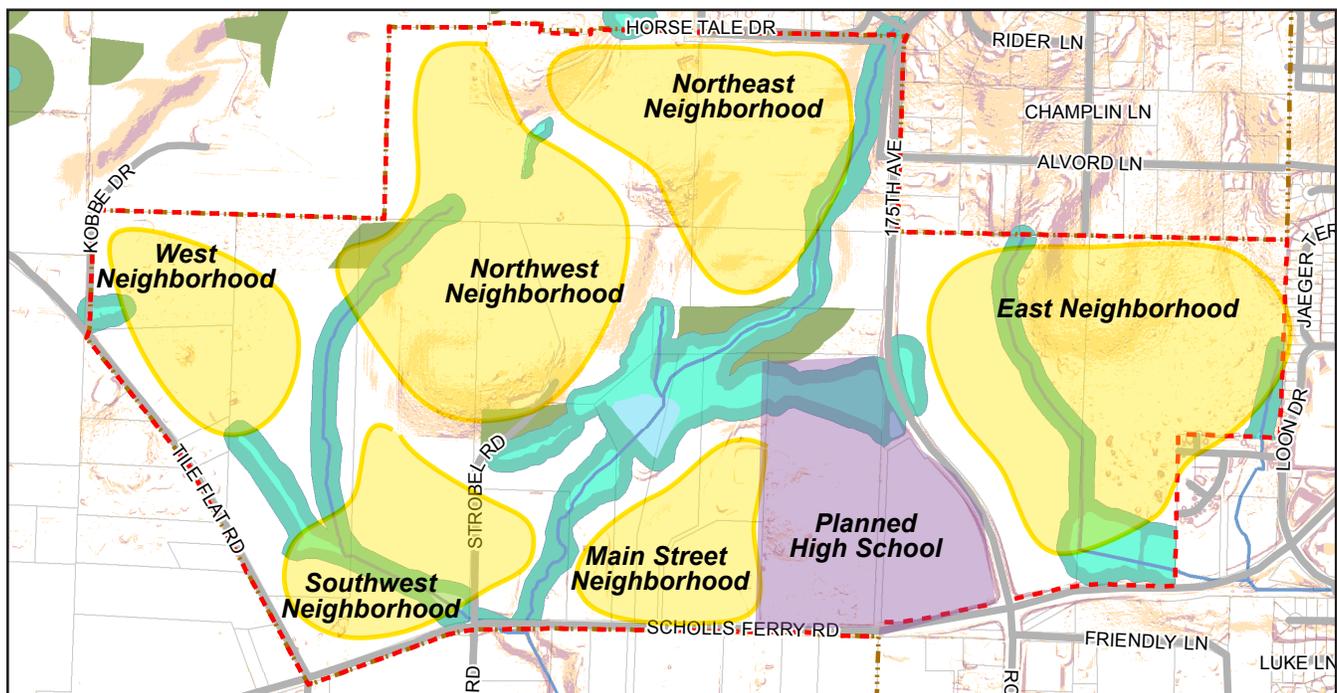
The land use patterns proposed for the SCMAA are responsive to the area's physical setting and existing conditions. The area is well suited for the proposed walkable urban community because it is:

- Comprised of gently rolling fields, hummocks, and small tributaries.
- Relatively free of physical constraints.
- Close to existing water, sanitary sewer, and transportation infrastructure.
- Anchored by a major civic land use – the new high school.
- Adjacent to existing water, sanitary sewer, and transportation infrastructure, currently being upgraded to serve SCM and the adjacent River Terrace community plan area to the south.

Residential Neighborhoods and Densities

The Concept Plan organizes residential land uses into six new neighborhoods that are intended to be walkable, anchored by parks and schools, have easy access to neighborhood shops and services, and connected to natural areas. Each neighborhood is approximately 1/4 mile (or less) from center to edge, which facilitates a comfortable 5 to 10 minute walk to all parts of the neighborhood. The proposed connected pattern of streets and trails is integral to creating a walkable setting that has direct and convenient routes for pedestrians, bicyclists and motorists alike.

Figure 4 - Annexation Area Neighborhood Framework



The plan focuses the highest density of housing (the Urban Neighborhood designation) in the southern portion of the SCMAA, close to Scholls Ferry Road and 175th Avenue, with density generally decreasing northward. The lowest density designation, Single Family Neighborhood, is placed near Loon Drive, Alvord Lane, and Horsetail Lane to promote compatibility with existing development and respect the sloped topography in these areas. Compact Neighborhood is the predominant land use designation in the eastern portion of the SCMAA where the land is relatively flat and can accommodate smaller lots, cottage clusters, and townhomes. The same topography extends west into the adjacent Lowlands area, so Future Compact Neighborhood is designated there in anticipation of a future UGB expansion. Density transitions along Tile Flat Road are planned through special setbacks (please see Rural Edges section under Community Design Concepts).



Main Street Location

A 10-acre Main Street Commercial area is shown at the northwest corner of the intersection of Scholls Ferry Road and a future collector road. This location offers:

- Good visibility and frontage along Scholls Ferry Road.
- Proximity to the future high school: potential shared parking; complementary daily activities.
- Proximity to adjacent neighborhoods, particularly Urban Neighborhoods where higher density housing is planned.
- Access from the new north-south collector road envisioned to cross Scholls Ferry Road mid-way between existing intersections at 175th Avenue and Tile Flat Road.



North Cooper Mountain

Northern one-third of NCM

The Concept Plan shows the northern one-third of NCM as Low Density Neighborhood except in the area west of Grabhorn Road, which is designated Very Low Density Neighborhood. The Low Density Neighborhood designation is intended to be consistent with Washington County's R-6 zoning designation (the lowest density residential zone currently available in Washington County).



The area to the west of Grabhorn Road is designated Very Low Density Neighborhood in recognition of the fact that it is fully platted with one- to two-acre lots and lies immediately adjacent to an active quarry.

Southern two-thirds of NCM

The southern two-thirds of North Cooper Mountain is designated Very Low Density Neighborhood, intended to roughly match the development pattern that exists in this area today, with single family homes on lots of roughly one to two acres.



Areas within the Urban Reserve

The portions of the planning area within the URA are not currently eligible for urban development, but are included in the concept plan to show how these areas might be incorporated in the UGB over the next 20 to 50 years. The land use patterns described

for the landscape areas within the URA are intended to serve as a guide for more detailed comprehensive planning that will be required after future UGB expansions occur. Future urbanization planning will also be done in accordance with applicable land use laws and regional requirements in place at the time of any new UGB expansions.

Hilltop

The land use framework designates this area for both compact and single-family neighborhood development, with lower densities adjacent to Kemmer Road, the Nature Park, and natural resource areas, reflecting several key issues discussed during the scenario refinement process (summarized beginning on page 16). The recommended plan is summarized as follows:

- Target overall densities around 10 dwelling units/net acre.³ This approach strikes a compromise between local concerns, stormwater considerations, and regional expectations and policies.
- Organize land uses so that the Future Compact Neighborhood designation is near 175th Avenue and Winkelman Park, with the Future Single Family Neighborhood designation in the northern, western and southern portions of the Hilltop.
- In the areas nearest Cooper Mountain Nature Park and creeks, designate the land as Future Cluster Neighborhood so that development is sited away from resource areas. As drawn, this band of the Future Cluster Neighborhood designation is approximately 400 to 500 feet in width.

Public viewpoints will be the hallmark of this area and will be a key public amenity.

The Creeks

Cooper Mountain Nature Park and the set of drainages and uplands within The Creeks, totaling nearly 600 acres in the central portion of the plan, comprise the primary natural resource areas and best opportunities for an enduring green legacy for the area. Providing infrastructure to the developable portions would have costs and impacts disproportionate to the housing benefits. It is therefore planned for natural area preservation, transfer of development rights, and careful transitions from resource areas to future development in adjacent areas.

East Hills

The vision for the East Hills is carefully planned and connected single-family neighborhoods in the hillside setting. A small compact neighborhood area providing a node of medium density housing within the surrounding lower density areas is shown east of 175th Avenue (north of Siler Ridge Lane) where topography is relatively level. The Future Single Family Neighborhood designation is used in flatter areas and the Future Low Density Hillside Neighborhood designation is used in steeper areas and potentially geologically unstable areas.



³ A "net acre" excludes protected natural resource areas, slopes over 25%, and right-of-way. It represents an acre of buildable land.



The Lowlands

The URA Lowlands area is a logical extension of the land use pattern of the South Cooper Mountain Annexation Area, and makes a transition to McKernan Creek. Key land use concepts in this area include:

- Future neighborhoods abutting the SCMAA to the north and northwest extend the Compact Neighborhood and Single Family Neighborhood designations found within the UGB.
- There is a “shelf” of sloped land that separates the SCMAA terrace from the lower terrace of the Lowlands, which is designated Future Hillside Neighborhood due to the steep slopes.
- A node of Future Urban Neighborhood has been located on the lower terrace, to the west of the above-referenced slope. This flat area is appropriate for denser development and helps the plan avoid placing higher density adjacent to Tile Flat Road and the agricultural area in the Rural Reserves to the west. The Future Urban Neighborhood designation increases the overall density in the Lowlands, which aids the plan in satisfying Metro expectations for efficient use of new urban land and paying for the new infrastructure (including a pump station) needed to serve this area.
- A band of Future Cluster Neighborhood runs along McKernan Creek. This is intended to ensure that careful site planning in the future will protect habitat and riparian areas near the creek.

Grabhorn Meadow

Given the infrastructure challenges described previously and its location within the URA, it is reasonable to expect that development of Grabhorn Meadow will not occur for several decades. The Concept Plan identifies the majority of Grabhorn Meadow as Future Compact Neighborhood, with a band of the Future Cluster Neighborhood designation adjacent to McKernan Creek and its tributary. The Future Compact Neighborhood designation will provide roughly 15 units per net acre on average, a density that Metro has required for recently added new urban areas, and the ability to design lower density transitions adjacent to creeks on the eastern edge, and the rural reserve area to the west of Grabhorn Road.

Community Design Concepts

The following community design concepts are intended to guide future development in South Cooper Mountain as well as future plans and implementation measures.

Neighborhood Focal Points

Future schools and parks to serve South Cooper Mountain should, to the extent possible, be sited to serve as focal points for neighborhoods and to be centrally located to walkable service areas. Within neighborhoods, pocket parks and “tot lots” should also be provided to serve residents, as focal points of those neighborhoods that do not include neighborhood parks or elementary schools so



that all residents are within an easy walk of recreational spaces. (See additional discussion of park and school needs beginning on page 37.)

Housing Variety

Providing a variety of housing types can improve the aesthetic character of the neighborhoods by avoiding large, monotonous areas of the same building form. A variety of housing also helps provide different housing types for different income levels. Neighborhoods should include a variety of housing types, designed and configured to be complimentary.

Integrating Affordable Housing

Clustering affordable housing within a single area tends to isolate and stigmatize residents. Providers of affordable housing must balance finding sites that provide amenities and services that support lower-income residents with integrating those residents into the broader community, so it is important to provide a variety of options and locations where affordable housing development is possible.

Walkable Streets

New development within South Cooper Mountain should be designed to offer a “friendly face” with physical and visual connections to the street in order to promote walking and biking, healthy lifestyles and a sense of community. This generally means that:

- garages and parking areas (other than driveways) should be located no closer to the street than the main pedestrian entrance;
- fences in front yards should not be so high as to block visual connections to the street; and
- buildings should have windows offering views onto the street.

Figure 5 - Neighborhood Design Principles



Open Space Edges

South Cooper Mountain includes several important stream corridors and wetland/riparian areas. These resources can become amenities for the future neighborhoods if they are properly protected and restored. In order to provide public views of and access to these natural areas, adjacent development should be designed with one of the following treatments of the open space edge:

- parallel trail along the edge of the habitat benefit area or vegetated corridor with access points from adjacent roads and community focal points;
- local streets that run adjacent to the edge of the habitat benefit area or vegetated corridor, without development between the street and the habitat benefit area or vegetated corridor; or
- neighborhood parks that connect to the resource area and provide breaks between developed areas abutting the resource.

Habitat-Friendly Development

Future development in South Cooper Mountain that is adjacent to protected open space areas and/or habitat priority areas should be designed to maximize open space preservation, habitat functions and value, and connectivity of habitat areas for wildlife movement. In order to achieve this, flexibility in development standards (such as setbacks, lot sizes, and required lot dimensions) should be allowed for sites that include or abut habitat benefit areas, natural resource areas, or protected open spaces so that development can be clustered away from the resources and designed to be as environmentally-sensitive as possible.

Main Street Character

The SCM Main Street should create a community focal point and potential future transit node. It is planned to have both street and trail connections to the adjacent neighborhoods and to be easy to access on foot, by bike, or by car from the rest of the SCM Community Plan area as well as from River Terrace in Tigard. Buildings should be built close to the sidewalk, promoting a pedestrian-oriented storefront character, and should occupy most of the street frontage



to provide a sense of enclosure and minimize breaks in the storefront environment. Parking should be located behind buildings wherever possible, and should not be allowed between the building and the sidewalk. Drive through uses may be allowed but drive aisles should not abut pedestrian improvements. Multi-story buildings are encouraged in order to provide an urban scale. The Main Street should relate and respond to the high school site.

Rural Edges

South Cooper Mountain abuts land outside the UGB and Urban Reserves, west of Tile Flat and Grabhorn Roads, that is designated Rural Reserve. Since this land is expected to stay in agricultural use for at least the next 50 years, the urban border will need to be sensitive to the adjacent rural uses. Due to density targets for the plan area and the unconstrained nature of the land immediately east of that edge along much of its length, it is not appropriate to substantially reduce densities adjacent to the rural edge. Further, even standard single-family neighborhoods can have a visual and spill-over impact on adjacent rural areas if not carefully designed. Therefore, the following measures are proposed along the edge adjacent to the Rural Reserve to provide a buffer between urban development in South Cooper Mountain and the Rural Reserve:

- Develop a multi-use path in a landscaped setback area adjacent to Tile Flat and Grabhorn Roads (south of Cooper Mountain Nature Park).
- Ensure that the setback area and path are landscaped with trees and shrubs that provide a visual screen for adjacent rural uses.



Interim Agricultural Use

Given the nature of South Cooper Mountain today, which includes some working farms and forestry lands, and the likelihood that not all property owners will be ready to develop immediately after plan implementation, provisions should be put in place to ensure that on-going agricultural use is allowed even as urbanization begins and progresses.

Views

Scenic vistas of the Chehalem Ridge and Tualatin Valley are part of the unique character of the South Cooper Mountain, and should remain available after development for the enjoyment of the adjacent neighborhoods and the broader community. Public spaces should be designed to offer dedicated view corridors to the Chehalem Ridge upon development. Such spaces should provide seating and areas for passersby to pause and take in the view without obstructing streets, sidewalks, or bike lanes.



By the Numbers: Capacity and Density Estimates

Housing Capacity and Density

The estimated housing capacity and density for the Preferred Concept Plan Scenario is shown in Table 1 below. The estimated total number of new dwelling units is 7,490.

The housing capacity and density displayed in Table 1 demonstrate a balance between efficient utilization of land within the UGB, and protection and enhancement of public lands and natural features in the area, consistent with Metro requirements.⁴ The highest densities are shown in the SCMAA (in the UGB), and in portions of the URA (Grabhorn Meadow and the Lowlands) that have the greatest future urbanization potential based on characteristics of the land and feasibility of infrastructure provision. An estimated 20 to 25 percent of the 2,300-acre concept planning area is designated for natural resource protection and habitat conservation.⁵ The overall net density for the 2,300-acre planning area is over 11 dwelling units per acre.

⁴ Metro Ordinance No. 11-1264B, Exhibit B, conditions on Land Added to UGB, adopted by the Metro Council October 20, 2011.

⁵ The areas identified for protection and conservation include stream corridors, wetlands, and the estimated protected buffer area around such resources; steep slopes (over 25%); and a portion of the upland habitat in the study area (roughly 50% of mapped Class B upland and roughly 90% of mapped Class A upland).

Table 1 - Housing Capacity and Density by Landscape Area – New Dwellings

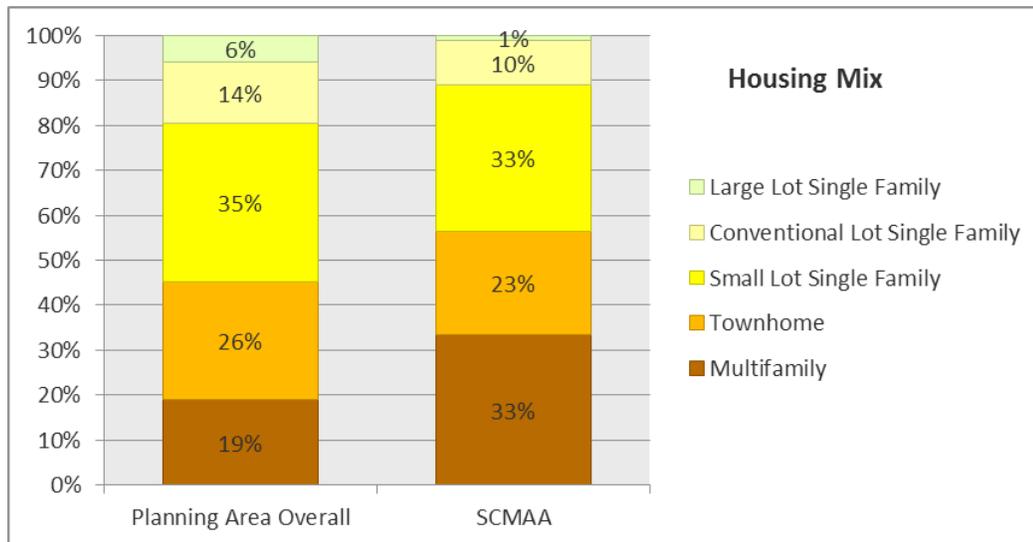
Landscape Area	Capacity (Housing Units)	Net Density
SCM Annexation Area*	3,430	14.5
North Cooper Mountain**	300	3.9
Hilltop	810	9.9
East Hills	830	7.1
URA Lowlands	1,360	13.7
Grabhorn Meadow	660	14.7
The Creeks	100	8.7
Total	7,490	11.2

* The 2011 UGB expansion including the SCMAA was conditioned by Metro to provide zoned capacity for an average of around 15 units per net developable acre.

** Title 11 of the Metro Code required 10 dwelling units per net developable acre in 2002 when NCM was added to the UGB. Title 11 has since been amended and no longer specifies density in new urban areas. The current version of the Metro Code prevails in this planning process.

The estimated mix of housing types for the Planning Area overall and for the SCMAA is shown in Figure 6.

Figure 6 - Overall Scenario Housing Mix - New Dwellings



The housing mix shown in Figure 6 is consistent with the city’s desire to address the need for single-family housing that was identified in the Beaverton Civic Plan Housing Strategy, with detached single-family homes comprising around 44 percent of the housing in the SCMAA.⁶

⁶ Beaverton Civic Plan, Housing & Neighborhood Strategy, adopted by City Council April 12, 2011.

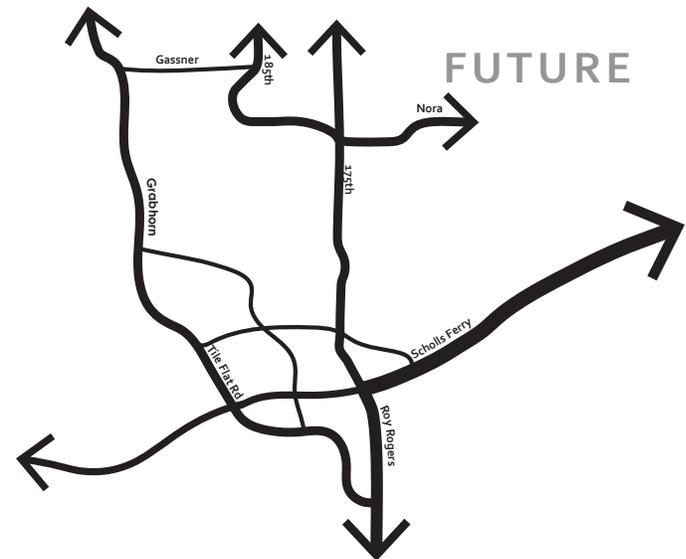
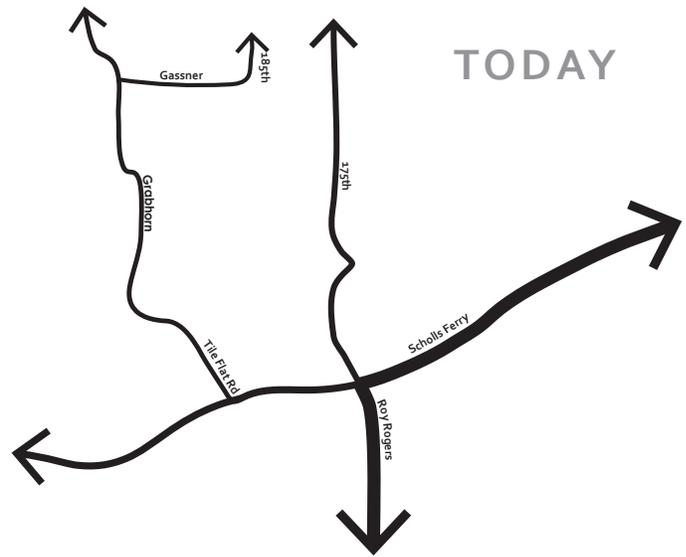
TRANSPORTATION

Five Key Transportation Solutions

Disperse and Balance Regional Traffic – It is well documented that north-south traffic is over-reliant on one corridor: the Roy Rogers/175th to 170th Avenue corridor. The solution is to reduce that reliance and disburse regional flows through a combination of improvements and new connections that result in a more complete network. Key projects include: (1) improving 175th at high priority locations such as the “kink” and the Kemmer/175th Avenue intersection; (2) connecting 175th Avenue to 185th Avenue via Kemmer Road and a new road east of 190th; (3) upgrading Tile Flat and Grabhorn Roads to arterial status and realigning the three 90-degree corners; (4) improving Scholls Ferry Road to 5 lanes west of 175th to Tile Flat Road; and (5) connecting Tile Flat Road to Roy Rogers Road (long term).

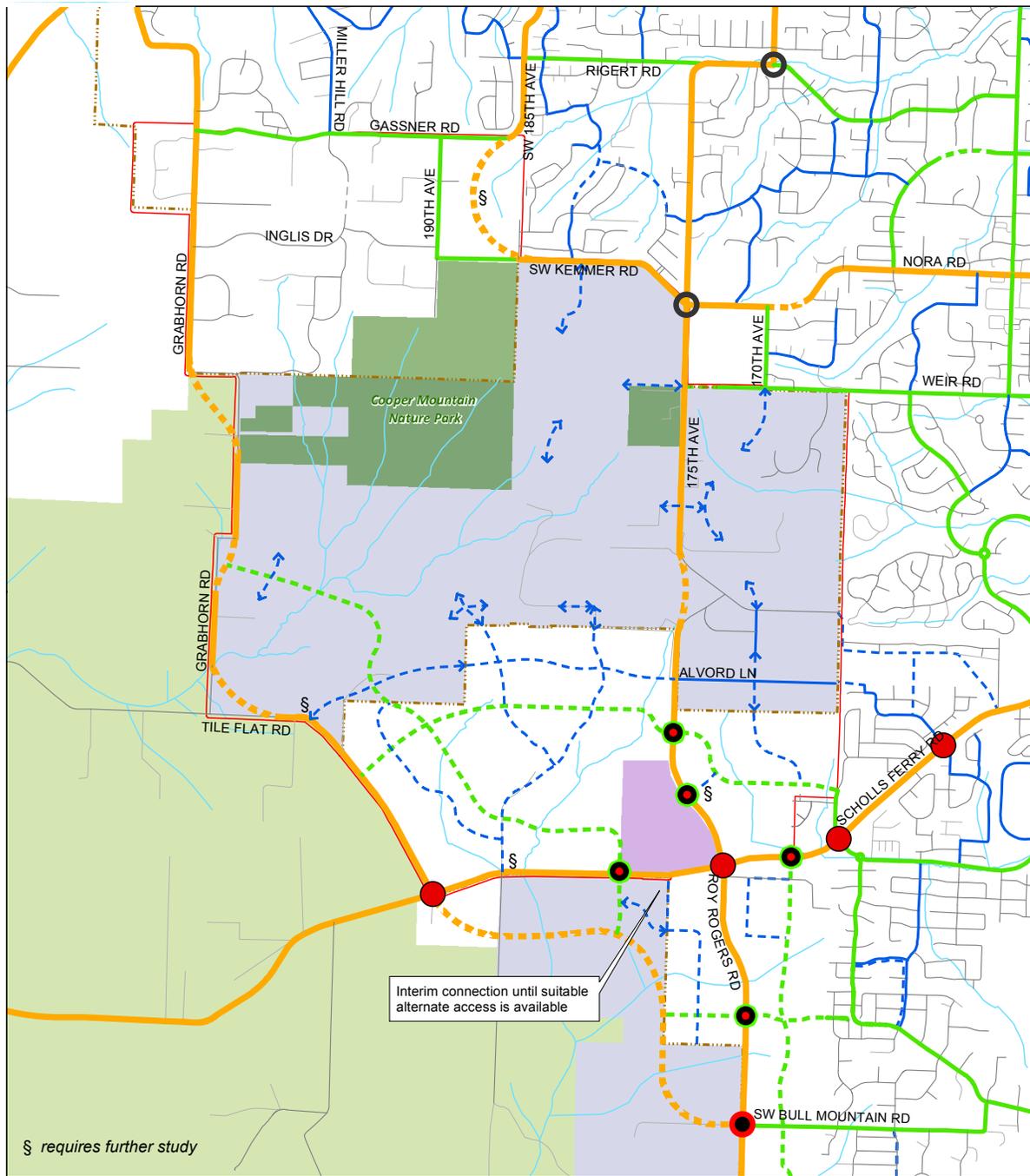
Provide a Well-Connected Local Street Network – The Concept Plan’s Transportation Framework sets the stage for a connected, walkable local street system that provides transportation choices in incorporates active transportation elements. This will not only help address the transportation needs of the area, but is an integral part of the vision for highly livable community. The plan specifies the “point A to point B” collector streets and neighborhood routes, and provides flexibility for the site-specific alignments.

Provide a Diverse, Connected Pedestrian and Bicycle Network – South Cooper Mountain’s pedestrian and bicycle network is a key component of a balanced transportation system that provides many travel option. The network will be built incrementally over time. The overall strategy is to provide many types of facilities that will achieve the vision and can be feasibly implemented. The specific strategies and recommendations are to: (1) ensure all streets are “complete” and provide for pedestrians and bicycles as well as vehicles; (2) plan for multi-use paths that parallel one side of perimeter arterials that frame the area wherever conditions allow;(3) connect neighborhoods in the SCM Annexation Area with multi-use paths;(4) plan for a system of nature trails that connect to Cooper Mountain Nature Park; (5) provide a regional trail along the southern edge of the McKernan Creek corridor; and (6) connect to the River Terrace Trail, the Westside Trail, the future Reedville Trail, and other adjacent paths and bikeways.



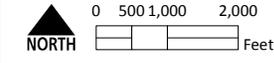
Be Transit-Ready – The Concept Plan focuses its highest density urban neighborhood designations near the high school and Main Street - in the southern part of the planning area - as one strategy to help the area support transit service in the future. The plan also anticipates longer-term, limited-stop commuter-oriented transit service from Sherwood to Hillsboro along Roy Rogers Road and 175th Avenue.

Figure 7 - Concept Plan Transportation Framework



Concept Plan Transportation Framework with Intersection Treatments

Proposed Functional Classification*		Intersection Treatments		Study Area	<p>* Realignments and new roads are shown in dashed lines. New roads east of study area are based on Washington County's Transportation System Plan; new roads and intersection treatments within UGB south of study area are based on current River Terrace Community Plan transportation planning. All new road alignments are conceptual.</p> <p>** Subject to approval by Washington County. Signalization of any intersection will be determined based on warrants via a TIA for development.</p>
Arterial	Existing Signal	Urban Growth Boundary	Rural Reserve	Existing Parks	
Collector	Planned Signal	Urban Reserve	Planned High School Site	Streams	
Neighborhood Route	Possible Signal**	Local			
Private	Possible Signal or Roundabout**				



Prepared By: Angelo Planning Group

Date: 11/11/2014

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Int'l
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Set Transportation Priorities as Part of the Funding Plan – A pervasive challenge is the limited funds available for transportation needs. Developed through a collaborative process with the City, County, service providers and private sector, the Concept Plan includes an Infrastructure Funding Plan which sets forth three coordinated strategies for bridging the transportation funding gap: (1) increase local revenues through a supplemental system development charge (SDC); (2) focus locally generated Transportation Development Tax (TDT) revenues on local projects; and, (3) identify and coordinate transportation priorities with Washington County and neighboring cities, including Major Streets Transportation Improvement Program (MSTIP) candidate projects.⁷ The funding plan combines these strategies into a high level capital improvement plan for meeting near-term and future transportation needs for the entire 2,300-acre Concept Plan area.

Roadway Framework

Summary of Key Elements

Key elements of the transportation framework are summarized below.

Arterial Roads



- 175th Avenue remains designated as an Arterial. Moving north from Scholls Ferry Road, the width is assumed to be five lanes⁸ through the SCMAA, tapering to three lanes⁹ in the vicinity of Alvord Lane. Re-grading and realignment is recommended in the vicinity of “the kink” on 175th Avenue to remove the sharp corner and reduce existing steep grades to roughly 10 percent in order to improve safety.



- A new connection from 175th Avenue to 185th Avenue is proposed. Between Kemmer and Gassner Roads, the alignment of the new road is proposed to curve around the west side of the stream corridor. Kemmer Road is proposed to be improved to function as an arterial from 175th to where the curve begins, around Mayberry Place. Improvements to the intersection of 175th Avenue and Kemmer Road will be needed to address safety issues and increase capacity.



- Tile Flat and Grabhorn Roads are proposed to be redesignated from Collectors to Arterials adjacent to the planning area (Grabhorn Road would also need to be redesignated to an Arterial from Gassner Road north to Farmington Road). The required cross-section is assumed to meet Washington County’s rural Arterial standards, with two travel lanes and turn pockets as needed. Any required additional width should be obtained from the urban east side in order to minimize impacts to farmland in the Rural Reserve to the west. Realignment to smooth sharp corners should be implemented wherever possible in order to improve safety. The proposed

⁷ As described in the Funding Plan, allocations of TDT and MSTIP funds are discretionary, and subject to approval by Washington County and the City of Beaverton. MSTIP funds in particular are limited, in high demand, and must be applied to roads of county-wide significance.

⁸ A five-lane road has two travel lanes in each direction with a two-way center turn lane in the center. All new, improved, and realigned roads will be designed in accordance with the applicable local (city or county) standards, including sidewalks and bike lanes in urban areas.

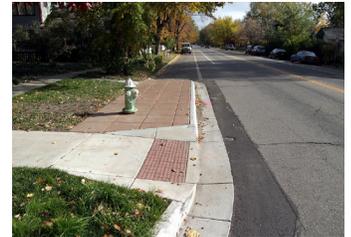
⁹ A three-lane road has one travel lane in each direction with a two-way center turn lane, where needed, in the center. All new, improved, and realigned roads will be designed in accordance with the applicable local (city or county) standards, including sidewalks and bike lanes in urban areas.

redesignations would result in a consistent functional classification from Scholls Ferry Road to 209th Avenue. 209th Avenue is planned by the City of Hillsboro as a 5-lane Arterial between Farmington Road and Tualatin-Valley Highway.

- A new Arterial road connection from Tile Flat Road to Roy Rogers Road and Bull Mountain Road is identified as a long-term extension through Urban Reserve Area 6C adjacent to Tigard's River Terrace and a small "undesigned" area located just south of the Tile Flat / Scholls Ferry intersection.¹⁰ An extension of the north-south Collector road across Scholls Ferry, terminating at the proposed new arterial road, is also proposed, as discussed below.

Collector Roads

- A new north-south Collector road connection is identified from Scholls Ferry Road through the SCMAA. North of Scholls Ferry Road, this new collector would serve as the Main Street area of South Cooper Mountain. The Collector is planned to ultimately continue through the URA (when that area is added to the UGB and urbanized) to tie into Grabhorn Road. A further long-term extension of this Collector road is identified south of Scholls Ferry Road, running through Urban Reserve 6C, and tying into the proposed new Arterial road discussed above that would connect Tile Flat Road to Roy Rogers Road.
- A new east-west Collector road is proposed through the SCMAA, from Tile Flat Road to Loon Drive. The eastern connection point of this Collector is proposed to be on Loon Drive across from the Scholls Heights Elementary School athletic fields, south of the existing homes in the Sterling Park subdivision and north of SW Oystercatcher Lane which provides access to the Churchill Forest subdivision.
- Weir Road is shown extending westward to 175th Avenue, and ultimately across 175th Avenue north of Winkelman Park to tie into other future streets in the URA. The extension to Weir Road is consistent with the Beaverton and Washington County Transportation System Plans. Its connection with other planned future roads would extend the network to provide greater connectivity through the area.

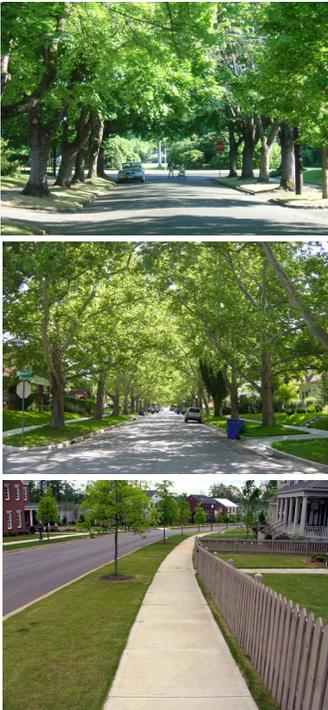


Neighborhood Routes¹¹

- A network of Neighborhood Routes is suggested through the SCMAA, including one running east-west and connecting to Alvord Lane to the east in the URA and ultimately west through the URA toward Tile Flat Road when the URA Lowlands are added to the UGB and urbanized. This Neighborhood route would connect to other Neighborhood Routes in the SCMAA creating a loop.

10 New roads may be permitted in areas that are designated urban Reserve or "undesigned" – designated neither as urban reserves nor as rural reserves – subject to a "goal exception" process. Whether such a "goal exception" is warranted has not been determined at this time; it is assumed that the proposed option will be evaluated for compliance with all applicable land use regulations when adopted in Transportation System Plans and implemented. For now, it is included as part of the conceptual transportation framework proposed to serve the South Cooper Mountain Concept Plan area.

11 Discussions with Washington County about potential Neighborhood Route connections to arterial roads are on-going. The need to provide a connected roadway system (which would benefit from more connections) must be balanced with the need for mobility on the arterial roads (which would be negatively impacted by more connections).



- Another key Neighborhood Route in the SCMAA would run north from Scholls Ferry Road along the edge of the central natural area in the SCMAA. This road could ultimately be extended into the URA (when that area is added to the UGB and urbanized) roughly where Horse Tale Road (a private road) exists today, continuing across McKernan Creek, linking to Kemmer Road. This would provide a second parallel route to 175th Avenue, providing for local trips, reducing turning movements on 175th Avenue, and facilitating walking, biking and access to Cooper Mountain Nature Park.
- A future north-south Neighborhood Route is identified winding through the East Hills from the intersection of 170th Avenue and Weir Road south to the SCMAA, enhancing connectivity through that part of the planning area; and providing a parallel route to 175th. This road would be developed segment by segment as future development in the East Hills is enabled by future UGB expansion(s).
- Improvements to Alvord Lane to Neighborhood Route standards are recommended in order to improve connectivity and provide safer pedestrian connections through neighborhoods.

Bicycle & Pedestrian Framework

Introduction

Provision of a diverse and connected bicycle and pedestrian network is one of the great opportunities for South Cooper Mountain. While the ultimate trail widths and designs will be determined in the future, the following trail typology is recommended for planning purposes (consistent with THPRD’s 2006 Trails Master Plan). When trails identified in the Concept Plan are implemented, the applicable City or THPRD trail standards (as applicable) in place at that time should be used.

Trail Types (Tualatin Hills Parks & Recreation District)

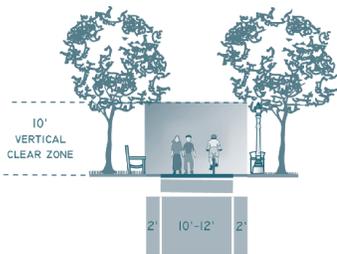


Figure 2. Regional Trail

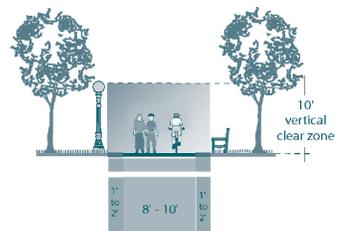


Figure 3. Community Trail

- **Regional Multi-Use Trails:** Regional trails provide connections between communities and to regionally significant features and destinations. These are assumed to be paved paths that accommodate both pedestrians (including those with disabilities) and bicyclists. They may follow roads, separated from the roadway by a landscaped area, or be located in their own separate right-of-way. Trail width may range from 10 to 14 feet depending on context and surrounding constraints (with 2 foot gravel shoulders wherever feasible).
- **Community Multi-Use Trails:** These trails link important land uses and areas of interest with one another and connect users to the regional trail system. They are assumed to be paved paths that accommodate pedestrians (including those with disabilities) and bicyclists, recognizing that topographic constraints may be challenging. Within the planning area, it is assumed that community multi-use trails along roadways will be separated by a landscaped area. Trail width may be slightly less than for regional trails, with 8 to 10 feet of paved width and one- to two-foot gravel shoulders.
- **Pedestrian-Only Nature Trails:** These are assumed to be soft-surface trails that are for pedestrians only. They provide connections through and along natural areas, including links to the Cooper Mountain Nature Park trail system. Widths may range

from 3 to 8 feet. Trails identified as Nature Trails should be designed to provide ADA accessibility wherever possible, and, where topography allows and storm water runoff can be managed appropriately, should be designed as paved shared-use paths.

The major components of the proposed bicycle and pedestrian framework are summarized below.

- On-Street Bicycle & Pedestrian Facilities:** All new and improved roadways within the planning area are planned to have sidewalks. In addition, all new Arterial and Collector roadways are planned to have bike lanes, as identified in the City of Beaverton and Washington County TSPs, unless additional sidewalk width or a more protective bike lane treatment is specified as part of the Community Plan in order to provide a comfortable walking and cycling experience.
- Regional Trail connections:** The SCM Concept Plan area lies between the Westside Trail and the planned Reedville Trail (formerly called the BN Powerline Trail). While a full Regional Trail north of Scholls Ferry Road is may not be feasible between the Westside Trail and 175th Avenue due to steep grades and existing development patterns, the planned River Terrace Trail provides such a link just south of Scholls Ferry Road. In addition, a network of bicycle and pedestrian facilities including trails and on-street connections will provide connectivity between the two regional trails, as well as linking to Cooper Mountain Nature Park, Winkelman Park, and the Jenkins Estate.

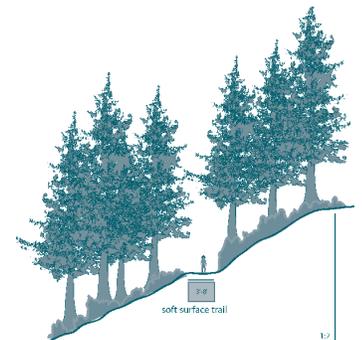
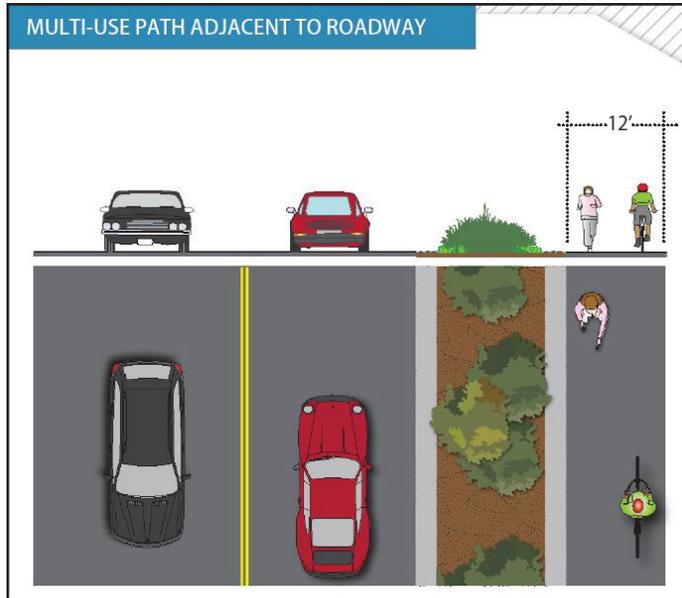


Figure 6. Natural Trail



Figure 8 - Washington County Bicycle Facility Design Toolkit - Multi-Use Path Diagram



- Cooper Mountain Loop Trails:** This system of community multi-use trails will follow major roadways within the planning area, running along the “inside” of the roads (i.e. the east side of Grabhorn Road & Tile Flat Road, the north side of Scholls Ferry Road, and the west side of 175th Avenue). These trails will link to one another and to the Cooper Mountain Regional Trail and the River Terrace trail system. The roadway cross-section and its relationship to the trail should be coordinated prior to construction (Washington County’s Bicycle Facility Design Toolkit includes a cross-section that provides a useful starting point, see Figure 8). Right-of-way or easements for the trail should be purchased or dedicated simultaneously with road improvements or construction whenever possible.

- McKernan Creek Trail:** This trail will run along the outer edge of the McKernan Creek riparian corridor, providing a link from Winkelman Park to Grabhorn Road. It provides the best opportunity for a Regional Trail linking to the Reedville Trail corridor within the SCM Concept Plan area.



- Ridgeline Trail and other Nature Park connections:** A system of nature trails will provide links to Cooper Mountain Nature Park trail system from Winkelman Park, the McKernan Creek Trail, and the South Cooper Loop Trail.

- Summer Creek Trail:** This trail follows the riparian corridor of Summer Creek, linking to Winkelman Park and the Cooper Mountain Nature Park trail system and the McKernan Creek Trail. A potential connection to the east near the southern tributary of Summer Creek and linking to local streets that connect to the Westside Trail is also shown.



- Annexation Area Stream Corridor Trails:** A system of trails will run along the outer edges of several stream reaches within the SCMAA, providing a recreational amenity and safe, pleasant pedestrian connections. East of 175th Avenue, a connection to the River Terrace Trail south of Scholls Ferry Road crosses through the wetland area at an existing driveway and follows the riparian corridor northward to Alvord Lane.

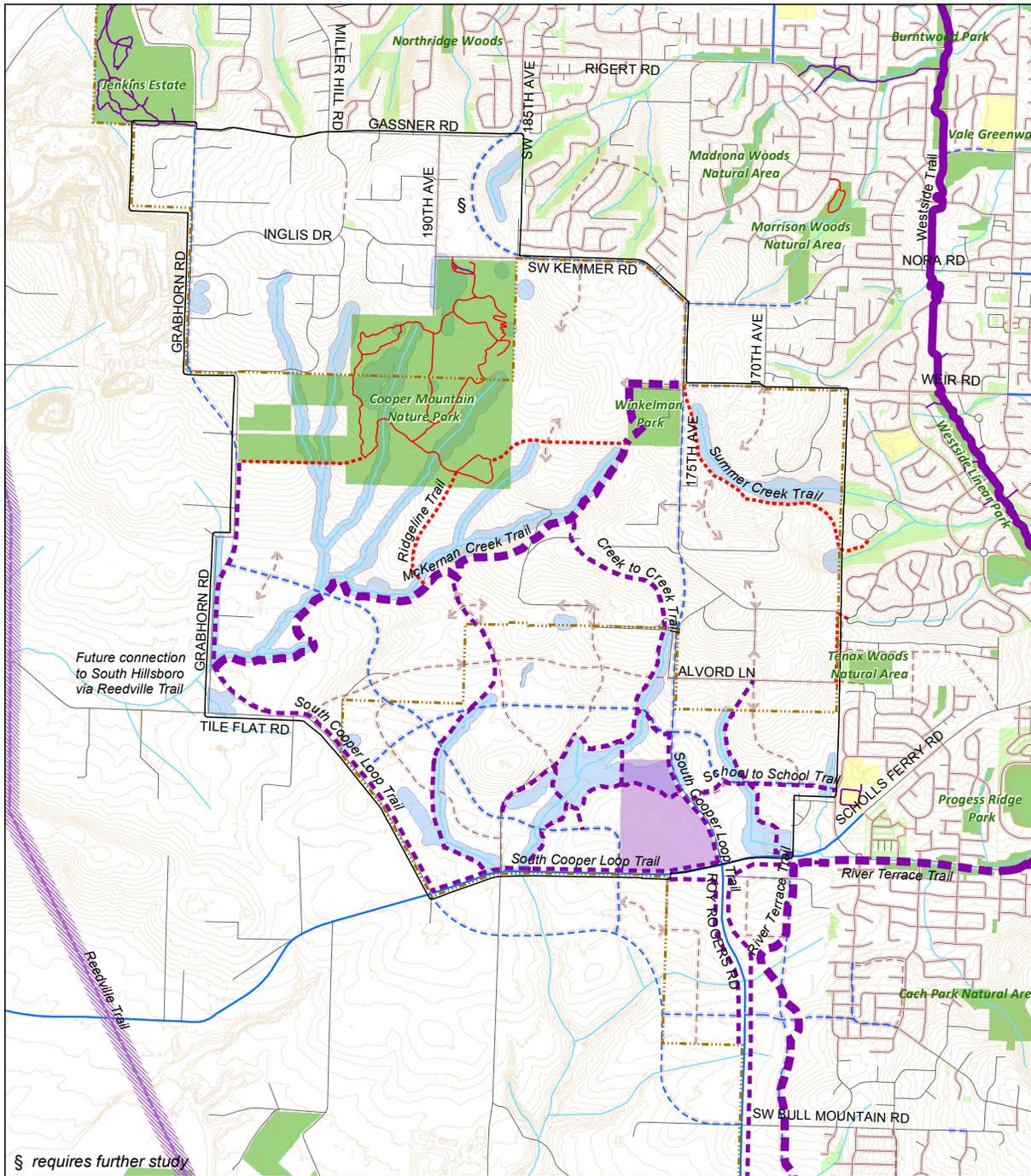
- Creek to Creek Trails:** These trails are proposed to provide a link between the McKernan Creek Trail and the Annexation Area stream corridor trails. The routes through the Urban Reserve Area are purely conceptual at this stage and very flexible, but should take advantage of tree groves and upland habitat areas where possible in order to help provide a habitat connection as well as a pedestrian connection.



- Edge Trail:** This short trail is intended to provide connections from local roads in the East Hills to Tenax Woods and the city street system leading to the Westside Trail.

The above-described trail framework has been designed to connect to the River Terrace trail system, specifically the multi-use path along Roy Rogers Road and the River Terrace Trail (formerly called the 300-foot trail) within the community. The proposed bike/pedestrian framework is shown on Figure 9. Where trails parallel a road, right-of-way or easements for the trail should be purchased or dedicated simultaneously with road improvements or construction whenever possible.

Figure 9 - Concept Plan Bicycle & Pedestrian Framework



Concept Plan Bicycle & Pedestrian Framework

- Proposed Regional Trail
- - - Proposed Community Multi-Use Trail
- - - Proposed Nature Trail
- - - Regional Multi-use Trails
- - - Community Multi-use Trails
- - - Local Multi-use Trails
- - - Existing Pedestrian-Only Nature Trails
- - - Private Paths
- Conceptual Future Trails
- - - Existing Sidewalk
- - - Existing Bike lane
- - - Streets
- - - Other Planned Roads
- Planned Sidewalks*
- Planned Sidewalks & Bike Lanes
- Planned Sidewalk (one side) & Bike lanes
- - - 10' contours
- - - Streams
- - - Riparian & Wetland Buffers
- Study Area
- Urban Growth Boundary
- Planned High School Site
- Existing Parks and Natural Areas
- Preserved by Home Owners Assns.
- Existing Schools

The location and classification of all transportation facilities outside Beaverton City Limits are preliminary and subject to change. Proposed trail locations inside Beaverton City Limits are approximate and subject to further refinement.

* New local streets (not shown) will have sidewalks.

Prepared By: Angelo Planning Group
This map is intended for informational purposes only.



Date: 11/25/2014

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Future Transit Framework

Based on discussions with Tri-Met officials and Tri-Met’s Westside Service Enhancement Plan, the most likely near-term extension of transit service to the planning area is the extension of bus service from Washington Square to the SCMAA along Scholls Ferry Road. This route will likely include a stop at Progress Ridge as well. A future stop to serve the SCMAA could potentially be located at the planned Beaverton School District high school or at the Main Street, if the necessary facilities, including a bus pullout area and access to amenities for drivers (such as restrooms or shops) are available and if there is a logical way for the bus to turn around. Service would potentially run daily throughout most of the day with fairly frequent service (15 to 20 minute headways) during peak times and half-hour to hour headways during off times.

In the longer-term, limited-stop commuter-oriented transit service could be provided from Sherwood to Hillsboro along Roy Rogers Road and 175th Avenue through the planning area. Future stops could be located adjacent to the Future Compact Neighborhood nodes along 175th Avenue. Service would likely be limited to peak commute hours, and could be provided in a single direction (north) in the morning and the reverse direction (south) in the evening. This line would likely utilize the connection from 175th Avenue to 185th Avenue. Improvements to 175th Avenue to eliminate the sharp turn at “the kink” would be required in order to provide bus service on 175th Avenue.



Transportation Design Concepts

Crossing Treatments

With several busy arterial roads bounding and splitting the South Cooper Mountain area, crossings will be critical to ensuring safe pedestrian access throughout the plan area. All signalized intersections within and abutting the plan area should be designed with high-quality pedestrian crossing treatments, including count-down timers and high-visibility cross-walks. Pedestrian and bicycle connections to the planned high school and to River Terrace are particularly important for providing safe routes to school and providing access from River Terrace to the planned Main Street within the South Cooper Mountain area. If a full signalized intersection will not be provided on 175th Avenue adjacent to the planned high school, a mid-block crossing with a pedestrian refuge in the median and pedestrian-activated flashing beacons or a traffic light should be provided instead to ensure access both to the high school and the play fields that will also serve the broader community.



Traffic Calming

Several new road connections are proposed to improve connectivity within the South Cooper Mountain area as well as to better link it to surrounding neighborhoods. In some cases, this will create the potential for cut-through traffic in existing and future neighborhoods. In order to balance the concerns of adjacent residents with the need to provide more direct routes and more options to get around, traffic calming measures should be considered wherever new local street or Neighborhood Route connections create the likelihood of cut-through traffic. Traffic calming measures are street designs and features that are intended to encourage drivers to slow down and that make the route less desirable as a through-route while still providing a multi-modal connection. Examples may include speed bumps; designs that reduce the width of the road or make it



feel narrower, such as narrow lanes, “queuing street” designs that require one car to pull to the side to let an oncoming car pass, curb bump-outs, and allowing on-street parking; designs that cause drivers to navigate curves or corners, such as allowing parking on alternating sides of the street so that the travel lane area shifts from one side to the other and adding small “jogs” to the road alignment; installing speed sensors with electronic displays that show speed; and other measures.

Wildlife Crossings

When conflicts between human activity and wildlife passage are identified, feasible safe wildlife passage options should be considered. For example: road crossings over streams should be designed with culverts large enough to allow wildlife passage wherever appropriate; where surface roads will cross through an important upland habitat area, measures to reduce driver speed should be considered in order to reduce the likelihood of collisions between vehicles and wildlife; when fencing is needed to delineate uses, wildlife friendly fencing systems should be encouraged.

Transportation Project List

The individual transportation system improvement projects recommended as part of the Concept Plan have been identified and their costs estimated. These projects and costs are focused on components that are not solely the responsibility of developers (such as local streets and neighborhood routes) and that are necessary to serve growth in the Concept Plan area. Transportation infrastructure in the South Cooper Mountain area will largely be the responsibility of the County (and to a lesser extent, the City) to build and maintain. Additionally, a sizable portion of project costs would be the responsibility of the private sector to fund directly. Table 2 lists the street projects, which include pedestrian and bicycle improvements. Additional shared-use paths, pedestrian crossings, and trails have been identified (see Infrastructure Funding Plan)

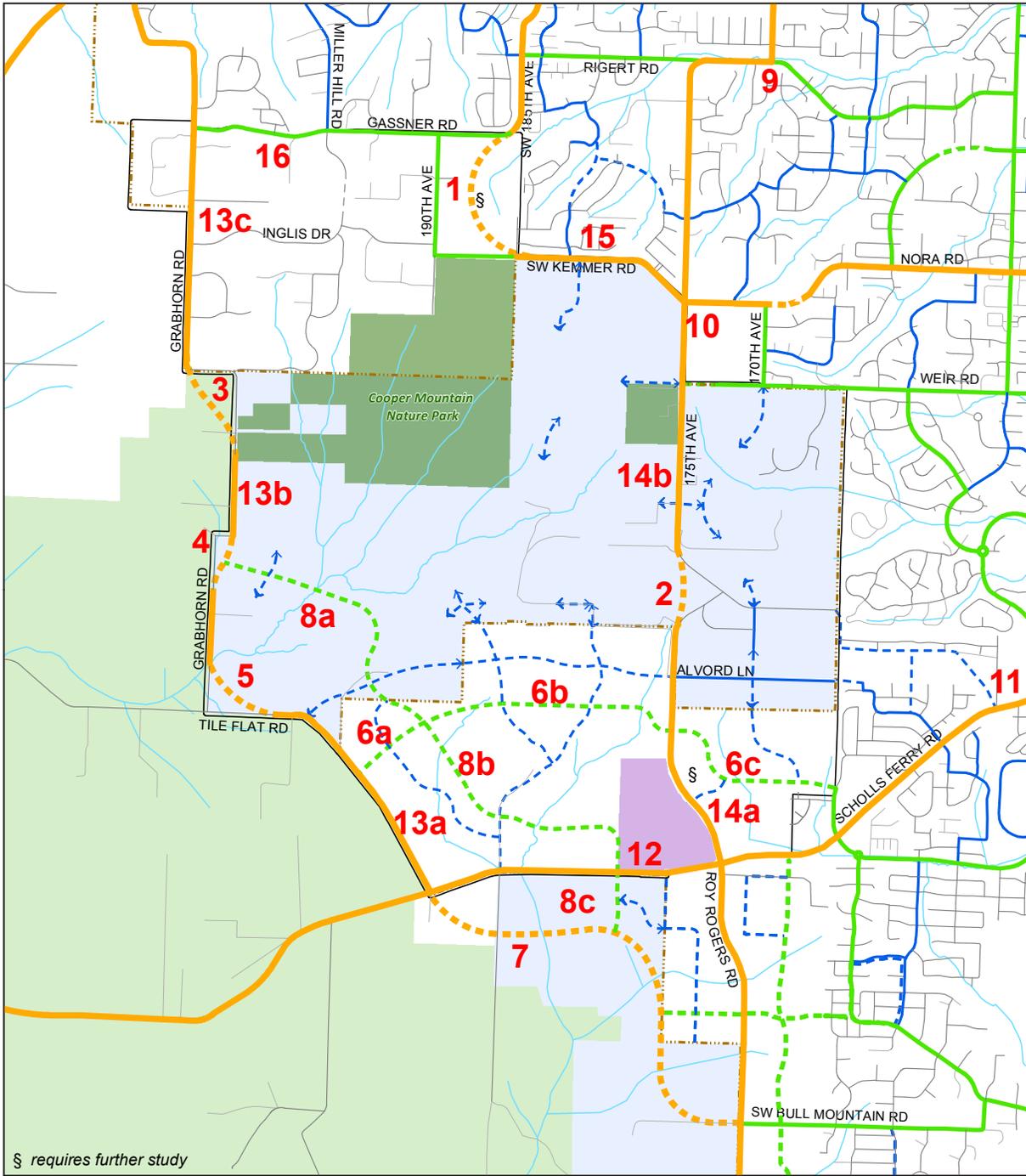
The projects listed and mapped in this section are in addition to projects already identified in the Transportation System Plan prior to the planning work for the Concept Plan. Approximate timing of these projects has been identified in Table 2.

Table 2 - Transportation Projects

Proj. ID	Project Description	Est. Cost	Est. Year of Need
1	Extend 185th Avenue from Gassner Road to Kemmer Road as a 3-lane County arterial.	\$5,760,000	20+ years
2	Realign 175th Avenue between Outlook Lane and Cooper Mountain Lane, as a 3-lane County arterial.	\$5,695,000	0-10 years
3	Realign the curve along Grabhorn Road near Stone Creek Drive, as a 3-lane County arterial.	\$4,575,000	10-20 years
4	Realign the curve along Grabhorn Road north of Tile Flat Road, as a 3-lane County arterial.	\$2,930,000	10-20 years
5	Realign Grabhorn Road east to provide a through connection with Tile Flat Road, as a 3-lane County arterial.	\$4,710,000	10-20 years

Proj. ID	Project Description	Est. Cost	Est. Year of Need
6a	Create a new east-to-west 3-lane City Collector street from Tile Flat Road to the new north-to-south Collector Street.	\$3,255,000	10-20 years
6b	Create a new east-to-west 3-lane City Collector street from the new north-to-south Collector Street to 175th Avenue.	\$10,970,000	0-10 years
6c	Create a new east-to-west 3-lane City Collector street from 175th Avenue to Loon Drive.	\$8,530,000	0-10 years
7	Extend Tile Flat Road between Scholls Ferry Road and the Roy Rogers Road/Bull Mountain Road intersection, as a 3-lane County arterial.	\$18,780,000	20+ years
8a	Create a new north-to-south 2-lane City collector street between Grabhorn Road and the UGB	\$9,465,000	20+ years
8b	Create a new north-to-south 2-lane City collector street between the UGB and Scholls Ferry Road	\$11,020,000	0-10 years near Main Street; 10-20 years to the west
8c	Create a new north-to-south 2-lane City collector street between Scholls Ferry Road and the Tile Flat Road extension.	\$1,935,000	20+
9	Improve the Rigert Road/170th Avenue intersection.	\$2,000,000	10-20 years (2030)
10	Improve the Kemmer Road/175th Avenue intersection.	\$2,500,000	0-10 years (2020)
11	Improve the Scholls Ferry Road/ Horizon-Teal Boulevard intersection.	\$500,000	10-20 years (2030)
12	Improve Scholls Ferry Road from Roy Rogers Road-175th Avenue to Tile Flat Road as a 5-lane County arterial.	\$8,165,000	0-10 years
13a	Improve Tile Flat Road from Scholls Ferry Road to the UGB as a 3-lane County arterial.	\$3,025,000	10-20 years
13b	Improve Tile Flat and Grabhorn Roads from the UGB, north of the new east-to-west Collector Street, to the UGB, near Stone Creek Drive, as a 3-lane County arterial.	\$4,170,000	10-20 years
13c	Improve Grabhorn Road from the UGB, near Stone Creek Drive, to Gassner Road, as a 3-lane County arterial.	\$4,335,000	10-20 years
14a	Improve 175th Avenue from Scholls Ferry Road to the UGB, north of Alvord Lane, as a 3-lane County arterial, with right-of-way dedications to 5-lane width.	\$3,985,000	0-10 years
14b	Improve 175th Avenue from the UGB, north of Alvord Lane, to Kemmer Road as a 3-lane County arterial.	\$3,940,000	10-20 years
15	Improve Kemmer Road from 175th Avenue to the 185th Avenue extension as a 3-lane County arterial.	\$2,590,000	10-20 years
16	Improve Gassner Road from Grabhorn Road to the 185th Avenue extension as a 2-lane County collector.	\$2,475,000	10-20 years

Figure 10 - Concept Plan Transportation Projects



§ requires further study

Concept Plan Transportation Projects

Proposed Functional Classification*	Rural Reserve**	<p>* Realignments and new roads are shown in dashed lines. New roads east of study area are based on Washington County's Transportation System Plan; new roads within UGB south of study area are based on current River Terrace Community Plan transportation planning. All new road alignments are conceptual.</p> <p>** As amended by HB 4078A.</p>
Arterial	Urban Reserve	
Collector	Study Area	
Neighborhood Route	Urban Growth Boundary	
Local	Existing Parks	
Private	Planned High School Site	
	Streams	

Prepared By: Angelo Planning Group

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl

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Updated November 2014

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CIVIC USES

For both the near-term and the future long term, locations for civic uses such as parks and elementary schools are not specifically identified. The needed amount of land for these uses is set aside through the assumptions built into the residential development types.

During the scenario refinement process, the specific degree of flexibility was discussed and two points of view emerged: (1) the schools districts and THPRD would like more certainty on how and when land is identified for schools and parks; and (2) developers would like more flexibility.

The Parks and Schools Framework Plans illustrate locations that meet the locational criteria for neighborhood parks and schools, respectively, but are meant to be illustrative and provide guidance, rather than being regulatory tools. It is assumed that the service providers (THPRD and Beaverton and Hillsboro School Districts) will use their standard site selection and land acquisition processes to acquire the land needed for these facilities (BSD is already in possession of the 45-acre high school site). In addition, current development review practices provide for coordination through the requirement to obtain Service Provider Letters from special service districts indicating that service levels are, or can be made to be, sufficient to support proposed development.

Schools

School Needs

The need for schools has been calculated using planning standards regarding number of students per school and demographic assumptions about number of students per household from the Beaverton and Hillsboro School Districts and coordinated with representatives of both districts. The needed facilities are summarized below:

South Cooper Mountain Annexation Area

- 1 K-5 or K-8 school within the Beaverton School District area
- 1 K-5 or K-8 school within the Hillsboro School District area

Urban Reserve Area

- Up to 1 K-5 or K-8 school within the Beaverton School District area (if a suitable site can be identified)
- Up to 1 K-5 or K-8 school within the Hillsboro School District area

The planned Beaverton School District (BSD) High School site is identified specifically because BSD is already in possession of the 45-acre high school site.

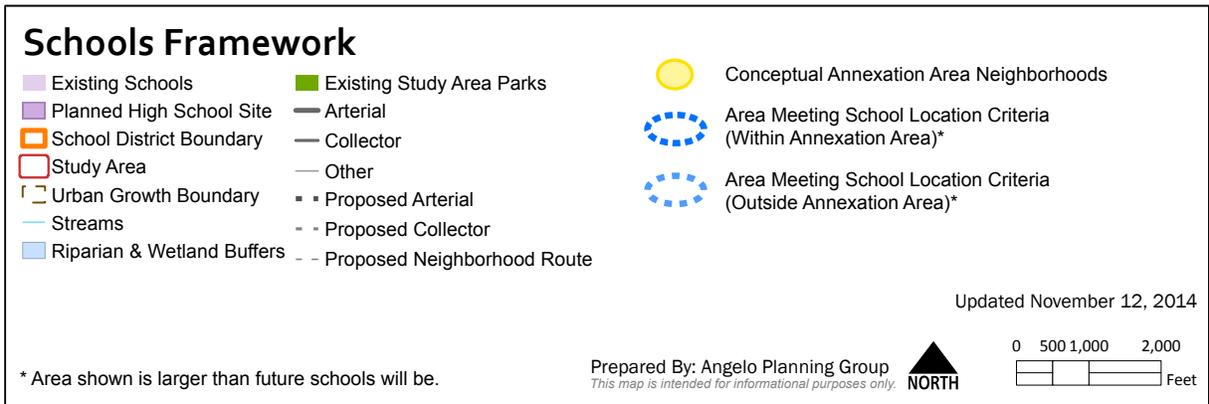
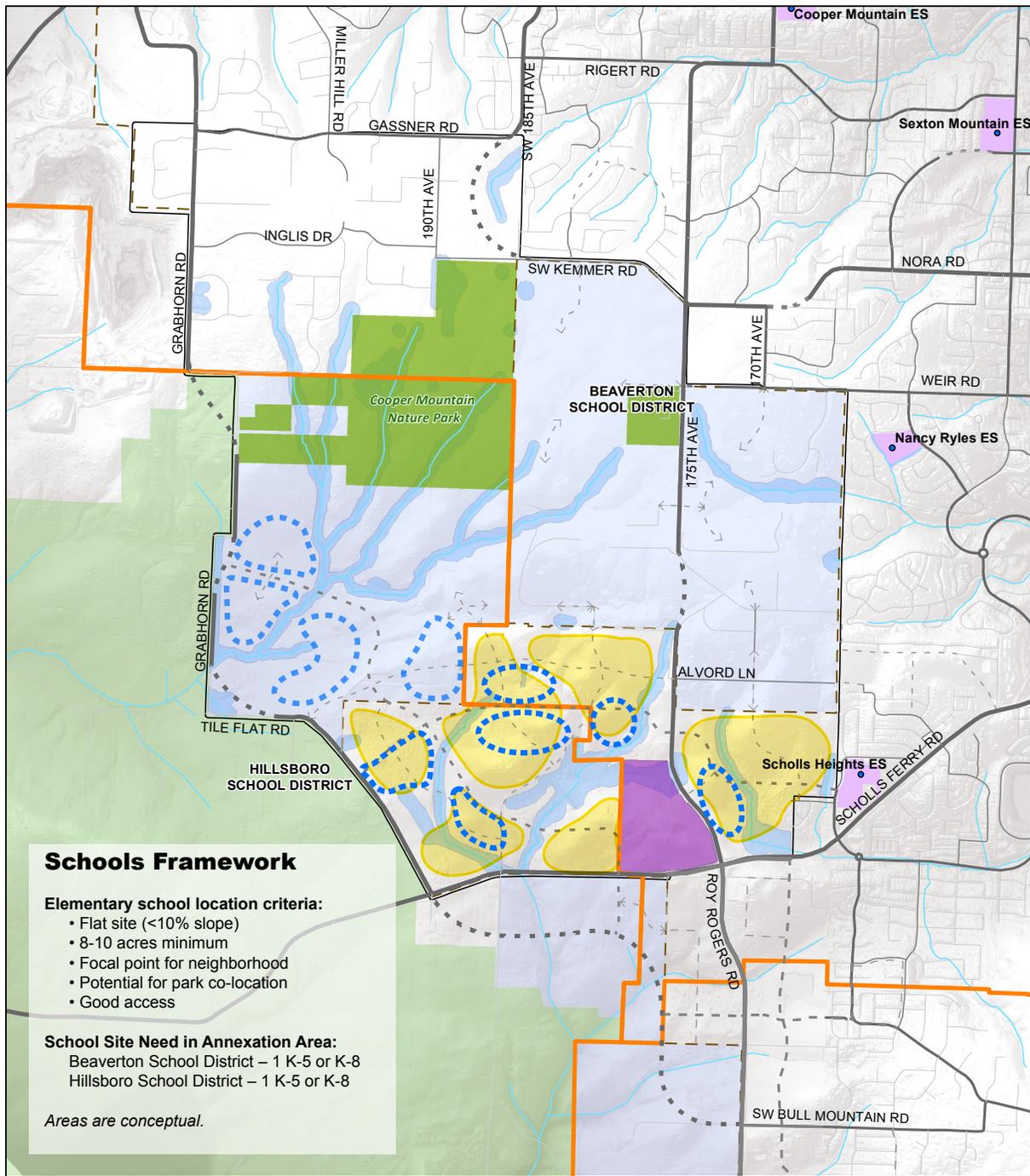
School Siting

The following criteria generally summarize the types of sites that are preferred for new elementary schools:

- Eight to ten acres of unconstrained, relatively level land
- Good access from Neighborhood Routes or Collector roads
- Not adjacent to an arterial road
- Focal points for neighborhoods, centrally-located within walkable attendance areas
- Co-location adjacent to a park is desirable



Figure 11 - Schools Framework



Guidance for the potential location of schools is provided through the Schools Framework Plan (Figure 11), which indicates multiple areas which meet the criteria. This method reflects the priority, expressed by multiple stakeholders, for flexibility in where these uses will be located.

Parks

Park Needs

The need for parks and schools has been calculated using planning level of service standards for acres of parks per 1,000 population from THPRD based on the District's 2006 Comprehensive Plan as well as discussions with THPRD on desired outcomes for the South Cooper Mountain area. The estimated need for new parks is summarized below.

South Cooper Mountain Annexation Area

- Roughly 10 acres of land for neighborhood parks¹²

North Cooper Mountain

- Roughly three-quarters of an acre of neighborhood park land¹³

Urban Reserve Area

- Roughly 8 acres of land for neighborhood parks
- Roughly 17 to 18 acres of land for a community park

Park Siting

The following criteria generally summarize the types of sites that are preferred for neighborhood and community parks:

Neighborhood Parks

- Two to four acres of unconstrained, relatively level land for active recreation facilities
- Good frontage on a local street or Neighborhood Route with on-street parking
- Good connections to trails
- Focal points for neighborhoods, with walkable "catchment areas"
- Co-location adjacent to a school is highly desirable

Community Parks

- 10 to 20 acres of unconstrained, relatively level land for active recreation facilities
- Good connections to trails
- Co-location with schools or other public facilities is desirable, especially where there are opportunities to share facilities

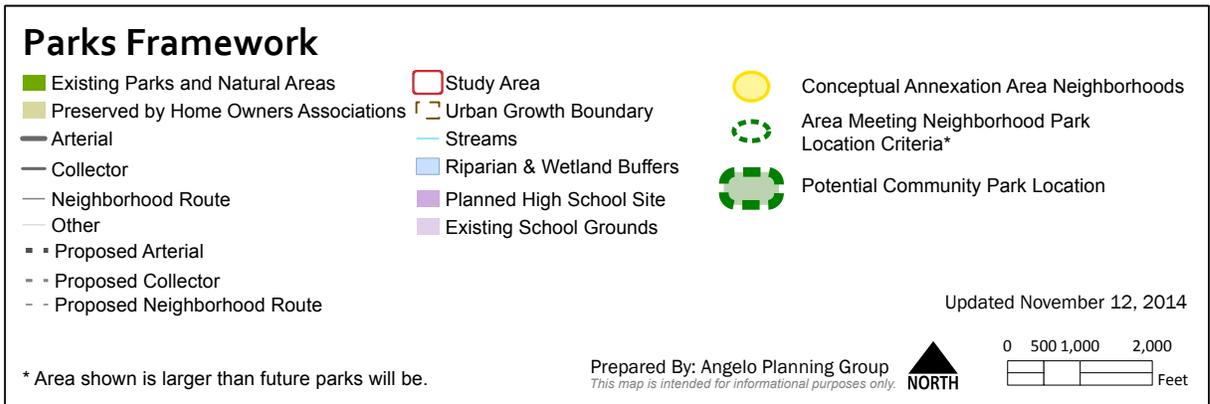
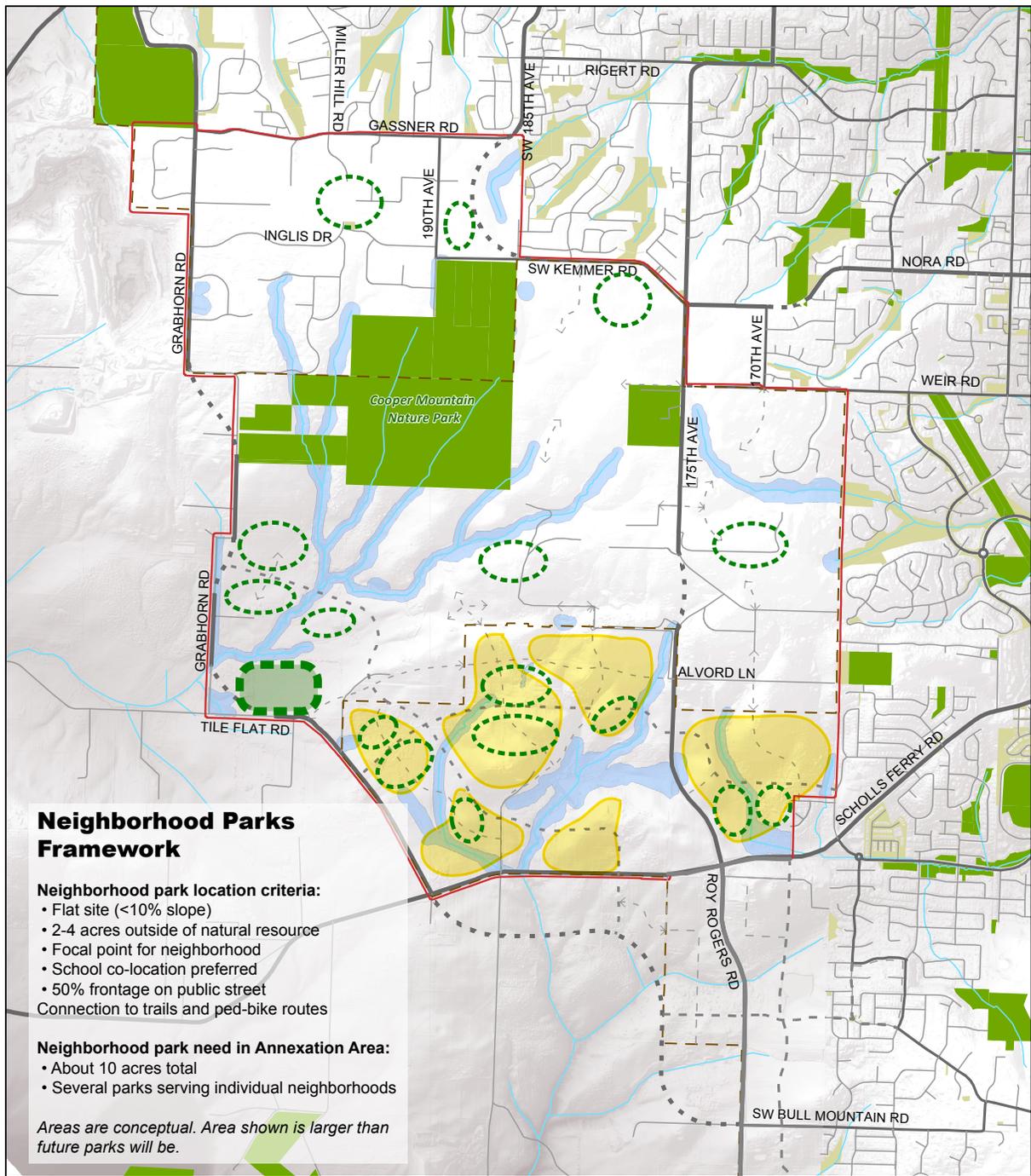
Guidance for the potential location of parks is provided through the Parks Framework Plan, which displays multiple areas that meet the criteria above. This method reflects the priority, expressed by multiple stakeholders, for flexibility in where these uses will be located.



¹² The neighborhood parks standard generates a need for approximately 7 acres of neighborhood parks. The total number of neighborhood park acres needed within the SCMAA has been increased by about 40% to partially compensate for the decision to not site a community park within the Annexation Area.

¹³ Given the limited increase in demand expected from NCM, a new neighborhood park in that subarea may not be the best way to meet that need.

Figure 12 - Concept Plan Parks Framework



NATURAL RESOURCES

Overview

A basic premise of the scenarios and of this planning effort is that the natural resources within the planning area are among the most important amenities and should be protected and enhanced as much as possible. For this Concept Plan, resources have been inventoried at a planning level, and their relative importance has been evaluated in general terms. Community Plans for both the SCMAA and NCM have more specific detail on what will be protected and to what level. Identification of a given resource as locally significant and its addition to City or County inventories of significant resources requires consideration of environmental, social, economic, and energy factors under Oregon's Statewide Planning Goal 5 regulations. This evaluation is not included in this Concept Plan; rather, this section serves to describe the resources and set the stage for their evaluation for local significance.



The Natural Resource Protection and Enhancement Priorities map is shown in Figure 13 on page 54. The resources on the map are keyed to descriptions in the sections below by category (conservation priorities, restoration priorities, and priority habitat connections). For each resource, identified with a letter below to correspond to the letters on Figure 13, the rationale for its identification as a priority and the value provided by the resource is summarized in the text that follows. (The hatched areas on the map indicating priority habitat areas are generalized and are not meant to indicate specific boundaries.)

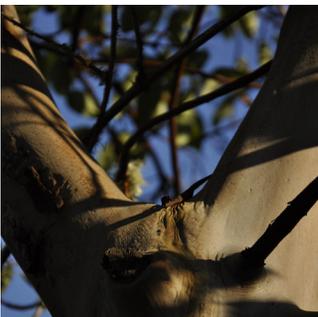
Habitat Conservation Priorities

Among the existing resources within the planning area, the top priorities for conservation have been categorized as Tier 1 or Tier 2 priorities based on the habitat value they provide.

Tier 1

Tier 1 habitat conservation priority areas represent the best habitats within the planning area and those most important to fish and wildlife. Within areas identified as Tier 1 conservation priorities, disturbance should be kept to the minimum possible, with little or no additional development allowed and carefully sited and designed road crossings.

- A. The heart of the McKernan Creek complex contains high quality riparian corridors and upland habitats that are connected to Cooper Mountain Nature Park and are relatively undisturbed. This area likely contains native Oak habitat similar to that found within Cooper Mountain Nature Park, which is important for native species.
- B. The central resource area within the SCMAA contains a diversity of native habitats, including wetland, riparian, and upland habitat. It contains the most intact stream within the SCMAA; human disturbance throughout this resource area appears to be relatively minimal, with the exception of an existing dam (removal of which should be evaluated for feasibility and environmental impacts). The area is home to a diverse mix of vegetation and frequented by migratory birds.



- C. The wetland area at the southeastern corner of the SCMAA covers roughly 4.5 acres, and is contiguous with wetlands on the Churchill Forest subdivision property that have been protected as part of the subdivision approval. This wetland provides diverse wildlife habitat, and meets criteria for designation as a locally significant wetland.
- D. The headwaters of a stream that drains into Washington County's Johnson Creek at the northwest corner of NCM provides a connection between two stream sheds. This area includes an existing patch of trees and upland habitat that provides a wildlife connection between Cooper Mountain Nature Park and the creek. New road alignments that cross this resource should take special precautions in design to ensure safe wildlife passage.
- E. The headwaters of two tributaries to McKernan Creek flow south through the southern portion of NCM to connect to stream corridors within Cooper Mountain Nature Park. They provide habitat connections through an otherwise largely developed area.



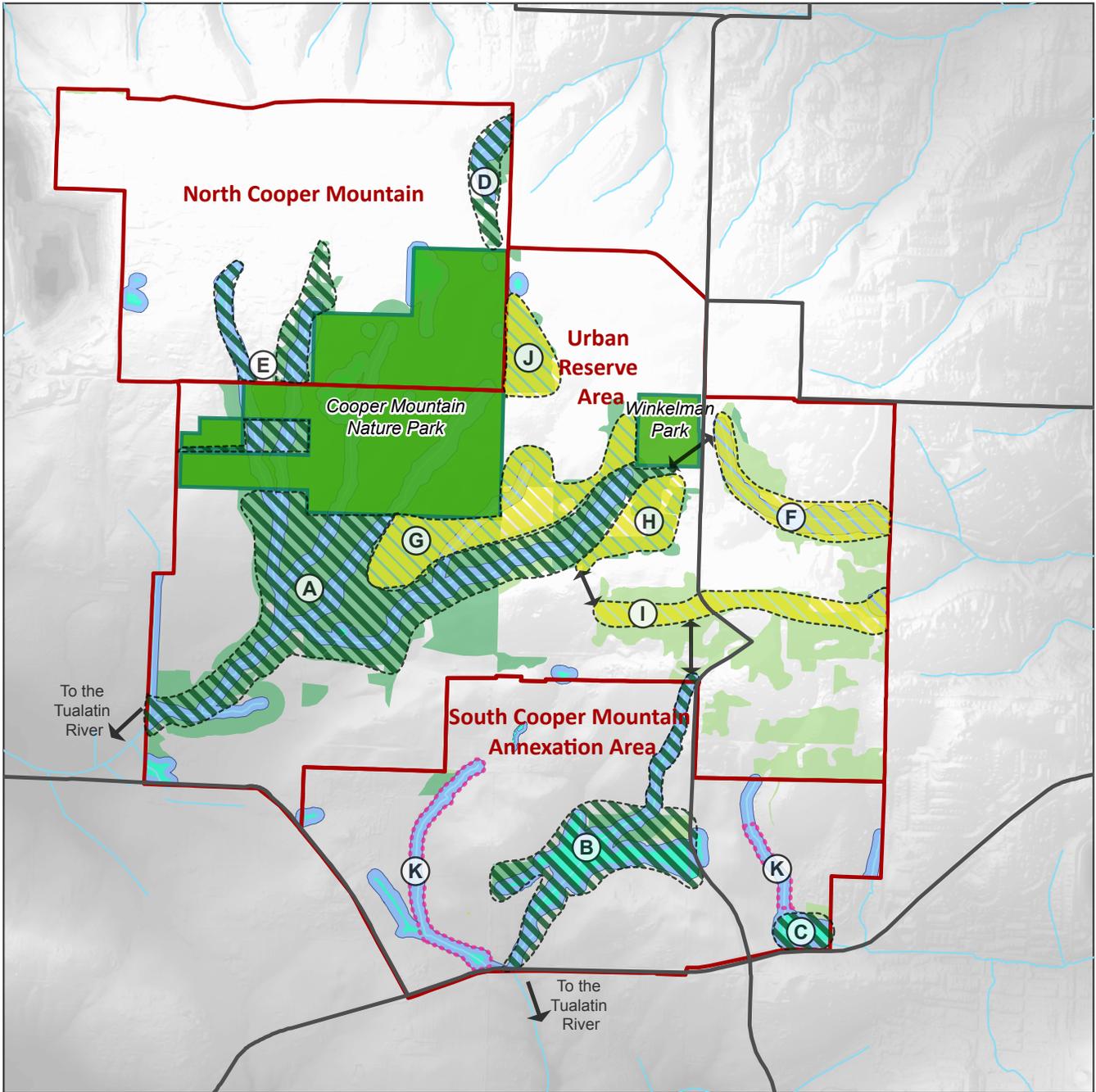
Tier 2

Tier 2 habitat conservation priority areas may have a greater level of human disturbance or play a less crucial role in wildlife movement than Tier 1 areas, but they include valuable upland habitats, riparian habitats, or both that provide important ecosystem services. Some limited degree of disturbance should be allowed, but the fundamental habitat value and ecosystem services should not be lost or excessively compromised.

- F. The northern stream corridor in the East Hills area of the URA is in a steep, forested ravine with limited development potential. It provides a link to the Summer Creek stream shed and the protected stream corridors to the east.
- G. The two farmed meadows within the McKernan Creek complex have experienced more human disturbance than other parts of The Creeks, with less tree cover and areas that have been farmed or cleared. However, they are contiguous with the remainder of the McKernan Creek complex (identified as Tier 1 habitat area A) and connect to Cooper Mountain Nature Park. The primary value in protecting this area is to prevent impacts on the Nature Park and on McKernan Creek.
- H. Just south of McKernan Creek and Winkelman Park, this generally wooded upland area contains a mix of natural forested areas, planted wood lots (e.g. christmas tree farm), and very low density housing. Its primary value is in providing upland forest habitat connected to the McKernan Creek complex (identified as Tier 1 habitat area A) and to Winkelman Park.
- I. As part of a larger area of the East Hills containing a mix of moderate quality upland habitat and rural homes, the east-west corridor spanning 175th Avenue at the northern end of "the kink" identified on Figure 13 provides tree cover connecting from the McKernan Creek complex (identified as Tier 1 habitat area A) to drainages and protected stream corridors to the east.



Figure 13 - Natural Resources Framework



Concept Plan Natural Resources Framework

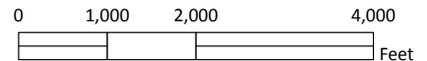
Legend

- | | | |
|------------------------|---------------------------------|---------------------|
| Wetland & Open Water | Highest Preservation Priority | SCM Planning Area |
| CWS Vegetated Corridor | Secondary Preservation Priority | Planning Area Parks |
| Class A Upland Habitat | Stream Enhancement Priority | Streams |
| Class B Upland Habitat | Priority Wildlife Connection | Arterials |

August 2014

Prepared By: Angelo Planning Group, David Evans and Associates, Inc.

This map is intended for informational purposes only.



- J. A large stand of trees within the Hilltop area adjacent to Cooper Mountain Nature Park provides moderate to high quality upland forest habitat connected to the larger resource area of the Nature Park.

Habitat Restoration Priorities

The eastern and western stream corridors within the SCMAA (labeled K on Figure 13) have been impacted and degraded by agricultural activities over time. Because they are central to the SCMAA and protected by local, state, and federal regulations, it is important to improve these channels to a state where they can be both ecologically healthy and attractive neighborhood amenities. Local regulations will require enhancement of the vegetated corridors around each stream with native plants and trees. Additional tree planting adjacent to the required vegetated corridors should be encouraged to provide wildlife habitat enhancement. Within areas identified as restoration priorities, stream restoration may be paired with trail construction and stormwater management facilities to achieve multiple benefits.



Priority Habitat Connections

The areas identified with arrows on Figure 13 represent key links between stream corridors and priority habitat conservation areas. Based on reports from area residents, wildlife currently pass through many of the yards in partially developed areas such as NCM and the East Hills. As future development reduces the opportunities for wildlife passage, these connection points will become more important. Trail connections through upland areas and in the vicinity of these habitat connections should be designed to protect or enhance tree canopy adjacent to either side of the trail in order to provide safe areas for wildlife movement.



Natural Resource Protection and Enhancement Strategies

Mechanisms to protect and to encourage enhancement of natural resources may include Habitat Benefit Areas, Significant Natural Resource Area designation, Tree Grove designation, tree protection standards, hillside/slope protection standards, development regulations that allow some increased flexibility or development potential on the buildable portion of the site in exchange for protections on the constrained portion, incentive-based tree protection measures, or other strategies. The existing and potential future protections for these resources are not absolute (i.e. they do not entirely prohibit disturbance); road and driveway crossings and some minimal disturbance is allowed when necessary.

While riparian and wetland habitats are regulated and protected (to a degree) by state and federal agencies, there is less protection of upland habitat areas. Trees provide a variety of important environmental benefits, in addition to offering aesthetic benefits. The environmental benefits include contributing to stormwater management by intercepting rainfall, moderating temperature, providing habitat, enhancing air quality, and improving soil stability on sloping terrain. Non-forested upland areas, particularly those with native vegetation, can also provide for wildlife habitat and corridors for wildlife movement.





Upland habitat protection should be prioritized adjacent to protected open space areas, especially Cooper Mountain Nature Park; adjacent to wetland and riparian areas, to provide a buffer between the open space and future development; and in corridors (such as trail corridors) that connect protected open space areas, including parks, wetlands, and riparian areas.

The City of Beaverton will work with Washington County and other partner jurisdictions to explore measures to encourage preservation of upland habitat within the URA prior to UGB expansion and to prevent tree removal in the interim period between UGB expansion and adoption of city zoning. Such measures could include:

- inventorying resources, including tree groves, prior to annexation so that all City regulatory protections are in place immediately upon annexation;
- outreach and education to property owners about incentives for and regulations on tree protection; and/or
- restrictions on annexation for up to six years after logging occurs to ensure state replanting requirements have been met.¹⁴

INFRASTRUCTURE

Water

The water system expansion into the South Cooper Mountain planning area will be based on the largest single point demand in the area. The largest single point water demand is fire service flow. Although providing domestic and irrigation services to the area is essential, the water system expansion will be developed to provide sufficient fire flow while maintaining a minimum water pressure.

The new 24-inch water line in SW Scholls Ferry Road will extend to SW 175th Avenue and the planned High School site. Additional development to the north and west will require expanded network connections.

A new 24-inch water line is planned to extend along SW 175th Avenue, ultimately connecting to a future five-million-gallon tank to be located near the intersection of SW 175th Avenue/SW Weir Road. By supplementing the existing system with this new five million-gallon storage tank, there will be adequate water storage to serve the entire planning area. The storage tank is scheduled to be constructed by 2020.

Other major water lines will be constructed in large loops within the existing or future right-of-ways of SW Scholls Ferry Road (west of SW 175th Avenue), the planned east-west collector roadway through the Community Plan area, the planned north-south Main Street

¹⁴ Oregon’s Forest Practices Act generally requires reforestation after logging. Property owners generally have 12 months from completion of logging to start reforestation; 24 months to complete planting; and 6 years in total to establish an adequately-stocked, free to grow stand. See the Oregon Department of Forestry’s website (<http://www.oregon.gov/ODF/privateforests/pages/fpareforestation.aspx>) for details. Reforestation is not required when the land is converted to non-forest use that is allowed under the rural zoning; the land use change must be completed within 24 months of harvest completion and must be maintained for at least 6 years.



collector roadway, SW Tile Flat Road and SW Grabhorn Road. In addition, while there are existing water lines within NCM, in order to provide a network of waterlines that will deliver consistent flow and pressures to all points within the network area, and to create a water system looped system, a major water main extension through NCM will likely be required in order to serve the full build-out of the western portion of the URA. Additional new lines will be needed to create a looped system to serve the eastern portion of the URA; these may or may not run within future street right-of-way, depending on the ultimate configuration of roads in that area.

The conceptual water system plan for the full Concept Plan area is shown in Figure 14. Water line alignments are conceptual and subject to further design and engineering. A planning-level cost estimate to construct these facilities is approximately \$21.6 million for the full planning area (including soft costs such as engineering and contingency but excluding the cost of the planned storage tank).¹⁵

Sanitary Sewer

An existing 21-inch gravity sanitary sewer located in SW Scholls Ferry Road can serve some of the area east of 175th Avenue and north of Scholls Ferry Road as well as the planned High School site. Most of the East Hills portion of the URA can also be served either with connections to existing sewer lines to the east or with future sewer line extensions in SW 175th Avenue that will gravity flow to the existing line in SW Scholls Ferry Road.

With the exception of the high school area, the areas west of SW 175th Avenue -- including a portion of the East Hills, the Hilltop, and the eastern portion of the URA Lowlands as well as most of the SCMAA -- will be conveyed towards the low point in SW Scholls Ferry Road (at the creek crossing near SW Vandermost Road) and eventually be conveyed to the new River Terrace Pump Station. The River Terrace Pump Station will be located within the urban growth boundary along the creeks south of SW Scholls Ferry Road and west of SW Roy Rogers Road. The River Terrace

¹⁵ Details of the cost estimates and planned water system are available in the Water System Concept Plan – Summary Findings and Planning Level Cost Estimates memorandum prepared by David Evans and Associates, Inc., June 11, 2014.

Pump Station is anticipated to be in operation by the end of 2015, and all flows from this proposed pump station will be directed to the intersection of Scholls Ferry Road and 175th Avenue to connect to the 21-inch Scholls Ferry Road Sanitary Sewer Extension and ultimately to the Durham Wastewater Treatment Plant.

A new Tile Flat Road Pump Station will be needed to serve future development on the west side of the URA, northwest of the downslope that runs towards McKernan Creek (Grabhorn Meadow and the western portion of the URA Lowlands). The Tile Flat Road Pump Station will be located at the low point (creek intersection) of Tile Flat Road. This pump station is anticipated to pump to the east along Tile Flat Road to a gravity system that will eventually convey sewage to the new River Terrace Pump Station. Sewer lines will be extended north and southeast of the pump station to serve Grabhorn Meadow and the western part of the URA Lowlands, respectively. The lines will likely follow SW Grabhorn Road and the western edge of the creek complex that flows into McKernan Creek as well as the extension of the north-south collector road and the realignment of Tile Flat Road.

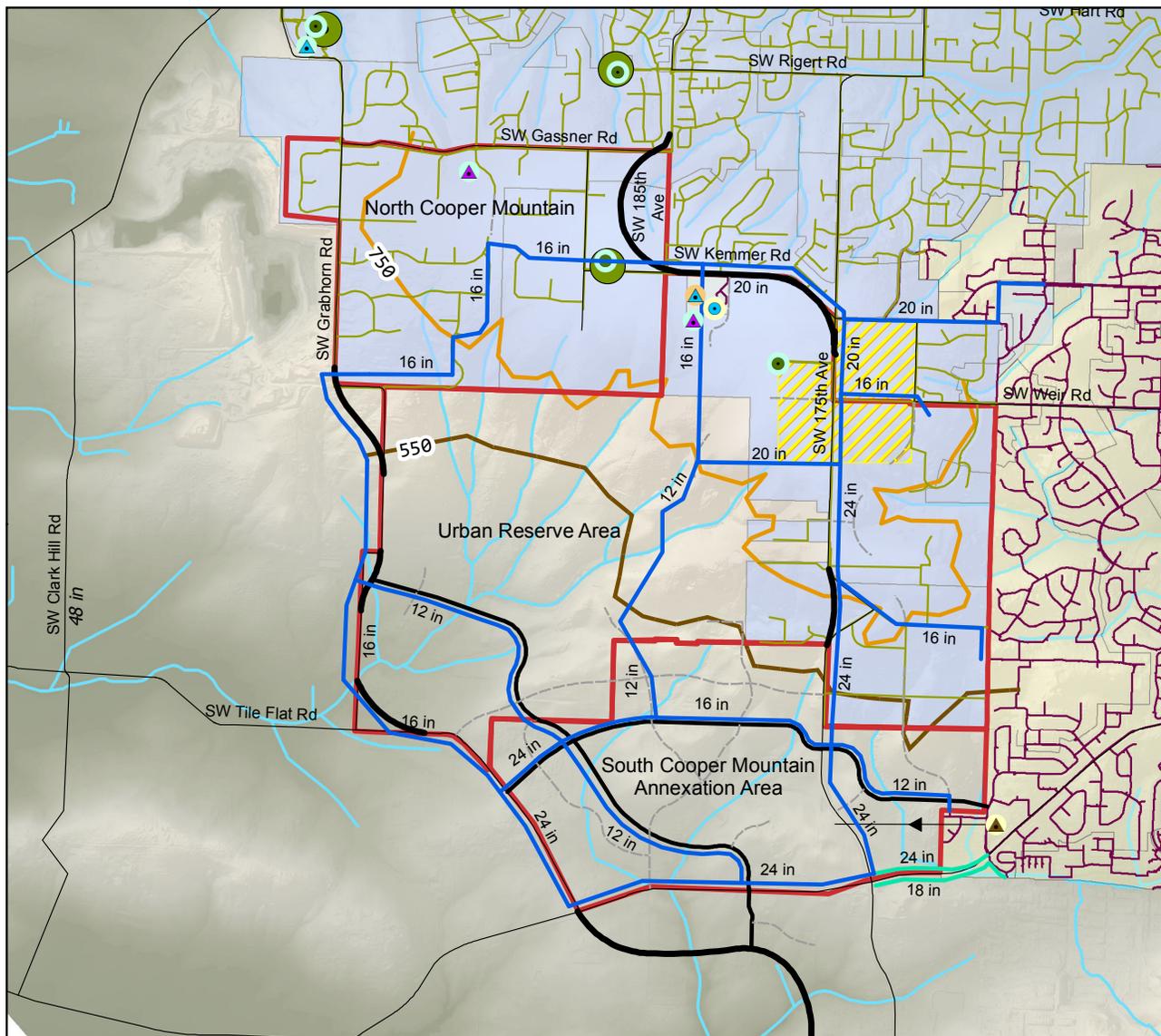
Once the Tile Flat Road Pump Station is constructed and sewer lines have been extended north through Grabhorn Meadow, this will enable the southern portion of NCM to be connected to the sanitary sewer system by further extending the sewer lines north as needed to address failing septic systems.

A planning-level cost estimate to construct sewer facilities to serve the full planning area is approximately \$43.3 million (including the Tile Flat Road Pump Station, the 6" force main to link it to the gravity line in Tile Flat Road, and soft costs such as engineering and contingency, but excluding the cost of the planned River Terrace Pump Station).¹⁶

The conceptual sewer system plan for the full Concept Plan area is shown in Figure 15. Sewer line alignments are conceptual and subject to further design and engineering.

¹⁶ Details of the cost estimates and planned sewer system are available in the Sanitary Sewer Concept Plan – Summary Findings and Planning Level Cost Estimates memorandum prepared by David Evans and Associates, Inc., June 11, 2014.

Figure 14 - Water Infrastructure Map



South Cooper Mountain Future Water System

Legend

- | | | | |
|--|--|---|---|
| <p>Reservoirs</p> <ul style="list-style-type: none"> Beaverton, In service TVWD Pump Station Potential Reservoir Site Zone* | <p>ASR Wells</p> <ul style="list-style-type: none"> Beaverton, Drilled not producing JWC, In service TVWD, In service TVWD, Planned | <p>Existing Waterlines</p> <ul style="list-style-type: none"> CoB Water Main TVWD Waterline Potential non-potable* <p>New Waterlines</p> <ul style="list-style-type: none"> Under construction (Local) Planned (Local)* | <p>Future Pressure Zones</p> <ul style="list-style-type: none"> 550 ft elevation 750 ft elevation CoB Supply Zone TVWD Supply Zone South Cooper Mountain Study Area Streams Arterials New Arterial New Collector |
|--|--|---|---|

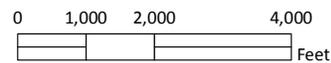
* Locations of planned facilities are conceptual only.

Prepared By: David Evans and Associates, Inc.

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl

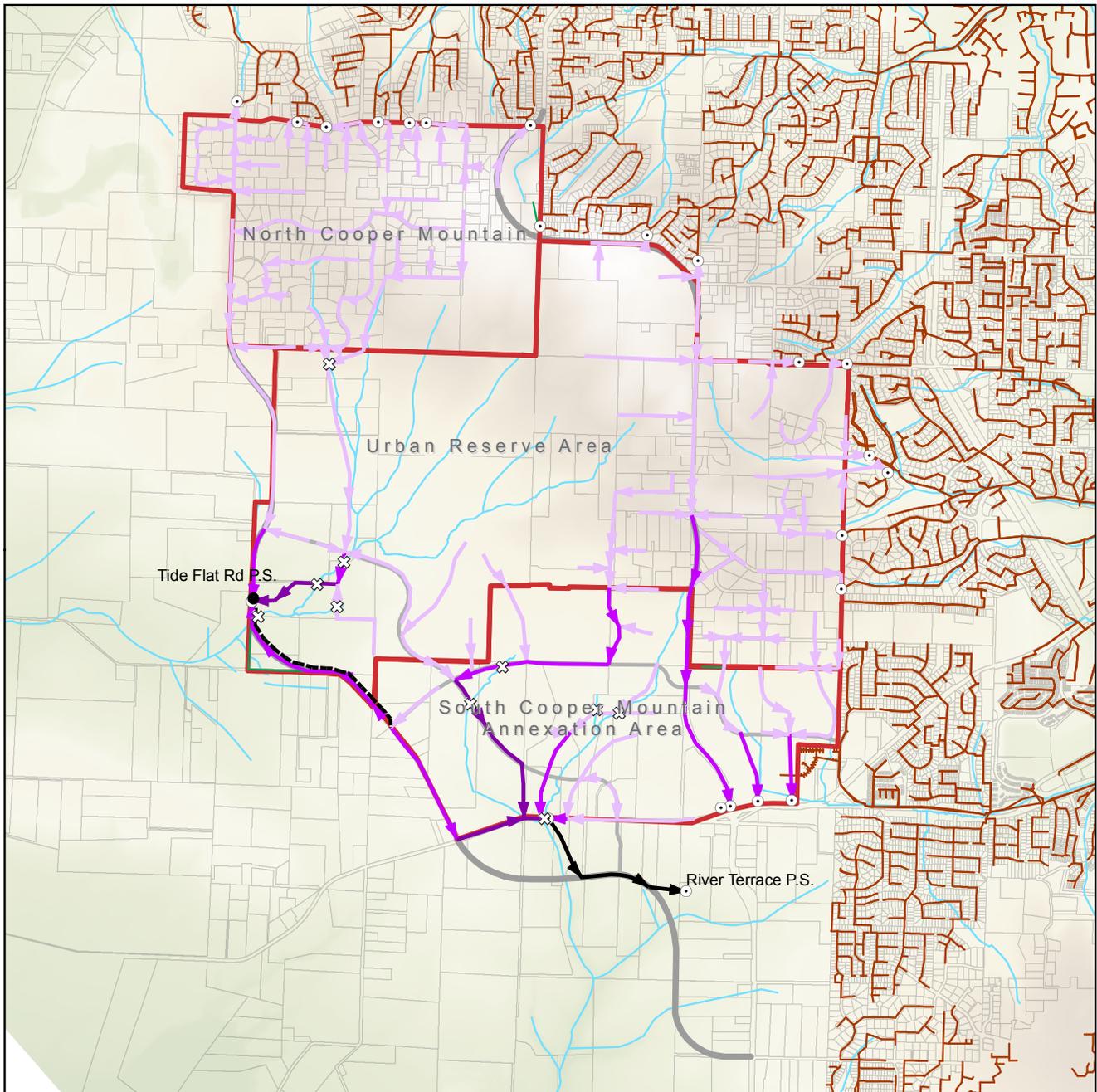
DISCLAIMER

This map is intended for informational purposes only. It is not intended for legal, engineering, or surveying purposes. While this map represents the best data available at the time of publication, the City of Beaverton makes no claims, representations, or warranties as to its accuracy or completeness. Metadata available upon request.



Date: 6/11/2014

Figure 15 - Sanitary Sewer Map



South Cooper Mountain Sanitary Sewers

Proposed Pipe Location and Diameter

- Force Main
- 8-inch
- 12-inch
- 15-inch
- 18-inch

Prepared By: David Evans and Associates, Inc.

- Point of Connection
- ⊗ Stream Crossing
- Existing Stream
- New Arterial
- New Collector

- Existing Sanitary Sewer
- ▭ South Cooper Mountain Study Area
- ▭ Washington County Taxlot

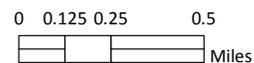
Note: All sewer lines are conceptual and are subject to zoning authority and permits.

Date: 6/11/2014

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl

DISCLAIMER

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Sewer lines outside of Community Plan area are also conceptual and shown only for context and to inform future planning in the area.

Storm water

Conceptual storm water management planning was conducted during scenarios phase of the Concept Plan. The work identified: (1) A preference by the City of Beaverton and Clean Water Services (CWS) for an approach that uses Regional Stormwater Facilities (RSFs); (2) Recognition that there are challenges to implementing RSFs, and flexibility is needed to apply site-scale storm water management instead of, or in combination with, RSFs; and (3) Changing water quality regulations may merit further planning for South Cooper Mountain. The description below summarizes elements of the work that was prepared for the Concept Plan.¹⁷

The preferred approach for implementing Overarching Principles 3 (sustainability), 4 (funding plan), and 7 (natural resources) is to plan for large scale dry detention ponds, termed Regional Stormwater Facilities (RSFs) by CWS, in order to manage peak runoff rates to avoid downstream impacts. This approach is preferred because it is consistent with planning in other new areas added to the Urban Growth Boundary; it provides planned, comprehensive flow control in a cost-effective manner; and, it provides the highest level of certainty of meeting the flow management guidelines being established by CWS. In addition, RSFs will meet water quality requirements (capture and treatment of stormwater pollutants) as well as preserving the stream health of the receiving channel by avoiding hydrographic modification.

It should be noted that RSFs require a high level of coordinated implementation. Options should be available so that there is some flexibility as how to design and construct facilities to serve individual properties prior to regional facilities being available.



¹⁷ For the scenario level evaluation, please see *Stormwater and Water Quality Scenario Summary*, David Evans and Associates, December 19, 2014.

Implementation Measures



Making it Happen

GUIDANCE TO FUTURE PLANNING

The SCM Concept Plan will guide future comprehensive plan and development code amendments that implement the Concept Plan in both the City of Beaverton and in Washington County. Detailed next steps for this process are identified in the South Cooper Mountain Implementation Plan, a non-regulatory document intended to inform and guide city, county, and service provider collaboration and coordination on plan implementation over the next several years. The Implementation Plan is included in Appendix B.

GOVERNANCE AND URBAN SERVICES

As required under Metro’s Title 11, areas of the SCM URA that are added to the UGB must be annexed to a city prior to or simultaneously with application of urban land use designations. The City of Beaverton will be the city responsible for annexations of and comprehensive planning for UGB expansion areas within the SCM URA. This will be identified in a Memorandum of Understanding (MOU) between the City and the County.

Urban services will be provided to those areas of the SCM URA that are brought into the UGB by the City of Beaverton in coordination with service providers including THPRD for parks, CWS for sanitary sewer and stormwater management, and TVWD for drinking water. MOUs identifying the specific responsibilities for service provision with each of the relevant agencies will be written after the adoption of this concept plan.

FUTURE URBAN GROWTH BOUNDARY EXPANSIONS

Metro is responsible for managing the Portland metropolitan area’s UGB. Oregon law requires the Metro Council to study the capacity of the existing UGB every five years to determine whether it can accommodate the population and employment growth that is forecast for the next 20 years. If the existing UGB provides sufficient capacity to accommodate the growth that is forecast for the next 20 years, no UGB expansion is needed. If the existing UGB does not have sufficient capacity to accommodate the 20-year growth that is forecast, the Metro Council will first work with local governments to determine whether steps can be taken to enhance the efficiency of land inside the existing boundary to accommodate more growth. If, after these efficiency measures are taken, there remains a need for additional capacity within the boundary to meet the forecast growth, the Metro Council will consider boundary expansions. Urban reserve lands will be the first lands studied and considered for possible expansion.¹⁸

While Metro Council is responsible for decisions regarding future UGB expansions, local governments play an important role in advocating for inclusion of specific candidate expansion areas. Given this role, the City of Beaverton and Washington County will coordinate with Washington County and service providers in considering support for areas within the SCM Urban Reserve Area for future expansion. The city will consider the following:

18 Metro, “Urban Growth Boundary,” <http://www.oregonmetro.gov/urban-growth-boundary>, accessed 8/25/14.

- adjacency to city limits;
- ease and cost of extending infrastructure, as described in this Concept Plan or in future refinement plans;
- ability to provide needed housing consistent with the land uses and housing described in the Concept Plan;
- ability to logically extend from and provide connections to existing neighborhoods, including the SCM Annexation Area;
- ability to build complete, sustainable communities with active transportation options;
- land needed to provide road or trail connections or improvements; and
- property owner commitment to natural resource protection, including preservation of upland habitat.

This understanding will be captured in a MOU between the City and the County.

INFRASTRUCTURE FUNDING

The South Cooper Mountain Infrastructure Funding Plan describes a plan and strategy for how infrastructure in the South Cooper Mountain area could be funded. Metro Title 11 Functional Plan requirements that state, for areas added to the Urban Growth Boundary, that “Comprehensive plan provisions for the area shall include... provision for the financing of local and state public facilities and services.” Areas within Urban Reserves are required by Title 11 to provide more generalized information in concept plans, including: “...Preliminary estimates of the costs of the systems and facilities in sufficient detail to determine feasibility and allow comparisons to other areas; and... Proposed methods to finance systems and facilities.” In addition to meeting these regulatory requirements, the analysis is intended to serve several practical purposes. First, it fulfills the projects guiding principle to “Prepare a realistic financing plan for infrastructure and feasible implementation strategies.” The analysis also informed selection of the final preferred land use and transportation scenarios.

The document is intended to identify the types of infrastructure projects that appear to have adequate funding from existing sources, and the types of infrastructure projects that appear to require new funding tools and inter-jurisdictional collaboration. The Funding Plan lays out the estimated funding needs and strategies to meet them for parks, water, sanitary sewer, stormwater, and transportation facilities. The Funding Plan was developed in collaboration with the South Cooper Mountain Finance Task Force and city staff. The Funding Plan will guide future public and private investments in infrastructure and future collaborations and coordination among service providers to extend and enhance the infrastructure and services needed to support urban growth in South Cooper Mountain.



Beaverton

South Cooper Mountain

The Region's Next Great Community

APPENDICES

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Appendix A: Acknowledgements

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Beaverton City Council

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Beaverton Planning Commission

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Ed Chadwick, Bierly Family properties, SCM
Kathy Cobb, Urban Reserve Area property owner
John Cooper, Urban Reserve Area property owner
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Appendix B: Implementation Plan

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South Cooper Mountain Concept & Community Plans

Implementation Plan November 26, 2014

Introduction

Background

This Implementation Plan is a companion document to the South Cooper Mountain Concept Plan. The purpose of the South Cooper Mountain (SCM) Concept Plan is to:

1. Establish a vision for future growth, natural resource preservation and enhancement, and development in the 2,300-acre planning area of South Cooper Mountain;
2. Guide city and county comprehensive planning in the Urban Growth Boundary expansion areas.

The SCM Concept Plan area covers nearly 2,300 acres of land intended for future urban development over the next 50 years: two subareas inside the Urban Growth Boundary (UGB) and one subarea area that is designated as Urban Reserve. The 544-acre South Cooper Mountain Annexation Area (SCMAA) was added to the UGB in 2011 and annexed to the City of Beaverton in 2013. The largely developed 510-acre North Cooper Mountain (NCM) area in unincorporated Washington County was added to the UGB in 2002 but a concept plan was never adopted for that area. The 1,232-acre Urban Reserve area (URA) between North Cooper Mountain and the South Cooper Mountain Annexation Area was designated by Washington County and Metro in 2011 as part of a comprehensive analysis of lands outside the UGB to identify priority locations for future urban lands and areas for long term resource and rural land use.

Purpose of the Implementation Plan

This Implementation Plan:

1. **Provides a comprehensive to-do list** of implementing actions planned occur after the adoption of the Concept Plan and SCM Community Plan.
2. **Provides project sheets describing each of the implementing actions:** what they are, who has lead responsibility, and implementation steps and schedule.
3. **Summarizes the infrastructure plans and next steps** for the Concept Plan area.
4. **Summarizes the infrastructure funding plan and next steps** for the Concept Plan area.
5. **Describes the intended governance** for South Cooper Mountain.

The Implementation Plan is applicable to the entire 2,300-acre South Cooper Mountain planning area. Accordingly, it references actions by the City of Beaverton and other implementation partners: Washington County, Clean Water Services, Tualatin Hills Park and Recreation District, and others.

Timeframe and Organization of the Implementation Plan

The Implementation Plan has a short term focus – those implementation projects that will occur over the next one to three years. A few implementation actions have a longer term focus. The Implementation Plan should be updated as the area develops and additions are considered to the UGB. A review cycle of every three years is recommended, with on-going monitoring.

For the City of Beaverton, the starting point for this Implementation Plan is after the acknowledgement and adoption of the initial documents by the City of Beaverton, which include:

- The South Cooper Mountain Concept Plan and Infrastructure Funding Plan
- The South Cooper Mountain Community Plan
- Amendments to the Beaverton Transportation System Plan
- Amendments to other chapters of the Beaverton Comprehensive Plan
- Amendments to the Beaverton Development Code and Zoning Map

For Washington County, the starting point for this Implementation Plan is after the acknowledgement of the initial documents by Washington County, which include:

- The South Cooper Mountain Concept Plan and Infrastructure Funding Plan

Implementation Plan Actions

Overview

This plan provides a comprehensive to-do list for early years of implementation of the Concept Plan. Table 1 listed the actions that are included in this plan. As used here, an “action” is the term used to describe the individual implementation efforts. The types of actions addressed by this plan include:

- Comprehensive plan and code amendments
- Infrastructure planning and implementation
- Intergovernmental coordination and agreements
- Natural resource planning

The Implementation Plan does not include projects that have already been initiated and are currently in various planning stages, such as the new water reservoir for South Cooper Mountain and River Terrace pump station. It also does not include some efforts that will be on-going, such as refining specific alignments for the first water and sewer lines to serve the annexation area.

Table 1. South Cooper Mountain Implementation Plan Actions

#	Action	Lead Sponsor	Timeframe
1	Beaverton code amendments to implement Community Plan policies	Beaverton Community Development	Dec 2014 – May 2015
2	North Cooper Mountain comprehensive plan and code amendments	Washington County Department of Land Use and Transportation	Fall, 2014 – Fall, 2015
3	Washington County TSP amendments	Washington County Department of Land Use and Transportation	Fall, 2014 – Fall, 2015
4	175 th Avenue “kink” realignment – Phase 1	Beaverton Public Works and Washington County Department of Land Use and Transportation	Spring 2015 – Fall 2017
5	Loon Drive connection study and right of way acquisition	City of Beaverton Public Works	Spring 2015 – Fall 2017
6	SCM Annexation Area Storm Water Master Plan	City of Beaverton Public Works	March 2015 – Summer 2016
7	Update of Public Facility Plans	Beaverton Community Development	Spring 2015 – Summer 2015
8	Memorandum of understanding for concept plan implementation and coordinated services provision	Beaverton Community Development	Spring 2015 – Summer 2015
9	SCM Special Transportation System Development Charge	Beaverton Finance Department	Fall 2014 – May 2015
10	Administration of SCM TDT funds	Beaverton Finance	Fall 2014 – Spring 2015
11	Urban Reserve Area Tree Protection Study	Washington County Department of Land Use and Transportation and Beaverton Community Development	Summer 2015 to Summer 2016
12	Urban Forestry Study	Beaverton Community Development	Summer 2015 to Winter 2016
13	Trails Planning and Trail Standards Coordination	Beaverton Community Development	Fall 2014 – Summer 2015

Project Sheets

Each action in Table 1 is supported by a project sheet that provides the project description, lead sponsor, rationale, implementation steps and schedule, public outreach, partners and roles, estimated costs, and funding sources or notes. The content of the project sheets is intended to be guiding, flexible and outcome-oriented; recognizing that actual actions will evolve as they are conducted. Also, the estimated costs and funding sources are initial estimates and very general; many are “to be determined”.



#1

Planned Unit Development Code Amendments

Project Description		Lead/Sponsor Organization
Adoption of amendments to the Beaverton Development Code to implement SCM Community Plan policies as related to Planned Unit Development (60.35) requirements. The Development Code will be reviewed with the perspective of developing modifications that will implement policy objectives in line with SCM and City-wide policies. (Note: other code amendments to implement the SCM Community Plan will be adopted as part of the adoption package for the SCM Community Plan.)		City of Beaverton Community Development Department
Rationale		
Amendments to the Planned Unit Development code are needed to implement the policies in the SCM Community Plan, to ensure that future development is consistent with the vision and goals of the plan.		
Implementation steps and schedule	<ol style="list-style-type: none"> 1. Prepare draft code amendments – December 2014 to February 2015 2. Work sessions with Planning Commission – March, 2015 3. Hearings and adoption – April - May, 2015 	
Public outreach	Focus groups or other outreach to developers during drafting of code amendments. Standard notice and public hearings for adoption, including email notice to all interested parties from the SCM Concept & Community Plan process.	
Partners and roles		
Legal department for review of modifications to the Planned Development code and whether any new standards for housing meet legal requirements for clear and objective regulation of needed housing, that trail dedication requirements meet nexus and proportionality standards, etc.		
Estimated Cost	Funding Sources	
\$ NA	Staff time	



2

NORTH COOPER MOUNTAIN COMPREHENSIVE PLAN AND CODE AMENDMENTS

Project Description		Lead/Sponsor Organization
<p>This action will create and adopt amendments to the County Comprehensive Framework Plan and Aloha-Reedville-Cooper Mountain Community Plan to implement recommendations of the Cooper Mountain Concept Plan specific to North Cooper Mountain. It will also create and adopt amendments to the County Development Code to establish the R-1 CM district.</p>		<p>Washington County Department of Land Use and Transportation</p>
Rationale		
<p>This action implements the recommendations for the North Cooper Mountain Area that were developed during, and acknowledged as part of, the South Cooper Mountain Concept Plan. It completes the work and extensive community dialogue that was undertaken during the Concept Plan process.</p>		
Implementation steps and schedule	<ol style="list-style-type: none"> 1. Community outreach (see below) – ongoing starting Fall, 2014 <ul style="list-style-type: none"> • North Cooper Mountain Open House – October 29, 2014. 2. Prepare draft amendments – Winter 2014-15 3. Work sessions with County Planning Commission and Board of County Commissioners – Spring/Summer, 2015 4. Hearings and adoption – By October 31, 2015 	
Public outreach	<p>Examples: open house, web site information, digital and hard copy mailings prior to public outreach, and required notification of ordinance hearings. Outreach to NCM was extensive during the Concept Plan planning process. This action will continue the practice of providing on-going information for NCM residents. A primary point of contact at the County should be designated and communicated on the City and County web pages.</p>	
Partners and roles		
<p>City of Beaverton – The City should keep its SCM web page up- to-date with information and links to Washington County’s web page and contacts. Washington County – the County will create and keep up-to-date a North Cooper Mountain webpage with appropriate topic headers and links. Cross-links to the City’s South Cooper website shall be updated as needed.</p>		
Estimated Cost	Funding Sources	
\$ NA	Staff time	



3

WASHINGTON COUNTY TRANSPORTATION SYSTEM PLAN UPDATE

Project Description		Lead/Sponsor Organization
This action will create and adopt amendments to the Washington County Transportation System Plan (TSP) to implement the South Cooper Mountain Concept Plan.		Washington County Department of Land Use and Transportation
Rationale		
This action is needed to update the County TSP so it is consistent with, and implements, transportation-related recommendations from the SCM Concept Plan. The updates will solidify the extensive City-County coordination which occurred related to transportation facilities and funding. The updated TSP will set the stage for coordinated project planning and delivery in the future.		
Implementation steps and schedule	<ol style="list-style-type: none"> 1. Include TSP information in public information posted regarding North Cooper Mountain (NCM) plan and code amendments - ongoing 2. Prepare draft amendments – Winter, 2015 3. Work sessions with County Planning Commission and Board of County Commissioners – Spring, 2015 4. Hearings and adoption – By October 31, 2015 <p>TSP amendments must be completed by the end of the 2015 County “ordinance season”, or held over to the next year.</p>	
Public outreach	See above. Outreach was extensive during the Concept Plan. This action will continue the practice of providing on-going information for NCM and Urban Reserve Area residents. A primary point of contact at the County should be designated and communicated on the City and County web pages.	
Partners and roles		
City of Beaverton – The City should keep its SCM web page up to date with information and links to Washington County’s web page and contacts.		
Estimated Cost	Funding Sources	
\$ NA	Staff time	



#4

175th AVENUE "KINK" – PHASE 1

Project Description	Lead/Sponsor Organization
<p>This action will conduct the preliminary design and coordination work needed for the realignment of 175th Avenue between Outlook Lane and Cooper Mountain Lane (3-lane County arterial, actual cross-section tbd). Phase 1 is a first step of a multi-year process to design the project and work with property owners in the area – leading to project construction by 2025. The land is currently outside the Urban Growth Boundary (UGB) and therefore will initially be improved to County rural arterial standards if it remains outside the UGB at time of construction.</p>	<p>A Partnership of:</p> <p>City of Beaverton Public Works</p> <p>Washington County Department of Land Use and Transportation</p>
Rationale	
<p>This project was identified in the SCM Infrastructure Funding Plan as one of the 0-10 year priorities. It is needed to correct steep grades and the sharp turn at the “kink”, and bring this section of 175th Avenue into compliance with adopted standards for a 3 lane arterial. Due to the adjacency to the UGB and near-term development in the Community Plan area, it is a high priority project to initiate. It is particularly important that this project be conducted with on-going outreach and communication with affected property owners.</p>	
Implementation steps and schedule	<p>The following steps are preliminary. At County request, no dates have been included.</p> <ol style="list-style-type: none"> 1. Establish partnership agreement and approach to the project, and verify staff resources. 2. Establish staff leadership for the project, including an engineering manager and public outreach planner within the partner agencies. 3. Prepare a project schedule and outreach program. 4. Obtain survey information and base mapping.. 5. Prepare a preliminary design and cost estimate. 6. Prepare updated funding plan. <p>Notes:</p> <ol style="list-style-type: none"> a. Phase 1 will conclude with a preliminary design. Future phases will include: Phase 2 – Commitment of project funds; Phase 3 - right-of-way acquisition; Phase 3 – Final design and construction.
Public outreach	<p>Effective, open and on-going public outreach is essential to this project. As noted above, a public outreach program should be prepared as part of Phase 1. At a minimum: information should be available on the City’s web site; a point of contact (i.e. public outreach planner) for the public should established; and a pro-active approach to public information and communication with property owners should be</p>

	established.
Partners and roles	
Key partners: City of Beaverton Public Works, City of Beaverton Community Development, Washington County Department of Land Use and Transportation.	
Estimated Cost	Funding Notes
\$ 40-50,000	Costs are for survey and consultant assistance. Potential funding is the SCM transportation SCD and/or dedicated TDT funds for Phase 1.



5

LOON DRIVE CONNECTION STUDY AND RIGHT-OF-WAY ACQUISITION

Project Description	Lead/Sponsor Organization
<p>This action will conduct preliminary design, coordination and right-of-way acquisition needed to implement the connection of the SCM East-West Collector road to Loon Drive.</p> <p>Note: This action is contingent on the Loon Drive connection being included in the approved SCM Community Plan.</p>	<p>City of Beaverton Public Works, Engineering</p>
Rationale	
<p>The East-West Collector is an important street within the SCM Transportation Framework. It provides a continuous parallel route to Scholls Ferry Road, connects existing and future neighborhoods, provides a safe route to multiple schools, connects SCM to the existing signal at the Barrows Road intersection, and enhances emergency access to the area. The SCM Community Plan identifies a conceptual connection point and acknowledges that more detailed and site-specific work is needed. This action is needed to conduct that work and ensure that the connection can be made when development occurs in the future. Three specific elements include:</p> <ol style="list-style-type: none"> a. The connection point at Loon Drive is in private ownership and needs to be acquired or donated as public right-of-way in order to implement the concept for the street. b. The segment of Loon Drive north from Scholls Ferry Road needs to be studied for a potential redesign to prioritize the traffic flow to the E-W collector, and reduce flow to the north on Loon Drive. c. Local street connections need to be evaluated. <p>Public outreach will be very important so that residents in the area can track the work and have opportunity to comment on working recommendations.</p>	
Implementation steps and schedule	<p>Note: the following steps and schedule assume a City lead on this project. The steps and schedule may be different if the developer of the SCM property to the west takes the lead.</p> <ol style="list-style-type: none"> 1. Establish staff leadership for the project, including an engineering manager and public outreach planner – Spring 2016. 2. Prepare a project schedule and outreach program – Spring 2015. 3. Obtain survey information and base mapping – Summer 2016. 4. Prepare a preliminary design (may be alternatives), traffic analysis, and cost estimate. Identify funding – by Fall 2016 5. Select an alternative and determine whether amendments to the City TSP and/or Community Plan are needed to implement the plan – by Spring 2017 6. Obtain right-of-way – 2017-18.

Public outreach	As noted above, a public outreach program should be prepared as part of Phase 1. At a minimum: information should be available on the City's web site; a point of contact (i.e. public outreach planner) for the public should be established; and a proactive approach to public information and communication with property owners and neighbors should be established.
Partners and roles	
Key partners: City of Beaverton Public Works, City of Beaverton Community Development	
Estimated Cost	Funding Sources
Steps 3 and 4 - \$15-20,000 Step 6 - tbd	tbd



6

SOUTH COOPER MOUNTIAN STORM WATER PLAN

Project Description		Lead/Sponsor Organization
<p>This action will describe the surface water runoff management (stormwater runoff) approach for the 544-acre SCM Annexation Area.</p> <p>Note: The action assumes the City will communicate the approach prior to accepting and processing land use applications.</p>		City of Beaverton Public Works
Rationale		
<p>Given that:</p> <ol style="list-style-type: none"> 1. Surface water runoff conveyance already occurs within the planning area. 2. Future development proposals will be filed for properties that are, for the most part, larger than 10 acres in size and their development effectively results in sub-regional approach(s) for surface water runoff management. 3. There is no enforceable legal mandate to make any changes to the current surface water runoff management (stormwater runoff) design criteria. <p>Surface water runoff management for the South Cooper Mountain area will be addressed by way of amendments to the Beaverton's Engineering Design Manual (EDM). A potential approach is expected to empower the private engineering community to use their creativity to craft a surface water runoff system design that fits well with marketable residential and commercial products as well as with the SCM annexation area ecosystem.</p> <p>As for the future expansion areas, it is envisioned that an urban Washington County approach using a continuous simulation hydrologic modeling will be in effect and mandated for use by the time these area annex to a city.</p>		
Implementation steps and schedule	<ol style="list-style-type: none"> 1. Draft proposed modifications to Chapter 3 of the Beaverton Engineering Design Manual that communicates an approach surface water runoff management approach for the 544-acre SCM Annexation Area - by October, 2014. 2. Technical Meeting with internal and external partners to discuss the engineering feasibility of the approach and anticipated results - by November, 2014. 3. Stakeholder meeting to present the proposed modification to the EDM for additional input and consideration - by December, 2014. 4. Adopt modifications to the EDM with public notice - by January, 2015. 	
Public outreach	Partner and Stakeholder meeting as described in implementation steps	
Partners and roles		
<p>Internal partners: Beaverton Community Development</p> <p>External partners: property owners, developers, civil engineering consultants,</p> <p>Stakeholders (initial list): Clean Water Services, City of Tigard, Tualatin Hills Park and Recreation District,</p>		

Tualatin Riverkeepers	
Estimated Cost	Funding Notes
\$ 10,000	Staff time



7

UPDATE OF PUBLIC FACILITY PLANS

Project Description		Lead/Sponsor Organization
This action will create and adopt amendments to the City's Public Facility Plans that are needed to implement the South Cooper Mountain Community Plan.		City of Beaverton Community Development Department
Rationale		
<p>OAR 660-011, the Public Facilities Planning rule, requires that cities adopt public facility plans (PFPs) as support documents to their Comprehensive Plans. The purpose of a PFP is to “help assure that urban development in ... urban growth boundaries is guided and supported by types and levels of urban facilities and services appropriate for the needs and requirements of the urban areas to be serviced, and those facilities and services are provided in a timely, orderly and efficient arrangement, as required by Goal 11.”¹ The City currently fulfills this requirement by referencing, in the Comprehensive Plan, other master plans such as the Water Master Plan. This action is needed as a “housekeeping” item to ensure that all references are up to date, and, the master plans themselves are fully consistent with the South Cooper Mountain Community Plan.</p>		
Implementation steps and schedule	<ol style="list-style-type: none"> 1. Review the Comprehensive Plan and Master Plans. Identify needed amendments – Spring, 2015. 2. Draft amendments, conduct hearings, and adopt amendments – Summer, 2015. 	
Public outreach	None.	
Partners and roles		
Internal partners – Beaverton Public Works Department		
Estimated Cost	Funding Sources	
\$ NA	Staff time	

¹ OAR 660-011-0000



8

**MEMORANDUM OF UNDERSTANDING
FOR CONCEPT PLAN
IMPLEMENTATION AND
COORDINATED SERVICES PROVISION**

Project Description		Lead/Sponsor Organization
<p>This action will create and adopt a Memorandum of Understanding (MOU) for the implementation of the Concept Plan and coordination of services by multiple service providers. The MOU will establish that the City and service providers will use the South Cooper Mountain Concept Plan (which includes the Infrastructure Funding Plan) as the framework for on-going planning and implementation of the following services: water, sanitary sewer, storm water, transportation, parks, schools, and fire and emergency services. Note: This is the “umbrella” MOU. Additional topic-specific MOUs and/or intergovernmental agreements (IGAs) may be created for individual service providers or projects.</p>		<p>City of Beaverton, Community Development Department</p>
Rationale		
<p>This action is needed to coordinate the planning and projects provided by multiple service providers in the 2,300-acre area, over many years. Each service provider will be able to use a common vision, policy base, land use assumptions, and infrastructure framework to deliver services and work together. Over the long term, the MOU will help implement the Concept Plan and save all parties time, resources and public investment through the collective benefits of coordinated implementation.</p>		
Implementation steps and schedule	<ol style="list-style-type: none"> 1. Draft the MOU. Existing service provider agreements will be reviewed, and updated if needed, to ensure they are up to date and consistent with the MOU – Spring, 2015. 2. Circulate the MOU for agency input – Spring, 2015. 3. Finalize the MOU and request approval by each of the partner jurisdictions – Summer, 2015. 	
Public outreach	<p>Post information regarding the MOU on the project web site.</p>	

Partners and roles	
Governmental partners: Washington County – land use and transportation City of Tigard – land use, transportation, infrastructure Districts: Tualatin Hills Park and Recreation District – parks, natural resources, trails Tualatin Valley Fire and Rescue – emergency services Tualatin Valley Water District – water infrastructure Clean Water Services – sanitary sewer and storm water infrastructure Beaverton School District – schools Hillsboro School District - schools	
Estimated Cost	Funding Sources
\$ NA	Staff time



9

SCM SPECIAL TRANSPORTATION SYSTEM DEVELOPMENT CHARGE

Project Description		Lead/Sponsor Organization
Creation and adoption of a Special Transportation System Development Charge (SDC) to be applied within the South Cooper Mountain Annexation Area.		City of Beaverton Finance Department
Rationale		
This action implements the recommendations from the South Cooper Mountain Infrastructure Funding Plan. Analysis of revenues and costs in the funding plan identified a gap in revenues to cover estimated project costs. The Special Transportation System Development Charge is one of several strategies to fill the gap in needed transportation funding. Initially estimated at generating over \$15,000,000 (at full build out), it is an essential funding source for the area.		
Implementation steps and schedule	<ol style="list-style-type: none"> 1. Obtain legal advice on steps required by state law and City ordinance – by Fall, 2014. 2. Calculate rate, prepare required documentation and draft ordinance. This step will identify internal administration/accounting procedures required for the SDC funds – February, 2015. 3. Provide working draft of ordinance to members of the SCM Finance Task Force for a comment period and provide informational notice of the SDC to property owners within the annexation area – March, 2015. 4. Hold work session with City Council – April, 2015. 5. Prepare hearings draft of ordinance, notice, conduct adoption hearing, and adopt SCD – May, 2015. 	
Public outreach	See Step 3 above. Developers and the Finance Task Force will continue to be directly involved in creating the Special SCD strategy. Also, the City has worked closely with property owners throughout the SCM process. This outreach is intended to continue the close coordination that has occurred during planning.	
Partners and roles		
Internal partners: Community Development Department, Public Works Department, City Attorney.		
External: Washington County Department of Land Use and Transportation.		
Estimated Cost	Funding Sources	
\$ NA	Staff time	



10

ADMINISTRATION OF SCM TDT FUNDS

Project Description		Lead/Sponsor Organization
<p>This action will establish the administrative and accounting mechanism for the “dedication” of Transportation Development Tax (TDT) funds from SCM to projects in the SCM area, as described in the SCM Infrastructure Funding Plan.</p>		<p>City of Beaverton Finance Department</p>
Rationale		
<p>This action implements the recommendations from the South Cooper Mountain Infrastructure Funding Plan. Analysis of revenues and costs in the funding plan identified a gap in revenues to cover estimated project costs. The “dedication” of funds from Transportation Development Tax funds to projects in the SCM area is one of several strategies to fill the gap in needed transportation funding. It is an essential funding source for the area.</p>		
Implementation steps and schedule	<ol style="list-style-type: none"> 1. Obtain legal advice on steps required by state law and City ordinance – by Fall, 2014. 2. Calculate rate, prepare required documentation and draft ordinance. This step will identify internal administration/accounting procedures required for the SDC funds – February, 2015. 3. Provide working draft of ordinance to members of the SCM Finance Task Force for a comment period and provide informational notice of the SDC to property owners within the annexation area – March, 2015. 4. Hold work session with City Council – April, 2015. 5. Prepare hearings draft of ordinance, notice, conduct adoption hearing, and adopt SCD – May, 2015. 	
Public outreach	<p>None required.</p>	
Partners and roles		
<p>NA</p>		
Estimated Cost	Funding Sources	
<p>\$ NA</p>	<p>Staff time</p>	



11

Urban Reserve Area Tree Protection Study

Project Description		Lead/Sponsor Organization
Identify and evaluate options to require or incentivize tree protection within the SCM Urban Reserve Area (URA) prior to inclusion in the Urban Growth Boundary (UGB).		Washington County Land Use and Transportation Department
Rationale		
<p>Tree preservation was identified as a priority by many participants in the SCM Concept and Community Plan process, especially for newly urbanizing areas. Concerns were raised about logging within the SCM Annexation Area after its addition to the UGB, and many expressed a desire to prevent the same from happening with any future UGB expansions into the SCM URA. With the Cooper Mountain Nature Park and adjacent high quality upland habitat on private land, protection of upland resources is a high priority for this area. In addition, Metro's IGA with Washington County for Urban and Rural Reserves identifies principles for concept planning of Urban Reserves that include offering "appropriate protection and enhancement to the public lands and natural features that are located throughout the area".</p>		
Implementation steps and schedule	Beaverton makes formal request to the County Board of Commissioners to add this to the Department of Land Use and Transportation Long Range Planning 2015-16 Work Program.	
Public outreach	Formation of a working group or similar mechanism to bring together key partners and stakeholders is recommended. Additional public outreach should include web-based information for ease of access by the general public and stakeholder groups.	
Partners and roles		
<p>Internal partners: Washington County Counsel External partners: Oregon Department of Forestry, City of Beaverton, Metro, Clean Water Services, Tualatin Hills Park and Recreation District Stakeholders (initial list): Tualatin Riverkeepers, Tualatin River Watershed Council, Friends of Trees, property owners, developers</p>		
Estimated Cost	Funding Sources	
\$ NA	Staff time	



#12

Urban Forestry Review

Project Description		Lead/Sponsor Organization
<p>Evaluate current urban forest conditions; review the city's existing regulations that relate to tree protection and planting; review natural resource policies and programs. Determine if there is a need to modify the current regulations; if so, work with stakeholders such as arborists, landscape architects, and developers and conduct outreach as needed.</p>		<p>City of Beaverton Community Development Department</p>
Rationale		
<p>Tree preservation was identified as a priority by many participants in the SCM Concept and Community Plan process, especially for newly urbanizing areas like SCM. Concerns were raised about logging within the SCM Annexation Area after its addition to the Urban Growth Boundary (UGB). In addition, Metro's Title 13 ("Nature in Neighborhoods") requires local jurisdictions to designate upland wildlife Class A and B habitat, mapped by Metro, as Habitat Conservation Areas when areas are brought within the UGB. The city's existing tree regulations and HBA program and LID techniques include protection, mitigation, and incentives for protection; however, further study of options is recommended.</p>		
Implementation steps and schedule	<ol style="list-style-type: none"> 1. Identify project approach, management structure, and generalized scope – Summer, 2015. 2. Review as described in the project description – Fall, 2015. 3. Complete review and draft recommendations – Fall, 2015. 4. Work sessions with Planning Commission and City Council, to determine if further Code amendments are needed – Fall 2015. 5. If determined to be needed, hearings and adoption for recommended plan and code amendments – Summer, 2016. 	
Public outreach	<p>To be determined based upon direction of City Council in the Fall of 2015.</p>	
Partners and roles		
<p>Internal partners: Beaverton Public Works Department and Sustainability Division External partners: Clean Water Services, Tualatin Hills Park and Recreation District, Oregon Department of Forestry Stakeholders (initial list): arborists, landscape architects, property owners, developers, Tualatin Riverkeepers, Tualatin River Watershed Council, Friends of Trees</p>		
Estimated Cost	Funding Notes	
<p>\$ NA</p>	<p>Staff time Funding for consultant services only if City Council directs staff to proceed with a larger study.</p>	



#13

Trails Planning and Trail Standards Coordination

Project Description		Lead/Sponsor Organization
Continue collaboration to refine trails planning for the SCM Urban Reserve Area and establish new or refined cross-sections as needed.		City of Beaverton Community Development Department
Rationale		
<p>Trails are an important component of the SCM Concept and Community Plans. Planning for trails within the planning area that connect to the Cooper Mountain Nature Park, surrounding neighborhoods, and the larger regional trail network is complex due to topography and existing development and ownership patterns. A Cooper Mountain Regional Trail that would run through the URA has been identified as a conceptual future trail connection by Tualatin Hills Park and Recreation District (THPRD) and Metro in past trails planning efforts; however, efforts to identify a suitable route for the trail as part of the SCM Concept Plan process have encountered challenges; additional work is needed to refine the proposed alignment of this important trail connection. In addition, the current standards for trails vary between jurisdictions which may pose issues for future addition of nature trails in the URA and trails adjacent to roads.</p>		
Implementation steps and schedule	<ol style="list-style-type: none"> 1. Stakeholder meeting with internal and external partners to discuss cross-section designs, right-of-way dedication, ownership, and maintenance responsibilities for trails – Winter 2015 2. Preparation of draft MOU(s) and amendments to as needed to reflect recommendations – Spring 2015 3. Circulate MOU(s) or EDM amendments or both for stakeholder and agency input – Spring 2015 4. Finalize MOU(s) and request approval by each of the partner jurisdictions and adopt modifications to the EDM with public notice – Summer 2015 5. Participate in THPRD Trails Plan update regarding potential regional trail connections within and adjacent to the SCM Concept Plan area – Spring/Summer 2015 	
Public outreach	Partner and Stakeholder meetings as described in implementation steps; post information on city's website.	
Partners and roles		
<p>Internal partners: Beaverton Public Works Department External partners: Tualatin Hills Park and Recreation District, Washington County Department of Land Use and Transportation, Metro Stakeholders (initial list): THRPD Trails Advisory Committee</p>		
Estimated Cost	Funding Notes	
\$ NA	Staff time	

Summary of Infrastructure Plans and Next Steps

As part of preparing a cohesive plan for the 2,300-acre Concept Plan area, the project team prepared infrastructure analyses and plans for the major infrastructure systems for the area: water, sanitary sewer, storm water, and transportation. The analyses included a review of existing conditions, projection of needs, evaluation of alternative scenarios, and preparation of a final concept-level infrastructure plan consistent with the preferred alternative land use scenario. In the case of storm water, the work concluded at the end of scenario evaluation that the storm water plan would be prepared as part of a subsequent storm water master planning effort. In all cases, the infrastructure plans were prepared in an iterative and integrated manner so that land use, transportation, natural resources, utilities and funding were all coordinated and planned together.

The infrastructure plans for South Cooper Mountain are summarized in the Concept Plan report. The technical memoranda are also attached as exhibits to this Implementation Plan. For further explanation and detail regarding the infrastructure plans, please refer to those documents.

The implementation of the infrastructure plans will occur through the many means, including the following:

1. *Implementation Plan actions* – The actions included in this Implementation Plan provide a to-do list of the key implementation actions needed in the early years of implementation. As described above, the actions span many different types of needs ranging from codes to agreements to specific project planning.
2. *Capital projects* – Specific capital projects will be planned individually, consistent with adopted Concept Plan and Community Plans. Examples include the South Cooper Water Reservoir and River Terrace Pump Station.
3. *Water and sewer specific area master planning* – Within the SCM Annexation Area, the Concept Plan's infrastructure plans provide the basic framework for water and sewer lines: "point A to B" alignments, key connection points, pipe sizes, and other facilities. Where appropriate, the City will initiate more localized water and sewer line master planning, so that the specific site conditions, more detailed engineering and alignment routing, and property owner coordination can occur. This work may, in some cases, also identify financing mechanisms such as local improvement districts that will serve specific projects and properties.
4. *Development review* – Within the SCM Annexation Area, development review of specific proposals will determine the "what, where, when and by whom" of infrastructure development, as guided by the Concept Plan. The Development Code, the Comprehensive Plan, inclusive of the adopted Community Plan, and the Engineering Design Manual will be the regulatory documents used to evaluate the needs and requirements for each of the specific proposals in order to establish the location of streets, intersections and access, trails, storm water facilities and other infrastructure improvements.

5. *On-going coordination with other projects* – South Cooper Mountain is at the nexus of two cities, the County, a regional park, regional and local transportation facilities, and the rural-urban interface. There will be many needs and opportunities for intergovernmental coordination. Examples include the Willamette Water Supply project, on-going coordination with the River Terrace Community Plan in Tigard, and the Washington County Transportation Study, just to name a few. The SCM Concept Plan will inform these efforts, and in turn, the projects will also inform the implementation of the Concept Plan.
6. *Monitoring and internal coordination by Beaverton's Core Implementation Team* – Beaverton created the Concept Plan and Community Plan through a core planning team that included expertise from community development, transportation, public works, finance, and legal. This in-house expertise and continuity will be invaluable to the implementation of the plan. The City's Core Implementation Team will provide the key staff to carry out this Implementation Plan.

Summary of Infrastructure Funding Plan and Next Steps

Process and Method

The Infrastructure Funding Plan was created through a collaborative process, involving the consultant team, City staff, representatives of local and regional governments and service providers responsible for building and maintaining infrastructure in the South Cooper Mountain (SCM) area, and private property owners and developers. Although this was an iterative process, the methods generally followed the following steps: review of land use scenarios and growth estimates; review of infrastructure analyses and identification of infrastructure projects to be included in the funding plan; estimation of revenues; identification of funding strategies in consultation with public and private partners²; preparation of an Early Funding Analysis so that funding strategies were known when the Preferred Concept Plan Scenario was selected; and preparation of the draft and final Infrastructure Funding Plan.

The analysis was conducted for each of the three constituent subareas of South Cooper Mountain: the South Cooper Mountain Annexation Area (SCMAA), North Cooper Mountain (NCM), and the Urban Reserve Area (URA).

The following is a very brief summary of how each of the infrastructure systems is likely to be built and funded. Details of costs and funding are provided in the Infrastructure Funding Plan.

² A series of interviews were conducted with private developers and public infrastructure providers to understand their perspectives on who should pay for infrastructure, through what sources, and what amounts. Additionally, a Finance Task Force was convened to bring these various public and private parties together to discuss these issues. The Finance Task Force meet five times between September 2013 and October, 2014. The Task Force meetings were supplemented by two developer focus group meetings and several meetings with Washington County regarding transportation funding.

Parks

Tualatin Hills Parks and Recreation District (THPRD) will be responsible for providing park infrastructure in South Cooper Mountain. Representatives of THPRD stated that Systems Development Charges (SDCs) are the only funding source that can be counted on for park projects in South Cooper Mountain.

Acquiring land for parks to serve will occur through two principle means: proactive site acquisition by THPRD and acquisition associated with development reviews. Co-location of parks with schools is special opportunity that is supported by the Concept Plan. Two new elementary schools will be needed in the annexation area.

The analysis of costs and revenues in the Funding Plan illustrates that SDC revenues are sufficient to cover costs, with one exception: funding of a community park in the Urban Reserve Area. The specific need for and cost of a community park is not specifically known. It will be influenced by other facilities (e.g. what is built at the High School, potential expansions at Winkleman Park, etc.), actual growth in the Urban Reserve, potential school-park co-locations throughout SCM, and, the specific program and intended service area that is developed should a community park be implemented. Therefore, the SCM Funding Plan carries a known gap for this one facility, with the recognition that a final need determination and funding strategy will need to be identified in the future.

Water

The City of Beaverton will be responsible for providing water service to the SCMAA and any areas within the Urban Reserve that are annexed to the City. The Tualatin Valley Water District currently provides water to the North Cooper Mountain area. For any new extensions with the TVWD district, the funding strategy assumes those are paid for by developing properties.

The City levies a SDC on new development to pay for the “public” share of water infrastructure costs. Private developers are also responsible for funding the “private” share of water infrastructure costs. Water infrastructure in South Cooper Mountain would be covered by these two sources. The public-private split of costs is determined by the demand from new development. Major capital projects will be initiated by the City or TVWD. Other more local water system improvements will be initiated through development projects.

Sanitary Sewer

The City of Beaverton has lead responsibility for providing sanitary sewer infrastructure for South Cooper Mountain. The City of Beaverton collects a SDC on new development to pay for the public portion of sanitary sewer infrastructure. The City has an intergovernmental agreement (IGA) with Clean Water Services (CWS) to provide sanitary sewer service, which results in ninety-six percent of this SDC being passed through to CWS. Private developers are also responsible for paying for a portion of sanitary sewer infrastructure, including all pipes 12-inches or less in diameter, and a portion of all pipes larger than 12-inches. Major capital projects will be initiated by the City or CWS. Other more local sewer system improvements will be initiated through development projects.

Storm Water

Unlike parks, water, and sanitary sewer, the costs for stormwater infrastructure are not typically covered by a SDC. Traditionally, detention facilities have been the responsibility of private developers, with individual developers building detention facilities onsite that are sufficient to manage the stormwater generated on that individual property. Under the traditional model, the cost of stormwater detention facilities would be excluded from a funding analysis like this.

Based on preliminary stormwater planning, Clean Water Services and the City of Beaverton have identified the use of regional stormwater facilities as the preferred approach for South Cooper Mountain. Regional facilities can offer several benefits compared to traditional onsite detention facilities in regards to meeting natural resource objectives. These facilities could be funded using either a new Regional Facility Fee (RFF), or a private reimbursement district. However, due to the challenges associated with regional facilities (see discussion below), more traditional site-scale facilities may be used in place of, or in combination with, regional facilities.

The Implementation Plan includes an action to prepare a Stormwater Master Plan for the annexation area to further explore storm water management options and identify the appropriate approach for the SCMAA. This plan is expected to address both the physical planning of facilities and an implementation strategy for funding stormwater facilities, regional or otherwise.

Transportation

Transportation infrastructure in the South Cooper Mountain area will largely be the responsibility of the County (and, to a lesser extent, the City) to build and maintain. County and City representatives participated in the Finance Task Force. Existing sources of funding for these types of City and County transportation infrastructure projects are essentially limited to developer funding, the Transportation Development Tax (TDT) and the Major Streets Transportation Improvement Program (MSTIP).

Based on input from the Finance Task Force and other key stakeholders, it was determined that these funding sources would also need to provide the bulk of the funding for the public share of transportation costs in South Cooper Mountain. However, these funding sources would be insufficient, requiring an additional funding mechanism, like a new site-specific SDC. Additionally, a sizable portion of project costs would be the responsibility of the private sector to fund directly. The Finance Task Force also directed the team to look not only at project costs versus revenues, but also what types of funds are appropriate for specific projects.

Through discussions with the Finance Task Force, developers, and Washington County, a four-part strategy was established for funding transportation projects on South Cooper Mountain:

1. **Set Priorities.** Transportation improvements were evaluated and segmented into which projects serve the annexation area versus other areas. They were then prioritized into time periods for implementation: 0-10 years; 10-20 years; and 20+ years.³
2. **Apply local TDT revenues to local projects.** This strategy assumes 80% of TDT generated from development in South Cooper Mountain will be used for transportation projects in the area.
3. **Generate new revenue through a SCM transportation SDC.** A SCM-specific special transportation SDC will be adopted to supplement other revenue sources. Revenues will be “dedicated” to transportation projects in the area.
4. **Identify projects of county-wide significance, and include limited amounts of MSTIP funds in their funding plans.** As a first step, a list of specific projects benefiting roads of countywide significance were identified. The list was then narrowed based on County input that MSTIP funds were limited and the City should reduce the amount of MSTIP assumed. The City revised the transportation funding responsibilities to decrease the proportion assumed from MSTIP and increase the proportion assumed from TDT dedication and the transportation SDC.

Based on the above strategies, the Infrastructure Funding Plan identifies funding sources for projects in each sub-area of SCM. Several follow-up implementation actions are needed:

- Completion of the calculation of the rate for the SCM transportation fee, and adoption of the SDC ordinance (see project sheet 11, SCM Transportation System Development Charge).
- City commitment to, and work on, the two specific transportation projects listed in the Action section of this plan (see project sheet 6, 175th Avenue “Kink” realignment phase 1 and project sheet 7, Loon Drive connection study and right-of-way acquisition). The 175th realignment project is one of the MSTIP funded projects (85% MSTIP, 15% local TDT), so the earlier next-step planning occurs, the more likely the project will be funded. The plan estimates it will take up to 10 years to complete preliminary design, finalization of the funding sources, and right-of-way acquisition.
- Continued discussion between Beaverton and other Washington County cities and the County regarding transportation funding.

³ Several projects were identified as not part of the SCM funding plan because they are far off-site and have been identified in previous plans (e.g. widening of 209th Avenue), or, are very far into the future (Project 7, Tile Flat extension to Roy Rogers Road).

Governance

As required under Metro's Title 11, areas of the SCM URA that are added to the UGB must be annexed to a city prior to or simultaneously with application of urban land use designations. The City of Beaverton will be the city responsible for annexations of and comprehensive planning for UGB expansion areas within the SCM URA. This will be identified in the Memorandum of Understanding (MOU) for Concept Plan Implementation and Coordinated Services Provision between the City and the County. The MOU is an action described in this Implementation Plan – please see the Implementation Plan Actions section. This City's role in governance of areas added to the UGB on South Cooper Mountain will also be implemented through a new land use policy and/or an amendment to the Special Policy section of the Urban Growth Management Agreement between Beaverton and Washington County.

Urban services will be provided to those areas of the SCM URA that are brought into the UGB by the City of Beaverton in coordination with service providers including THPRD for parks and trails, Washington County for transportation, CWS for sanitary sewer and stormwater management, and TVWD for drinking water.

Future Urban Growth Boundary Expansions

Metro is responsible for managing the Portland metropolitan area's UGB. Oregon law requires the Metro Council to study the capacity of the existing UGB every five years to determine whether it can accommodate the population and employment growth that is forecast for the next 20 years. If the existing UGB provides sufficient capacity to accommodate the growth that is forecast for the next 20 years, no UGB expansion is needed. If the existing UGB does not have sufficient capacity to accommodate the 20-year growth that is forecast, the Metro Council will first work with local governments to determine whether steps can be taken to enhance the efficiency of land inside the existing boundary to accommodate more growth. If, after these efficiency measures are taken, there remains a need for additional capacity within the boundary to meet the forecast growth, the Metro Council will consider boundary expansions. Urban reserve lands will be the first lands studied and considered for possible expansion.⁴

While Metro Council is responsible for decisions regarding future UGB expansions, local governments play an important role in advocating for inclusion of specific candidate expansion areas. Given this role, the City of Beaverton and Washington County will coordinate with service providers in considering support for areas within the SCM Urban Reserve Area for future expansion. The city will consider the following:

- adjacency to city limits;
- ease and cost of extending infrastructure, as described in this Concept Plan or in future refinement plans;

⁴ Metro, "Urban Growth Boundary," <http://www.oregonmetro.gov/urban-growth-boundary>, accessed 8/25/14.

- ability to provide needed housing consistent with the land uses and housing described in the Concept Plan;
- ability to logically extend from and provide connections to existing neighborhoods, including the SCM Annexation Area;
- ability to build complete, sustainable communities with active transportation options;
- land needed to provide road or trail connections or improvements; and
- property owner commitment to natural resource protection, including preservation of upland habitat.

This understanding will be captured in a MOU for Concept Plan Implementation and Coordinated Service Provision between the City and the County, which will be prepared subsequent to the adoption of this Concept Plan.

Exhibits

The following exhibits are attached to and a part of this implementation plan:

1. Water System Concept Plan – Summary Findings and Planning Level Cost Estimate, memorandum by David Evans and Associates, June 11, 2014.
2. Sanitary System Concept Plan – Summary Findings and Planning Level Cost Estimate, memorandum by David Evans and Associates, June 11, 2014.
3. Stormwater and Water Quality Scenario Summary, South Cooper Mountain and Community Plans, memorandum by David Evans and Associates, December 19, 2013.
4. Transportation Findings for Preferred Scenario, memorandum by DKS Associates, June 27, 2014.



PROJECT MEMORANDUM

DATE: June 11, 2014
FROM: Steven Harrison, PE – David Evans and Associates, Inc.
TO: South Cooper Mountain Technical Advisory Committee
CC: South Cooper Mountain Project Management Team
SUBJECT: **Water System Concept Plan – Summary Findings and Planning Level Cost Estimates**
PROJECT: **South Cooper Mountain Concept and Community Plans
City of Beaverton #2752-13B**
DEA PROJECT NO: APGI0000-0002

This memo provides a summary to support the evaluation of the final concept for the South Cooper Mountain Concept Plan including estimated water system demands and estimated waterline capacity and associated costs. This memo is related to the future water system infrastructure needs within the South Cooper Mountain planning area. Information was gathered from the City of Beaverton (City), Tualatin Valley Water District (TVWD), and the City of Hillsboro to identify their near term plans to provide adequate water system capacity to serve the planning area.

Evaluation Assumptions

The water system expansion into the South Cooper Mountain planning area will be based on the largest single point demand in the area. The largest single point water demand is fire service flow. Although providing domestic and irrigation services to the area is essential, the water system expansion will be developed to provide sufficient fire flow while maintaining a minimum water pressure. Therefore, the water system design will not vary based on the density of development. The City has indicated the design fire flow at any given point within the water system is 3,000 gallons per minute (gpm) while maintaining a minimum pressure of 20 pounds per square inch (psi).

Our evaluation did not include smaller diameter service lines (8-inches and smaller) to private land development projects, however, we did include the larger main lines (12-inches and larger) that are necessary to serve the larger area.

The unit cost for the water system is on a per linear foot basis and, in addition to raw pipe material, includes a 20% increase for miscellaneous items such as utility relocation, abandoning of existing facilities, etc.; 15% increase for general contractor profit and overhead; 25% increase for engineering and administration; and a 30% increase for general contingency. The City of Beaverton provided recommended unit costs as shown:

Table 1. Water System Unit Costs

Ductile Iron Pipe Diameter (inches)	Unit Cost (\$/LF)	Ductile Iron Pipe Diameter (inches)	Unit Cost (\$/LF)
12	239	20	374
16	267	24	460

Water System Overview by Subarea

As stated in previous memorandums, there are three (3) subareas defined in this study. They are, as shown on the attached map, "North Cooper Mountain", "Urban Reserve Area", and "South Cooper Mountain Annexation Area". Existing water service and the anticipated types of improvements needed within each subarea are summarized briefly below.

North Cooper Mountain (NCM)

This area is largely developed with existing single family homes on large lots. TVWD currently provides water service through their existing network of waterlines and water storage tanks in this area. Further development and added water demand in this area can be served by extending the existing water system network to areas that currently do not have service. To provide a network of waterlines that will deliver consistent flow and pressures to all points within the network area, and to create a water system looped system, we anticipate a major water main extension through this area will be required. Potential connection points are shown in the attached "South Cooper Mountain Water System" map.

Urban Reserve Area (URA)

This area includes the Cooper Mountain Nature Park and several dozen single family homes on large lots in the vicinity of SW 175th Avenue. TVWD currently provides water service to these properties through their existing network of waterlines. Future development and added water demand in this area can be served by extending the existing water system network to areas that currently do not have service. We anticipate the expanded network will include water main pipes between 12- and 24-inches in diameter located within existing and future roadways. Points of connection can be made at SW Kemmer Road, SW Weir Road, SW Snowy Owl Lane, and/or from a main line extension through the South Cooper Mountain Annexation Area in SW 175th Avenue as shown in the attached "South Cooper Mountain Water System" map.

South Cooper Mountain Annexation Area (SCMAA)

This subarea is also mostly undeveloped. The Beaverton School District has near-term plans to build a new high school in the area just north of SW Scholls Ferry Road and east of SW 175th Avenue starting as early as 2015. The City has indicated the school site can be adequately served from the 24-inch waterline soon to be under construction in SW Scholls Ferry Road. However, additional development to the north and west will require expanded network connections. Based on preliminary information from the City, the expansion will likely include water main pipes between 12- and 24-inches in diameter located within roadways and connections to the water storage facilities in the Hilltop area. Potential connections can be made at any point in SW Scholls Ferry Road, and/or from SW 175th Avenue. Potential connection points are shown in the attached "South Cooper Mountain Water System" map.

The City is also planning a future five-million-gallon tank to be located near the intersection of SW 175th Avenue/SW Weir Road and has indicated that by supplementing the existing system with this new five-million-gallon storage tank, there will be adequate water storage to serve the entire planning area. The new tank is not included in the cost estimate. Per the City, it is scheduled to be constructed by 2020.

Water System Improvements

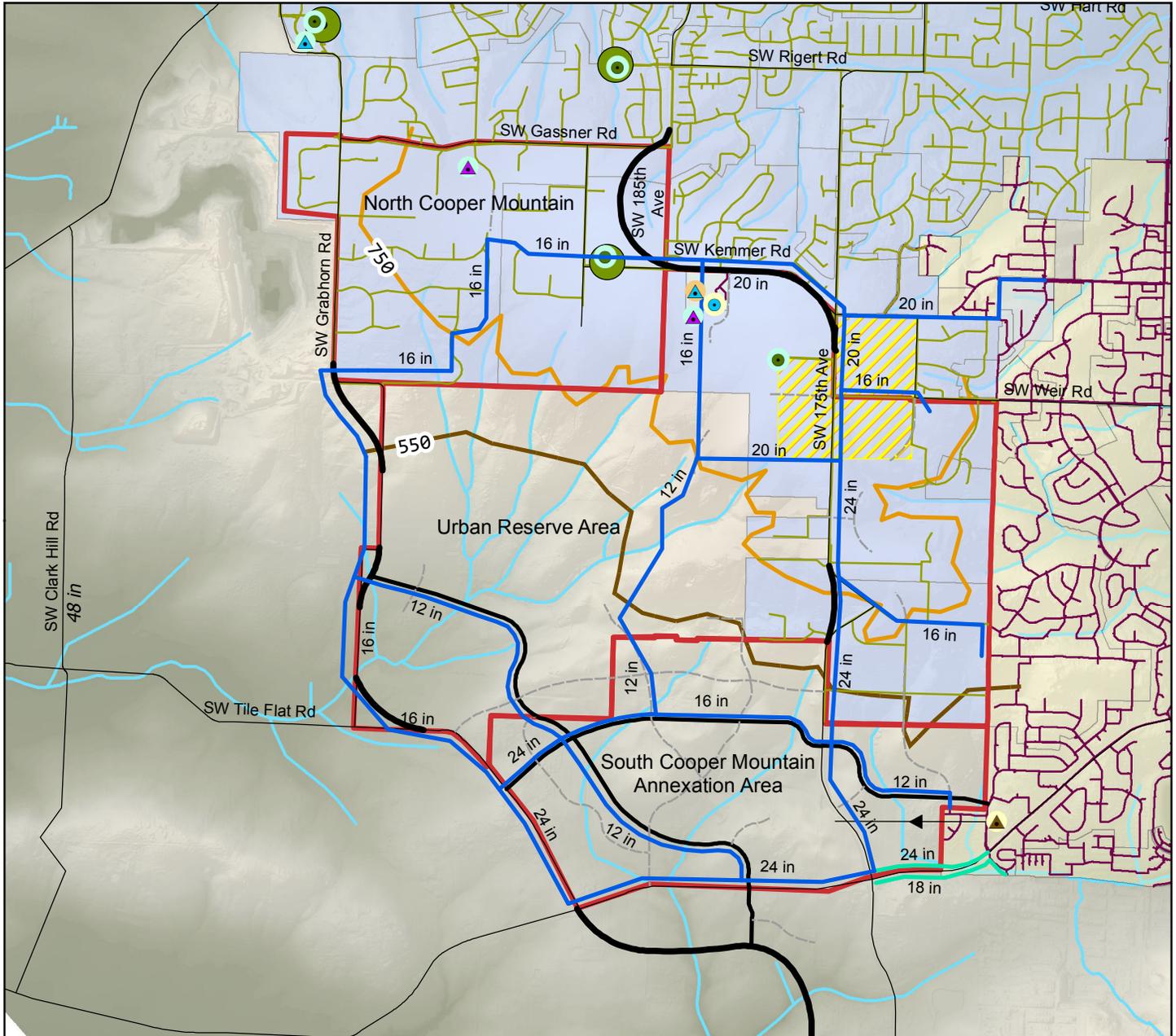
The concept plan includes a 16-inch water line within North Cooper Mountain area. This new water line will serve the new growth within NCM area. However, the main purpose of this water main is to create a water system loop that will serve Grabhorn Meadow to the south. The looped system will provide a network of waterlines that will deliver consistent flow and pressures to all points within the network.

175th Avenue remains in the same location to the north boundary of the SCMAA. A new 24-inch water line will extend along this new alignment to the future SW Weir Road intersection where the water line becomes a 20-inch line. The east-west roadway extending from SW Tile Flat Road through the 175th Avenue intersection and continuing on to SW Loon Drive will include a water line that starts as a 24-inch line on the west side and decreases to 16-inch, then 12-inch water line. A new 24-inch water line will be extended west from the 175th/Scholls Ferry intersection to Tile Flat Road and will continue north along Tile Flat Road connecting up with the new 24-inch water line within the new east-west roadway. A new 12-inch water line will be extended along the new collector from SW Scholls Ferry Road and extend northwest to SW Grabhorn Road. Development occurring within the interior of SCMAA area will connect to one of these mainlines. Service to the initial phases of development in the SCMAA (in the vicinity of 175th), could be provided from the new 24-inch water line located within 175th Avenue or SW Scholls Ferry Road.

Table 2. Water System Infrastructure Costs

North Cooper Mountain			
Pipe Diameter	Total Length (ft)	Unit Cost (\$/LF)	SubTotal
16	*7,841	267	\$2,093,547
Subarea Total:			\$2,093,547
Urban Reserve Area			
Pipe Diameter	Total Length (ft)	Unit Cost (\$/LF)	SubTotal
12	7,500	239	\$1,792,500
16	11,375	267	\$3,037,125
20	10,000	374	\$3,740,000
24	4,000	460	\$1,840,000
Subarea Total:			\$10,409,625
South Cooper Mountain Annexation Area			
Pipe Diameter	Total Length (ft)	Unit Cost (\$/LF)	SubTotal
12	7,021	239	\$1,678,019
16	4,715	267	\$1,258,905
24	13,500	460	\$6,210,000
Subarea Total:			\$9,146,924
Total:			21,650,096

* - This pipe is necessary to provide a sufficient network of waterlines to serve the Urban Reserve Area.



South Cooper Mountain Future Water System

Legend

Reservoirs

- Beaverton, In service
- TVWD Pump Station
- Potential Reservoir Site Zone*

ASR Wells

- Beaverton, Drilled not producing
- JWC, In service
- TVWD, In service
- TVWD, Planned

Existing Waterlines

- CoB Water Main
- TVWD Waterline
- Potential non-potable*

New Waterlines

- Under construction (Local)
- Planned (Local)*

Future Pressure Zones

- 550 ft elevation
- 750 ft elevation
- CoB Supply Zone
- TVWD Supply Zone
- South Cooper Mountain Study Area

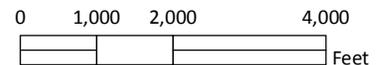
* Locations of planned facilities are conceptual only.

Prepared By: David Evans and Associates, Inc.

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl

DISCLAIMER

This map is intended for informational purposes only. It is not intended for legal, engineering, or surveying purposes. While this map represents the best data available at the time of publication, the City of Beaverton makes no claims, representations, or warranties as to its accuracy or completeness. Metadata available upon request.





PROJECT MEMORANDUM

DATE: June 11, 2014
FROM: Steven Harrison, PE – David Evans and Associates, Inc.
TO: South Cooper Mountain Technical Advisory Committee
CC: South Cooper Mountain Project Management Team
SUBJECT: **Sanitary Sewer Concept Plan – Summary Findings and Planning Level Cost Estimates**
PROJECT: **South Cooper Mountain Concept and Community Plans
City of Beaverton #2752-13B**
DEA PROJECT NO: APGI0000-0002

This memo provides information to support the evaluation of the final concept for the South Cooper Mountain Concept Plan including estimated sanitary sewer design flows, and estimated pipe and pump station capacity and associated costs. This memo is related to the sanitary sewer infrastructure needs within the South Cooper Mountain planning area. Information was gathered from the City of Beaverton and Clean Water Services District (CWS) to identify their near term plans to provide adequate sanitary sewer capacity to serve the study area and to verify our cost assumptions.

Evaluation Assumptions

The final concept depicts land uses using “development types”. We pared down the “development types” to five (5) basic types. The average daily sanitary sewer flows from each of these basic “development types” is given below:

Table 1. Average Daily Sanitary Sewer Flows from Basic Development Types

Generalized Development Type	Average Daily Sanitary Sewer Flow (gallons/day/unit)	Average Daily Sanitary Sewer Flow (gallons/day/employee)	Average Daily Sanitary Sewer Flow (gallons/day/student)
Single Family Neighborhoods	360		
Compact Neighborhoods	295		
Urban Neighborhoods	212		
Commercial Development		45.8	
Schools			15

(Typical Average Daily Flows are between 100-125 gpcd. The above assumptions resulted in 140 gpcd based on the population)

Because sanitary sewer flows fluctuate throughout the day, the peak hourly design flow rate is obtained by multiplying the average daily rate by a peaking factor. Based on the anticipated population of the planning area, the peaking factor can range from 1.8 to 5.5.¹ A larger population requires a smaller peaking factor. Given that the South Cooper Mountain planning area is relatively small (adding roughly 7,400 housing units), we used a peaking factor of 4.0.

¹ Source: Babbitt, H.E., “Sewerage and Sewage Treatment”. 7th ed., John Wiley & Sons, Inc. New York (1953).

Based on industry accepted design principles, we assumed the minimum pipe size would be 8-inches in diameter with a minimum slope of 0.5%. We also evaluated existing contours along the roadway alignments to determine potential roadway, and associated sewer, grades/slopes. We used this information to estimate future pipe capacity. Where possible we avoided sanitary sewer creek crossing. However, there were instances where a creek crossing was required. In most cases we ran the new sanitary lines along the creek top of bank.

The unit cost for the sanitary sewer system was provided by the City of Beaverton and is on a per linear foot basis and includes manholes at 200-foot intervals and service laterals at 50-foot intervals. The unit costs also include miscellaneous items such as utility relocation, abandoning of existing facilities, etc.; 15% increase for general contractor profit and overhead; 25% increase for engineering and administration; and a 30% increase for general contingency.

Table 2. Gravity Sanitary Sewer Unit Costs

PVC Pipe Diameter (Inches)	Unit Cost (\$/LF)
8	255
12	311
15	354
18	393

Sanitary Sewer System Overview by Subarea

As we have established in previous memoranda, there are three (3) subareas defined in this study. They are the “North Cooper Mountain”, “Urban Reserve Area”, and “South Cooper Mountain Annexation Area”. Generally, the overall sanitary sewer system will flow by gravity towards future pump stations (Tile Flat Road Pump Station or River Terrace Pump Station) or to a 21-inch line in Scholls Ferry Road and eventually to the Durham Waste Water Treatment Plant.

North Cooper Mountain (NCM)

This area is largely developed with existing single family homes on large lots that are currently utilizing septic systems for sanitary sewerage disposal. The need for a public sanitary sewer system to serve this area may come from failure of the existing septic systems² and/or future growth at urban densities within the northern part of NCM. The northern one-third of this area, by following the natural existing terrain, may be conveyed to the north and connect to adjacent existing systems. We have evaluated several potential future sanitary sewer points-of-connection. The southern two-thirds of this area will require conveyance to the south and be served by the future Tile Flat Road Pump Station. The cost estimate has been broken down to differential the northern one-third and the southern two-thirds.

Urban Reserve Area (URA)

This area includes the Cooper Mountain Nature Park and several dozen single family homes on large lots in the vicinity of SW 175th Avenue. Based on the natural terrain of this subarea, connections can be made along the east boundary, through the South Cooper Mountain Annexation Area within SW

² Septic systems typically last approximately 50 years before they require replacement. Failure of septic systems within an urban area requires connection to a public sewer; replacement with a new septic system is not allowed.

Scholls Ferry Road, to the future River Terrace Pump Station or Tile Flat Road Pump Station systems. These connection points are shown in the attached "South Cooper Mountain Sanitary Sewers" map.

South Cooper Mountain Annexation Area (SCMAA)

This subarea is mostly undeveloped. Based on the natural terrain, connections can be made at SW Scholls Ferry Road or to the future River Terrace Pump Station system. These connection points are shown in the attached "South Cooper Mountain Sanitary Sewers" map.

Future Pump Stations

Clean Water Services has evaluated the South Cooper Mountain area and has determined that in order to meet the service requirements of both the URA and SCMAA, two new pump stations (Tile Flat Rd Pump Station and River Terrace Pump Station) will be required. The Tile Flat Road Pump Station will be located at the low point (creek intersection) of Tile Flat Road. This pump station is anticipated to pump to the east along Tile Flat Road to a gravity system that will eventually convey sewage to the new River Terrace Pump Station.

The River Terrace Pump Station will be located within the urban growth boundary along the creeks south of SW Scholls Ferry Road and west of SW Roy Rogers Road. The tentative location is shown on the attached "South Cooper Mountain Sanitary Sewers" map. The River Terrace Pump Station is anticipated to be in operation by the end of 2015, and all flows from this proposed pump station will be directed to the intersection of Scholls Ferry Road and 175th Avenue to connect to the 21-inch Scholls Ferry Road Sanitary Sewer Extension and ultimately to the Durham Wastewater Treatment Plant. The final location and timing of this facility should be coordinated closely with the City of Tigard in that it is concurrently developing an urbanization plan for the River Terrace area, directly south of SW Scholls Ferry Road along SW Roy Rogers Road. Based on a CWS study conducted by CH2M Hill in March 2013, regardless of the inclusion of the Cooper Mountain sanitary flows, significant improvements are required to the Summer Creek trunk line extending east to SW 121st Avenue. The study states improvements will include upsizing sewer lines to 21- to 42-inches in diameter.

Pump stations can be expanded to add capacity relatively easily, so the initial designs are assumed to serve only the projected growth within the existing UGB. The pump stations can then be expanded to provide additional capacity to serve the Urban Reserve Area in the future. The design and construction costs for these pump stations are estimated both for the full build-out of the Urban Growth Boundary (20 years) and the build-out of the Urban Reserve Area (50 years).

Sanitary Sewer System Improvements

The northern NCM area includes several 8-inch sewer lines with seven (7) different points of connection in SW Gassner Road. These improvements will be needed in order to serve future development in this area whenever it is initiated by property owners, but will also provide a solution for existing homes as septic systems fail. Because these lines serve small areas, they are likely to be built incrementally, as needed. The southern part of NCM area also includes new 8-inch sewer lines that will convey waste water to the south to the new Tile Flat Road Pump Station. These new 8-inch lines will only be built when the Tile Flat Pump Station is complete and enough septic systems in the area have failed to create a need for public sewer service.

When the URA Grabhorn Meadow area is urbanized, it will be served by new 8-inch sanitary lines along the creek and within Grabhorn Road. The low area south of the creeks will be served by several 8-, and 12-inch sewer lines. The portion of the Hilltop area is served by several connection points. The Hilltop area with natural grades that slope to the north will be served by new 8-inch sewer pipe and two

(2) connection points within Kemmer Road when urbanization occurs. The area of Hilltop with natural slope to the south will connect to a new 8-inch and eventual 12-inch line in 175th Avenue. The 175th Avenue sanitary sewer line will mainly serve properties adjacent to the roadway. There are several lengths of 8-inch sewer lines along the east boundary of the study area connecting at six (6) different locations.

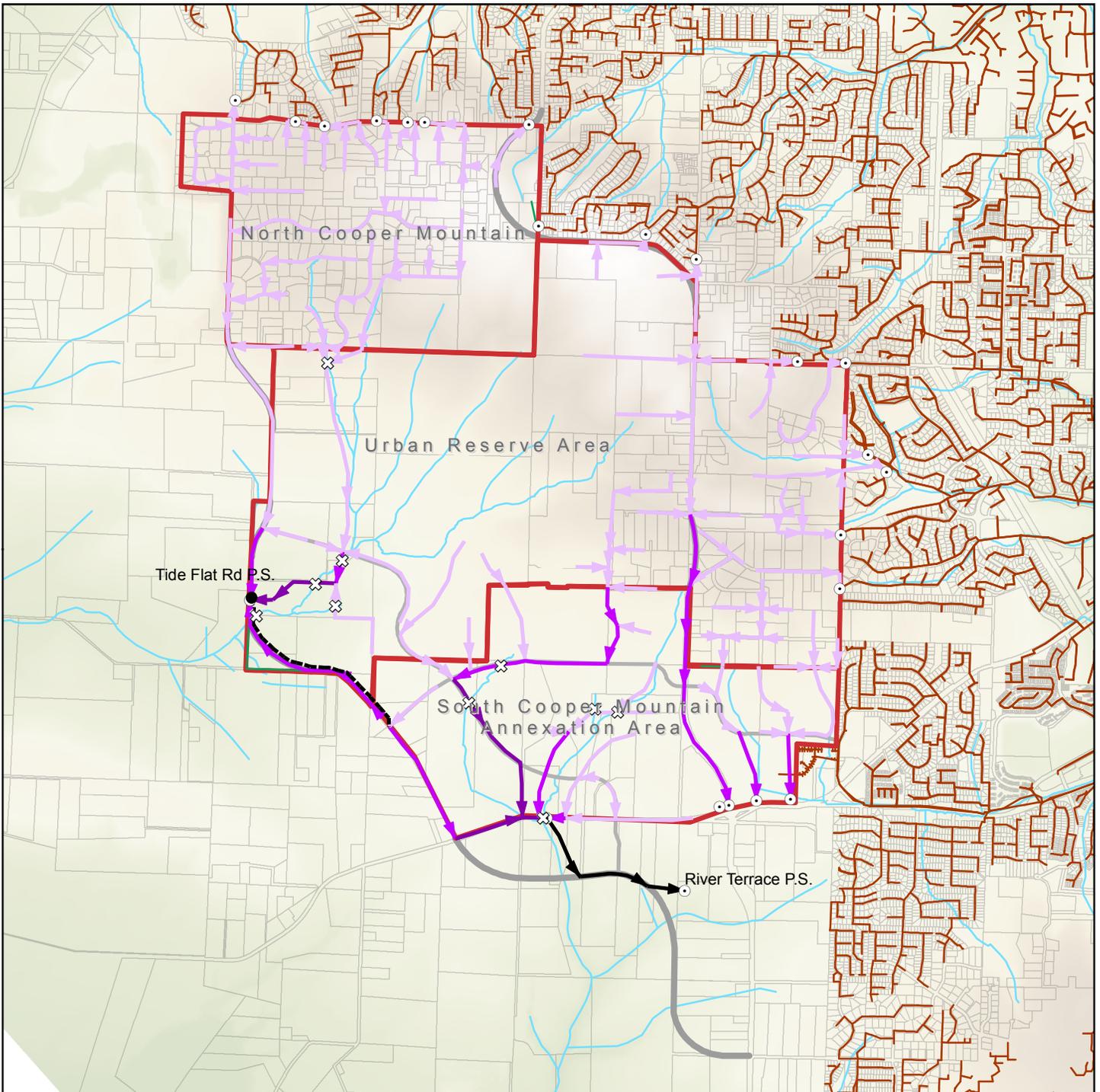
The SCMAA will be served by many different sewer line locations. The Beaverton School District has near term plans to build a new high school in the area just north of SW Scholls Ferry Road and east of SW 175th Avenue starting as early as 2015. This area can be served by the existing 21-inch gravity sanitary sewer located in SW Scholls Ferry Road. The area east of 175th Avenue and north of Scholls Ferry Road will be served by a new 12-inch sewer line located in 175th Avenue and two (2) connection points in SW Scholls Ferry Road. With the exception of the high school area, the areas west of 175th Avenue will eventually be conveyed to the new River Terrace Pump Station. The new east-west collector road will include 8- and 12-inch sewer lines. The new north-south collector road extension located east of SW Vandermost Road will include a new 15-inch sewer line along the northern portion and an 8-inch sewer line along the southern portion connecting to the SW Scholls Ferry Road line. A 12-inch line will also be located in SW Tile Flat Road serving adjacent properties and will eventually accept force main flow from the Tile Flat Road Pump Station. The sewer line from Tile Flat Road to the low point in Scholls Ferry Road will need to be 15-inches in diameter. The low lying creek will have 8-inch and 12-inch sanitary sewers on each side to convey waste water to the low point in Scholls Ferry Road. From this point the sanitary sewer flows will be conveyed within an 18-inch sanitary sewer line southeast to the River Terrace Pump Station as shown in the attached "South Cooper Mountain Sanitary Sewers" map.

Table 3. Gravity Sanitary Sewer Infrastructure Costs

North Cooper Mountain			
NCM Northern One-Third			
Pipe Diameter	Total Length (ft)	Unit Cost (\$/LF)	SubTotal
8	17,506	255	\$4,464,030
NCM Southern Two-Thirds			
Pipe Diameter	Total Length (ft)	Unit Cost (\$/LF)	SubTotal
8	21,583	255	\$5,503,665
Subarea Total:			\$9,967,695
Urban Reserve Area			
Pipe Diameter	Total Length (ft)	Unit Cost (\$/LF)	SubTotal
8	61,073	255	\$15,573,615
12	11,244	311	\$3,496,884
15	1,594	354	\$564,276
Subarea Total:			\$19,634,775
South Cooper Mountain Annexation Area			
Pipe Diameter	Total Length (ft)	Unit Cost (\$/LF)	SubTotal
8	19,931	255	\$5,082,405
12	14,640	311	\$4,553,040
15	4,201	354	\$1,487,154
18	3,000	393	\$1,179,000
Subarea Total:			\$12,301,599
Total:			\$41,904,069

Table 6. Sanitary Sewer Pump Station Costs

Tile Flat Road Pump Station			
Pump Station	Total	Unit Cost	SubTotal
Pump Station (Complete with wet well, piping, pumps, control building, and backup generator)	1 each	\$765,000	\$765,000
6" Force Main	4,400 ft	\$145/LF	\$638,000
Total:			\$1,403,000



South Cooper Mountain Sanitary Sewers

Proposed Pipe Location and Diameter

Force Main

8-inch

12-inch

15-inch

18-inch

Point of Connection

Stream Crossing

Existing Stream

New Arterial

New Collector

Existing Sanitary Sewer

South Cooper Mountain Study Area

Washington County Taxlot

Note: All sewer lines are conceptual and are subject to zoning authority and permits.

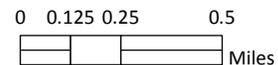
Prepared By: David Evans and Associates, Inc.

Date: 6/11/2014

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl

DISCLAIMER

This map is intended for informational purposes only. It is not intended for legal, engineering, or surveying purposes. While this map represents the best data available at the time of publication, the City of Beaverton makes no claims, representations, or warranties as to its accuracy or completeness. Metadata available upon request.





DAVID EVANS
AND ASSOCIATES INC.

PROJECT MEMORANDUM

DATE: December 19, 2013
FROM: Claudia Sterling, PE – David Evans and Associates, Inc.
TO: South Cooper Mountain Beaverton Core Project Team
CC: South Cooper Mountain Technical Advisory Committee
SUBJECT: **Stormwater and Water Quality Scenario Summary**
PROJECT: **South Cooper Mountain Concept and Community Plans
City of Beaverton #2752-13B**

DEA PROJECT NO: APGI0000-0002

Executive Summary

This technical memorandum provides an overview of stormwater management systems for the three future growth scenarios being evaluated for the South Cooper Mountain (SCM) Concept Plan. The three scenarios are described in the cover memorandum titled “Scenarios for Evaluation,” dated November 5, 2013. The SCM Scenarios for Future Growth (September 12, 2013) report describes the basic approach to stormwater management for South Cooper Mountain.¹ Three of the project’s guiding principles are applicable to this stormwater evaluation and plan:

- Create a sustainable community
- Prepare a realistic financing plan for infrastructure and feasible implementation strategies
- Provide appropriate protection, enhancement, and access to Cooper Mountain’s natural resources and public lands.

For scenario analysis the primary approach for meeting stormwater management goals will be large-scale dry detention ponds, termed Regional Stormwater Facilities (RSFs), in the developing areas in order to manage peak runoff rates to avoid downstream impacts. This approach was chosen because it provides planned, comprehensive flow control in a cost-effective manner and provides the highest level of certainty of meeting the flow management guidelines being established by Clean Water Services (CWS), the agency primarily responsible for regulating stormwater management for urban portions of the planning area.² This technical memorandum provides a map of potential RSFs in all three project subareas; they have been categorized as neighborhood (smaller scale, local in benefit) or regional (larger scale, broader area benefiting). In addition, major elements of the stormwater conveyance system that directs flow to the RSFs or from the RSFs to area streams are also shown. The RSFs and conveyance are intended to work in combination with elements of the Concept Plan, including:

¹ The Scenarios report is available at <http://www.beavertonoregon.gov/DocumentCenter/View/6489>.

² CWS builds, maintains and enhances the public drainage system to meet public needs and to comply with water quality regulations set for the Tualatin River drainage area by the Oregon Department of Environmental Quality. The City of Beaverton maintains open and closed conveyance facilities (i.e., ditches or streams, and storm sewers, respectively) adjacent to the eastern and southeastern portions of the study area. The City owns and maintains the systems located within city limits, and will maintain new systems when constructed in the South Cooper Mountain Annexation Area. Once annexed into the CWS service area, CWS will also provide services for the North Cooper Mountain area. Currently that area and the Urban Reserve Area is the responsibility of Washington County.

protection and enhancement of natural resource areas, provisions of parks and other open spaces, and management of stormwater at the site and street scale.

The detention facilities have been tentatively sized given the total upland impervious acres as approximately located. The sizing tool was the Western Washington Hydrologic Model, which matches flow-duration curves for a range of storms pre- and post-development. CWS is in the process of updating its conveyance and detention standards based on a similar approach and intends to have these standards in place prior to the start of development in the South Cooper Mountain Annexation Area (SCMAA). Thus these facilities would be reflective of that anticipated standard of care. Fine tuning of the location, upland area, and final RSF size (including buffer and access areas) will be required following the selection of a preferred scenario.

Additional site-specific reviews of opportunities for Low Impact Development Approaches (LIDA) are encouraged as part of development, which may reduce the size of downstream detention facilities. This would be a joint decision of CWS and the City of Beaverton and would need to be decided prior to commitment to size and construct the regional facilities. Once sized, the cost recovery mechanism for CWS to construct the facilities would be established.

Further development in the northern portion of the North Cooper Mountain (NCM) will require managed connections to the existing Clean Water Services Cross Creek, Butternut Creek, and Johnson Creek stormwater conveyance systems to the north and northeast, and connections to existing stormwater conveyances (both closed and open) outside the planning area will need to be examined to prevent downstream problems.

The future development of the Urban Reserve Area (URA), which is largely forest, grassland, farm land and rural homesites today, will need to be carefully managed to minimize stream erosion of the existing channels flowing southwest from the peak of Cooper Mountain to McKernan Creek. The southern portion of North Cooper Mountain is the upland area for the Urban Reserve Area and drains southwest; in this scenario analysis stormwater from this area is assumed to be collected and conveyed to help minimize stream erosion in the small open channels of the Urban Reserve Area.

As the eastern portion of the Urban Reserve Area is developed, managed connections to the City of Beaverton's Summer Creek conveyance systems to the east and southeast will need to be included.

For The Creeks, Hilltop, Grabhorn Meadow and portions of the URA Lowlands, stormwater management will be required to minimize erosion of the existing stream channels, as well as minimize the impact on the downstream channel of McKernan Creek, a tributary of the Tualatin River. The SCMAA and the eastern portion of URA Lowlands affect either Summer Creek (flows east) or an unnamed tributary of the Tualatin River (flows south). Development in these areas will need conveyance and detention systems that convey flow to the streams without causing channel erosion within the two areas, as well as not adversely impacting downstream conveyance elements.

For purposes of scenario comparison, RSFs were sited and their size and cost were estimated. Sizes ranged from 0.3 to 3.7 acres; costs are as shown below. The sizes of the facilities do not vary much among the scenarios because of the underlying assumption that they will serve the same upland area footprints in each scenario; the impervious surface area upland of the facilities changes with scenario, but the impact on sizing is fairly small. In NCM, where there are homes but no current stormwater facilities, a conveyance system was sized and laid out in anticipation of future annexation into CWS. These vary by scenario due to impervious area differences. All sizes are set for future build out.

Not all of the planning area is encompassed in upland areas to these facilities; therefore, the remaining portion of the area will need to be served solely by additional neighborhood or site-scale detention.

Table 1: Summary of Estimated Regional Stormwater Facility Costs

Area	Number of RSFs	Estimated Scenario 1 RSF cost without land (\$)	Estimated Scenario 2 RSF cost without land (\$)	Estimated Scenario 3 RSF cost without land (\$)
NCM	2	\$710,100	\$1,330,400	\$1,330,400
URA	10	\$9,879,300	\$9,739,100	\$9,817,900
SCMAA	10	\$7,898,800	\$7,952,300	\$7,480,200
TOTAL	22	\$18,488,200	\$19,021,800	\$18,628,500

For purposes of scenario comparison, new Stormwater conveyance lines were laid out to direct collect flow from arterials and major developed areas to the facilities, and from the facilities to the streams. The lengths of pipe vary among the scenarios primarily due to the different new roadway alignments proposed for each, and the pathway required to direct flow to the RSFs. Sizes of the pipes were set to provide stormwater conveyance for future build out for each scenario.

Table 2. Major Stormwater Pipe Cost Summary

Area	Scenario 1			Scenario 2			Scenario 3		
	Total Pipe Length (feet)	Pipe Dia-meters (inches)	Capital Cost (\$)	Total Pipe Length (feet)	Pipe Dia-meters (inches)	Capital Cost (\$)	Total Pipe Length (feet)	Pipe Dia-meters (inches)	Capital Cost (\$)
NCM	10,800	12-21	\$3,006,100	10,800	12-21	\$3,006,100	12,500	12-21	\$3,392,700
URA	20,900	12-36	\$7,305,000	21,400	12-36	\$7,474,000	20,200	12-36	\$6,643,300
SCMAA	19,300	15-24	\$6,246,600	20,500	12-24	\$6,480,100	14,600	12-24	\$4,647,600
TOTAL	51,000		\$16,557,700	52,700		\$16,960,200	47,300		\$14,683,600

Introduction

This technical memorandum provides an overview of stormwater management systems for the three future growth scenarios being evaluated for the South Cooper Mountain (SCM) Concept Plan. The three scenarios are described in the cover memorandum titled “Scenarios for Evaluation,” dated November 5, 2013. The SCM Scenarios for Future Growth (September 12, 2013) report describes the basic approach to Stormwater management for South Cooper Mountain.³ Three of the project’s guiding principles are applicable to this Stormwater evaluation and plan:

- Create a sustainable community
- Prepare a realistic financing plan for infrastructure and feasible implementation strategies

³ The Scenarios report is available at <http://www.beavertonoregon.gov/DocumentCenter/View/6489>.

- Provide appropriate protection, enhancement, and access to Cooper Mountain's natural resources and public lands.

The level of analysis was basic and was intended only to help distinguish consequences to meeting the Guiding Principles among the three scenarios.

Clean Water Services (CWS) builds, maintains and enhances the public drainage system to meet public needs and to comply with water quality regulations set for the Tualatin River drainage area by the Oregon Department of Environmental Quality. The City of Beaverton (City) maintains open and closed conveyance facilities (i.e., ditches or streams, and storm sewers, respectively) adjacent to the eastern and southeastern portions of the study area. The City owns and maintains the systems located within city limits, and will maintain new systems when constructed in the South Cooper Mountain Annexation Area. Once annexed into the CWS service area, CWS will also provide services for the North Cooper Mountain area. Currently that area and the Urban Reserve Area is the responsibility of Washington County.

At the current time, there are no storm water conveyances or treatment facilities managed by either the City or CWS within the SCM study area. The only facilities are culverts and drainage ditches associated with roads and culverts conveying streams under county roads. Previous reports illustrated natural topography, stream corridors, and the existing closed conveyances that serve the areas north and east of the study area that might receive flow from the fringes of the SCM area.

Basis of Development of the Stormwater System Components

For scenario analysis the primary approach for meeting Stormwater management goals will be large-scale dry detention ponds, termed Regional Stormwater Facilities (RSFs) by CWS, in the developing areas in order to manage peak runoff rates to avoid downstream impacts. This approach was chosen because it is consistent with planning in other new areas added to the Urban Growth Boundary; it provides planned, comprehensive flow control in a cost-effective manner; and it provides the highest level of certainty of meeting the flow management guidelines being established by CWS. In addition, these RSFs will meet water quality requirements (capture and treatment of stormwater pollutants) as well as preserving the stream health of the receiving channel (avoids hydrographic modification).

It should be noted that RSFs require a high level of coordinated implementation. Implementation strategies will be determined as part of the Community Plan and implementation work for SCM. It is assumed here that options will be available so that there is some flexibility as how to design and construct facilities to serve individual properties prior to regional facilities being available.

This technical memorandum provides a map of potential RSFs in all three subareas of the planning area. In addition, major elements of the Stormwater conveyance system that directs flow to the facilities or from the facilities to area streams are shown. The facilities and conveyance are intended to work in combination with elements of the Concept Plan, including: protection and enhancement of natural resource areas, provisions of parks and other open spaces, and management of stormwater at the site and street scale.

Detention facilities have been tentatively sized given the total impervious acres upland of the facilities as approximately located. The sizing tool was the Western Washington Hydrologic Model, which matches flow-duration curves for a range of storms pre- and post-development. CWS is in the process of updating its conveyance and detention standards based on a similar approach and intends to have these standards in place prior to the start of development in the South Cooper Mountain

Annexation Area (SCMAA). Thus these facilities would be reflective of that anticipated standard of care. Fine tuning of the location, upland area, and final facility size (including buffer and access areas) will be required following the selection of a preferred scenario.

Additional site-specific reviews of opportunities for Low Impact Development Approaches (LIDA) are encouraged as part of development, which may reduce the size of downstream detention facilities. This would be a joint decision of CWS and the City of Beaverton and would need to be decided prior to commitment to size and construct the regional facilities. Once sized, the cost recovery mechanism for CWS to construct the RSFs would be established.

Further development in the northern portion of the North Cooper Mountain (NCM) will require managed connections to the existing Clean Water Services Cross Creek, Butternut Creek, and Johnson Creek stormwater conveyance systems to the north and northeast, and connections to existing stormwater conveyances (both closed and open) outside the planning area will need to be examined to prevent downstream problems.

The future development of the Urban Reserve Area will need to be carefully managed to minimize stream erosion of the existing channels flowing southwest from the peak of Cooper Mountain to McKernan Creek. The southern portion of the North Cooper Mountain area is the upland area for the Urban Reserve Area and drains southwest; in this scenario analysis stormwater from this area has been collected and conveyed to help minimize stream erosion in the small open channels of the Urban Reserve Area.

As the eastern portion of the Urban Reserve Area is developed, managed connections to the City of Beaverton's Summer Creek conveyance systems to the east and southeast will need to be included.

For The Creeks, Hilltop, Grabhorn Meadow and portions of the URA Lowlands, stormwater management will be required to minimize erosion of the existing stream channels, as well as minimize the impact on the downstream channel of McKernan Creek, a tributary of the Tualatin River. The SCMAA and the eastern portion of URA Lowlands affect either Summer Creek (flows east) or an unnamed tributary of the Tualatin River (flows south). Development in these areas will need conveyance and detention systems that convey flow to the streams without causing channel erosion within the two areas, as well as not adversely impacting downstream conveyance elements.

Basic Assumptions

The planning area includes land that is very steep and has narrow stream catchments. Much of The Creeks is high value natural resource land and is not buildable. Placement of infrastructure in sensitive natural areas was avoided unless necessary (e.g. major arterials). Stream crossings were also minimized.

A general approach to sizing pipes and regional facilities was developed for this stage of the planning. Land use for each scenario was developed by the team and disaggregated into large geographic basins. Impervious fractions were assigned to each land use type which resulted in estimated total impervious acres by geographic basin. For each pipe segment or regional facility upland area, the upstream area was estimated as combinations of whole or partial geographic basins and the impervious acreage proportioned accordingly. This technique assumes uniform distribution of land use mixes, which in reality will be quite variable depending on specific site conditions. It is assumed that in the final sizing analysis, the actual impervious area will be recalculated.

Table 3. Scenario Analysis Impervious Area Assumptions

Development Type	Gross Imperviousness (Area-wide) (percent)
Neighborhood Commercial	59-74% (varies by scenario)
Urban Neighborhood	71%
Compact Neighborhood	58%
Single Family Neighborhood	57%
Future Urban 15	57%
Future Urban 10	54%
Single Family Residential Cluster	55%
Single Family Hillside	41%
Very Low Single Family Residential	18%
High School	30%
Elementary School	40%
Park	10%

Detention Facility Location, Sizing, and Costing

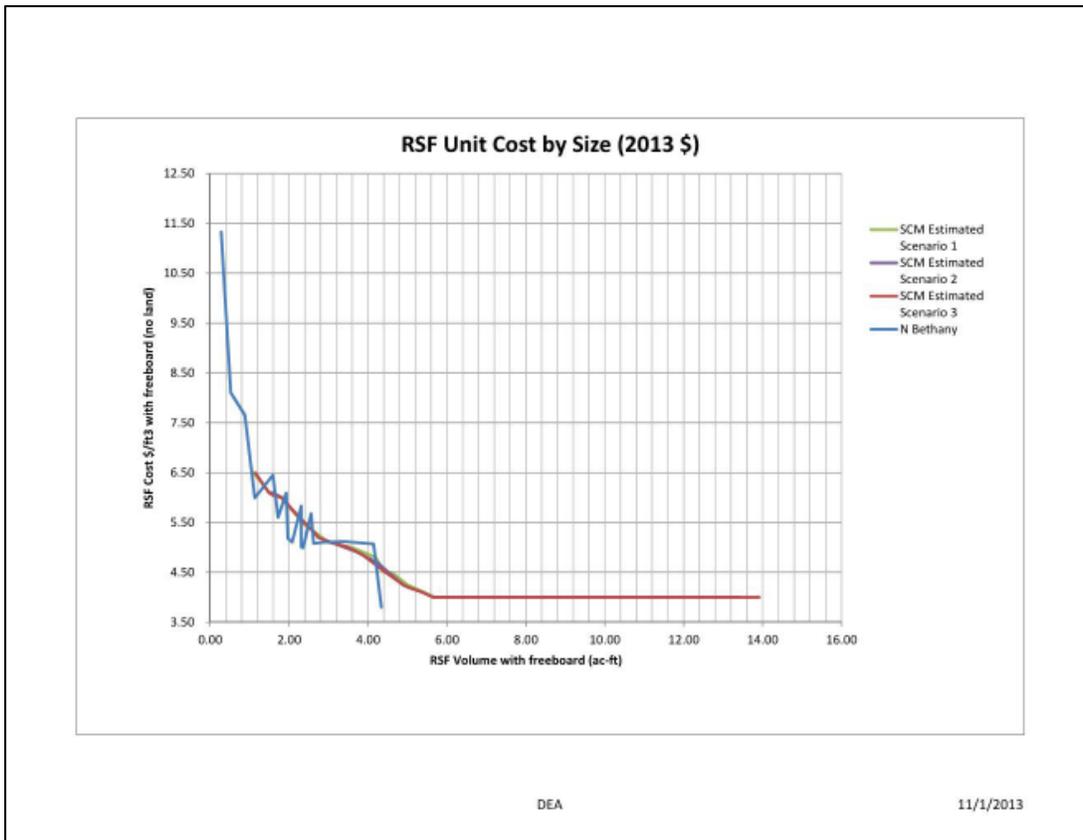
Regional detention facilities were first located primarily based on natural topography, then refined and added after the land use scenarios were developed. For this stage in the planning effort, all scenarios have the same facility locations and upland basin areas; what vary among the scenarios are only the impervious acres served. The locations and sizes (surface area and total constructed volume) will be refined after input from the TAC and CAC and the final land use pattern and roadway alignments are determined.

Regional facilities were located according to the following general guidelines:

- Protection of headwaters of streams where significant development is anticipated in the upland
- Adjacent to streams, lower in the catchment, where topography allows capture of urban flow prior to release
- Basin proportion practical for efficient piping to the facility (distance from top to bottom of basin is generally longer than the width)
- Sizing of facilities to meet flow detention requirements will be such that water quality requirements will also be met

To size the facilities, the Western Washington Hydrologic Model (WWHM) was used. This model sizes detention ponds with controlled outlets to create discharge hydrographs post-development that match the pre-development conditions (in this case, pasture and forest was assumed). The match is made against flow-duration curves, similar to the approach that CWS anticipates adopting by the time the SCM plan is adopted. The flow-duration curves match for stream-forming flows (2-year or less return period) as well as flooding flows (10-, 25-year return periods).

To prepare facility costs for purposes of scenario comparison, the facility costs for the North Bethany project⁴ were reviewed and a nomograph prepared to represent the effective cost per constructed volume of pond. The graph below (and attached) illustrates this relationship for North Bethany and the curves used to estimate costs for SCM ponds.



Pipe Location, Sizing, and Costing

A system backbone is proposed whose primary function is to capture flow upland of or along roadways and deliver to the RSFs, or to adjacent streams. The system assumes street-level stormwater management systems are installed by developers to connect to the pipe and pond system.

The hydrology of upland areas to the system piping was developed as follows:

- Rainfall 25-year from CWS manual 3.9 in Type 1A SBUH
- Soil Class C
- Impervious area CN 98
- Pervious area CN 77 (=good grass cover)
- Initial Time of Concentration (Tc) 10 min
- Drainage area geographic and roadway boundaries from the map

⁴ North Bethany Stormwater Implementation Plan, prepared by Brown and Caldwell for Clean Water Services, October 9, 2013

The simplified model HydroCAD was then used to estimate peak runoff rate from each upland geographic basin that contributed to a pipe.

The hydraulics for pipe sizing was developed as follows:

- Minimum pipe diameter set as 12 inches
- Estimated slope along road using 10 foot contours, visually selecting defining segment of each pipe
- Approximately half the pipes in Scenario 3 were sized using Flowmaster
- A generalized relationship between upland area and resulting pipe diameter was developed from these modeled pipes based on normal flow, pipes flowing full
- Remaining pipes in Scenario 3 and all of Scenario 2 pipes were sized using this relationship

Pipe costs were taken from unit capital costs provided by City of Beaverton for sanitary sewers, adjusted to remove laterals. Generally similar materials were assumed with similar construction techniques. These unit rates can be revised for estimating final costs of the selected scenario.

Table 4. Estimated Unit Storm Pipe Costs

Pipe Diameter (inches)	Total Capital Cost (\$/linear foot)	Pipe Diameter (inches)	Total Capital Cost (\$/linear foot)
12	\$218	21	\$335
15	\$258	24	\$456
18	\$296	36	\$583

Capital costs include construction, manholes, miscellaneous, contractor overhead and profit, contingency, and engineering. Numbers estimated based on adjusting water/sanitary unit costs provided by CoB.

Summary of Conveyance and Detention Components

At this stage of the planning, 22 RSF general locations have been identified, as shown in the scenario maps. A comparison of the estimated facility sizes by scenario is given in Table 5. The basin area is the shaded area shown in the maps.

Stormwater Detention

Table 5. Regional Stormwater Facility Size Estimates by Scenario

RSF No.	Location	Basin Area (acres)	RSF Surface Area (acres)			RSF Volume (acre-feet)		
			Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
1	NCM	24.1	0.3	0.6	0.6	1.1	2.0	2.0
2	NCM	32.8	0.4	1.1	1.1	1.5	3.9	3.9
3	URA	64.5	1.4	1.5	1.5	5.3	5.4	5.4
4	URA	47.7	2.4	2.2	2.5	9.1	8.3	9.5
5	URA	21.8	0.5	0.5	0.5	1.8	1.8	1.8

RSF No.	Location	Basin Area (acres)	RSF Surface Area (acres)			RSF Volume (acre-feet)		
			Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
6	URA	14.7	0.3	0.3	0.3	1.1	1.1	1.1
7	URA	67.0	3.5	3.5	3.7	13.4	13.4	13.9
8	URA	32.8	2.1	2.0	1.7	7.9	7.5	6.4
9	URA	20.3	0.7	0.7	0.7	2.5	2.5	2.5
10	URA	13.1	0.4	0.4	0.4	1.5	1.5	1.5
11	URA	50.2	1.6	1.5	1.5	5.7	5.7	5.7
12	URA	42.2	1.2	1.3	1.3	4.4	4.9	4.9
13	SCMAA	33.5	2.9	2.9	2.8	10.9	11.1	10.5
14	SCMAA	9.2	0.5	0.5	0.5	1.6	1.6	1.6
15	SCMAA	7.4	0.5	0.5	0.5	1.8	1.8	1.8
16	SCMAA	16.7	1.1	1.2	1.2	4.2	4.2	4.4
17	SCMAA	8.8	0.4	0.4	0.4	1.4	1.5	1.4
18	SCMAA	17.0	1.0	1.0	0.8	3.6	3.7	2.9
19	SCMAA	39.1	1.3	1.3	1.0	4.6	4.7	3.5
20	SCMAA	8.1	0.8	0.7	0.7	3.0	2.7	2.3
21	SCMAA	26.3	1.4	1.4	1.4	5.0	5.0	5.0
22	SCMAA	30.0	0.7	0.8	0.8	2.4	2.7	2.7
Total		627.3	25.4	26.3	25.9	94.0	97.2	94.7

See maps for location of facilities. The surface area of the detention pond includes the total depth of the facility (three-foot wet depth, plus one foot freeboard) without additional buffer, access, or related features. The volume is the excavated volume for the four-foot deep facility.

A cost comparison of the three scenarios is given in Table 6, using the costing nomograph developed based on the North Bethany ponds (attached figure). For the final analysis, once the roadway and RSF locations are finalized, more precise cost estimates can be prepared.

Table 6. Regional Stormwater Facility Cost Comparison

Area	RSF No.	Scenario 1		Scenario 2		Scenario 3	
		RSF Top Volume (ac-ft)	Estimated RSF Cost without Land (\$)	RSF Top Volume (ac-ft)	Estimated RSF Cost without Land (\$)	RSF Top Volume (ac-ft)	Estimated RSF Cost without Land (\$)
NCM	1	1.1	\$311,500	2.0	\$514,000	2.0	\$514,000
	2	1.5	\$398,600	3.9	\$816,400	3.9	\$816,400
	SUBTOTAL	2.6	\$710,100	5.9	\$1,330,400	5.9	\$1,330,400
URA	3	5.3	\$958,100	5.4	\$961,200	5.4	\$961,200
	4	9.1	\$1,585,600	8.3	\$1,451,700	9.5	\$1,649,600
	5	1.8	\$470,400	1.8	\$474,000	1.8	\$474,000
	6	1.1	\$311,500	1.1	\$323,500	1.1	\$323,500
	7	13.4	\$2,334,800	13.4	\$2,338,200	13.9	\$2,424,900
	8	7.9	\$1,376,500	7.5	\$1,311,900	6.4	\$1,106,100
	9	2.5	\$588,100	2.5	\$593,000	2.5	\$593,000
	10	1.5	\$398,600	1.5	\$396,000	1.5	\$396,000
	11	5.7	\$993,200	5.7	\$984,800	5.7	\$984,800
	12	4.4	\$862,500	4.9	\$904,800	4.9	\$904,800
	SUBTOTAL	52.7	\$9,879,300	52.2	\$9,739,100	52.6	\$9,817,900
	SCMAA	13	10.9	\$1,899,200	11.1	\$1,931,900	10.5
14		1.6	\$425,100	1.6	\$422,200	1.6	\$418,700
15		1.8	\$470,400	1.8	\$475,000	1.8	\$475,000
16		4.2	\$878,200	4.2	\$867,700	4.4	\$870,600
17		1.4	\$378,100	1.5	\$409,700	1.4	\$378,400
18		3.6	\$784,100	3.7	\$798,200	2.9	\$651,800
19		4.6	\$901,700	4.7	\$897,700	3.5	\$764,500
20		3	\$666,500	2.7	\$611,100	2.3	\$559,600
21		5	\$925,700	5.0	\$918,900	5.0	\$918,900
22		2.4	\$569,800	2.7	\$619,900	2.7	\$619,900
SUBTOTAL	38.5	\$7,898,800	39.2	\$7,952,300	36.2	\$7,480,200	
TOTAL	93.8	\$18,488,200	97.2	\$19,021,800	94.7	\$18,628,500	

Stormwater Conveyance

The following discussion highlights the potential needs for stormwater conveyance systems by scenario. Table 7 compares all three scenarios.

Scenario 1

Table 7. Scenario 1 - Stormwater Major Conveyance Improvements

North Cooper Mountain			
Pipe Diameter	Total Length (ft)	Unit Cost (\$/LF)	Subtotal (\$)
12	1,300	\$218	\$283,400
15	4,300	\$258	\$1,109,400
18	3,300	\$296	\$976,800
21	1,900	\$335	\$636,500
Subtotal	10,800		\$3,006,100
Urban Reserve Area			
Pipe Diameter	Total Length (ft)	Unit Cost (\$/LF)	Subtotal (\$)
12	1,400	\$218	\$305,200
15	3,200	\$258	\$825,600
18	8,300	\$296	\$2,456,800
21	3,100	\$335	\$1,038,500
24	1,400	\$456	\$638,400
36	3,500	\$583	\$2,040,500
Subtotal	20,900		\$7,305,000
South Cooper Mountain Annexation Area			
Pipe Diameter	Total Length (ft)	Unit Cost (\$/LF)	Subtotal (\$)
15	4,900	\$258	\$1,264,200
18	9,900	\$296	\$2,930,400
24	4,500	\$456	\$2,052,000
Subtotal	19,300		\$6,246,600
Total:			\$16,557,700

North Cooper Mountain

To protect the McKernan Creek tributaries, a stormwater conveyance system is recommended south of the ridge line. Flow would be diverted along Grabhorn Road. This area is not upland of any proposed RSF. Pipe sizes and costs would generally be the same among all the scenarios.

Urban Reserve Area

Pipes along Grabhorn and Tile Flat Roads would capture the majority of flow below the six RSFs recommended west of SW 175th Avenue. This pipe would increase in size along the road as it would accumulate flow along its path. By contrast, the pipe systems along SW 175th Avenue would be short segments devoted to directing flow to the new RSFs. East of SW 175th Avenue, flow would be diverted to Summer Creek or to a new system directing flow to RSF 11. This facility would protect the stream in SCMAA.

South Cooper Mountain Annexation Area

Major lines along the roadways are shown. In addition, a pipeline connecting RSF 12 to RSF 13 is shown. The exact layout of course will depend on development; this line is shown to ensure the outflow from RSF 12 is properly anticipated as SCMAA is developed.

Scenario 2

Table 8. Scenario 2 - Stormwater Mayor Conveyance Improvements

North Cooper Mountain			
Pipe Diameter	Total Length (ft)	Unit Cost (\$/LF)	Subtotal (\$)
12	1,300	\$218	\$283,400
15	4,300	\$258	\$1,109,400
18	3,300	\$296	\$976,800
21	1,900	\$335	\$636,500
Subtotal	10,800		\$3,006,100
Urban Reserve Area			
Pipe Diameter	Total Length (ft)	Unit Cost (\$/LF)	Subtotal (\$)
12	300	\$218	\$65,400
15	5,500	\$258	\$1,419,000
18	10,200	\$296	\$3,019,200
24	1,400	\$456	\$638,400
36	4,000	\$583	\$2,332,000
Subtotal	21,400		\$7,474,000

South Cooper Mountain Annexation Area			
Pipe Diameter	Total Length (ft)	Unit Cost (\$/LF)	Subtotal (\$)
12	700	\$218	\$152,600
15	8,000	\$258	\$2,064,000
18	6,000	\$296	\$1,776,000
21	1,300	\$335	\$435,500
24	4,500	\$456	\$2,052,000
Subtotal	20,500		\$6,480,100
Total:			\$16,960,200

North Cooper Mountain

The system here is largely the same as for Scenario 1.

Urban Reserve Area

The modified roadway system for SW 175th Avenue will require additional lengths of storm conveyance pipe and management of flow intended to be routed to RSFs 3, 4, and 5; and to 16, 17, and 18. Areas east of SW 175th Avenue are the same as for Scenario 1. Flow will be easier to direct to RSF 12.

South Cooper Mountain Annexation Area

The modified connection from SW Scholls Ferry Road to SW Grabhorn Road will increase the length of pipe required from that of Scenario 1. This roadway scenario also has two additional stream crossings.

Scenario 3

Table 9. Scenario 3 - Stormwater Major Conveyance Improvements

North Cooper Mountain			
Pipe Diameter	Total Length (ft)	Unit Cost (\$/LF)	Subtotal (\$)
12	2,600	\$218	\$566,800
15	4,700	\$258	\$1,212,600
18	3,300	\$296	\$976,800
21	1,900	\$335	\$636,500
Subtotal	12,500		\$3,392,700

Urban Reserve Area			
Pipe Diameter	Total Length (ft)	Unit Cost (\$/LF)	Subtotal (\$)
12	1,200	\$218	\$261,600
15	5,900	\$258	\$1,522,200
18	7,000	\$296	\$2,072,000
21	3,100	\$335	\$1,038,500
36	3,000	\$583	\$1,749,000
Subtotal	20,200		\$6,643,300

South Cooper Mountain Annexation Area			
Pipe Diameter	Total Length (ft)	Unit Cost (\$/LF)	Subtotal (\$)
12	700	\$218	\$152,600
15	3,200	\$258	\$825,600
18	6,200	\$296	\$1,835,200
21	1,800	\$335	\$603,000
24	2,700	\$456	\$1,231,200
Subtotal	14,600		\$4,647,600
Total:			\$14,683,600

North Cooper Mountain

The system here is largely the same as for Scenario 1.

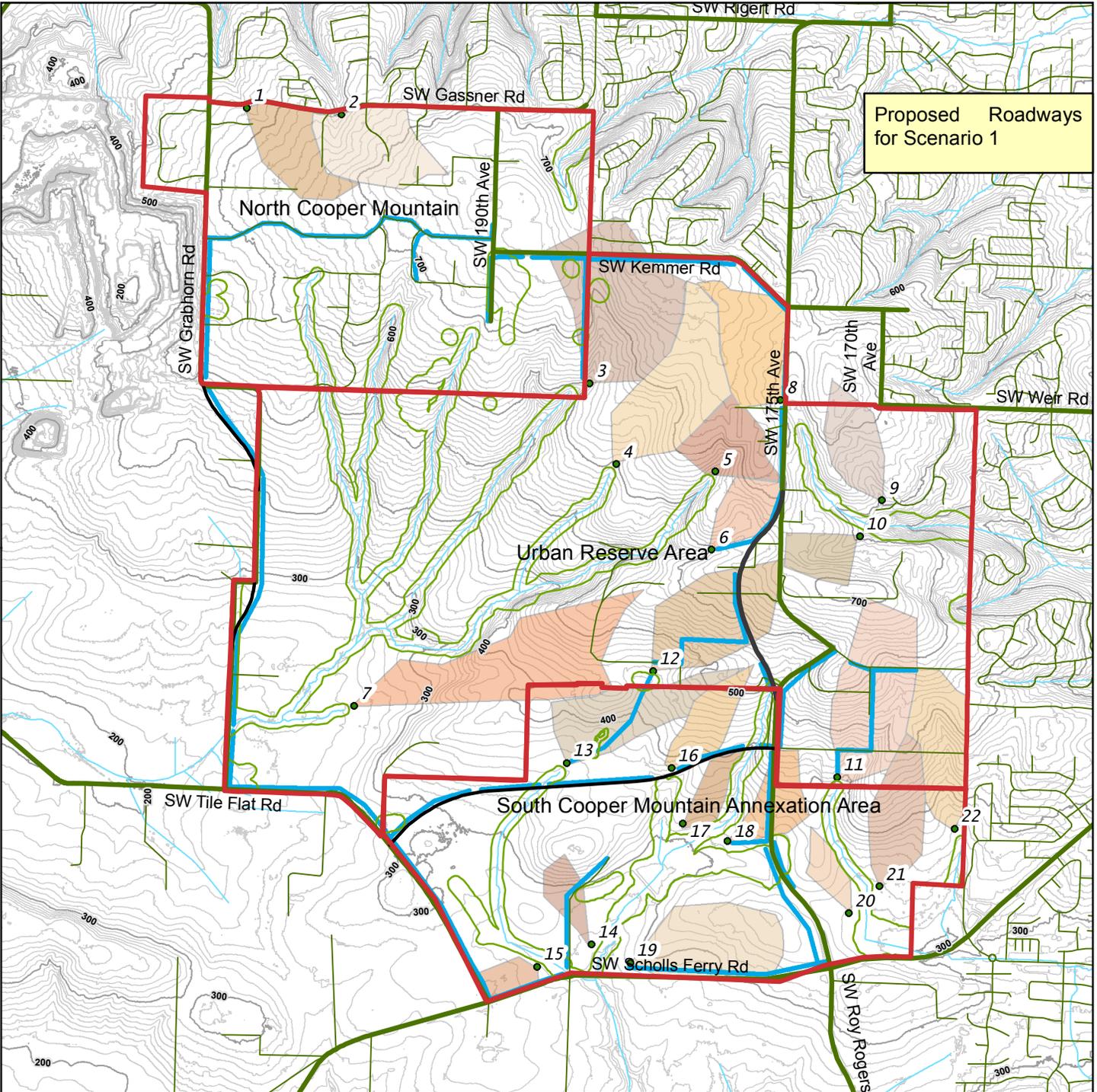
Urban Reserve Area

The new roadway connecting to SW 185th Avenue and the split roadway system to SW 175th Avenue will require additional lengths of storm conveyance pipe. Flow will be easier to direct to RSFs 3, 4, 5, and 6. Areas east of SW 175th Avenue are the same as for Scenario 1.

South Cooper Mountain Annexation Area

Slightly different routing of storm flow may be possible along the new roadway connecting SW Scholls Ferry Road to SW Grabhorn Road. This variation was associated with this scenario in order to provide information on how much this approach might cost.

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Proposed Roadways for Scenario 1

South Cooper Mountain Potential Stormwater System--Scenario 1

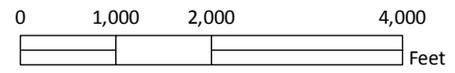
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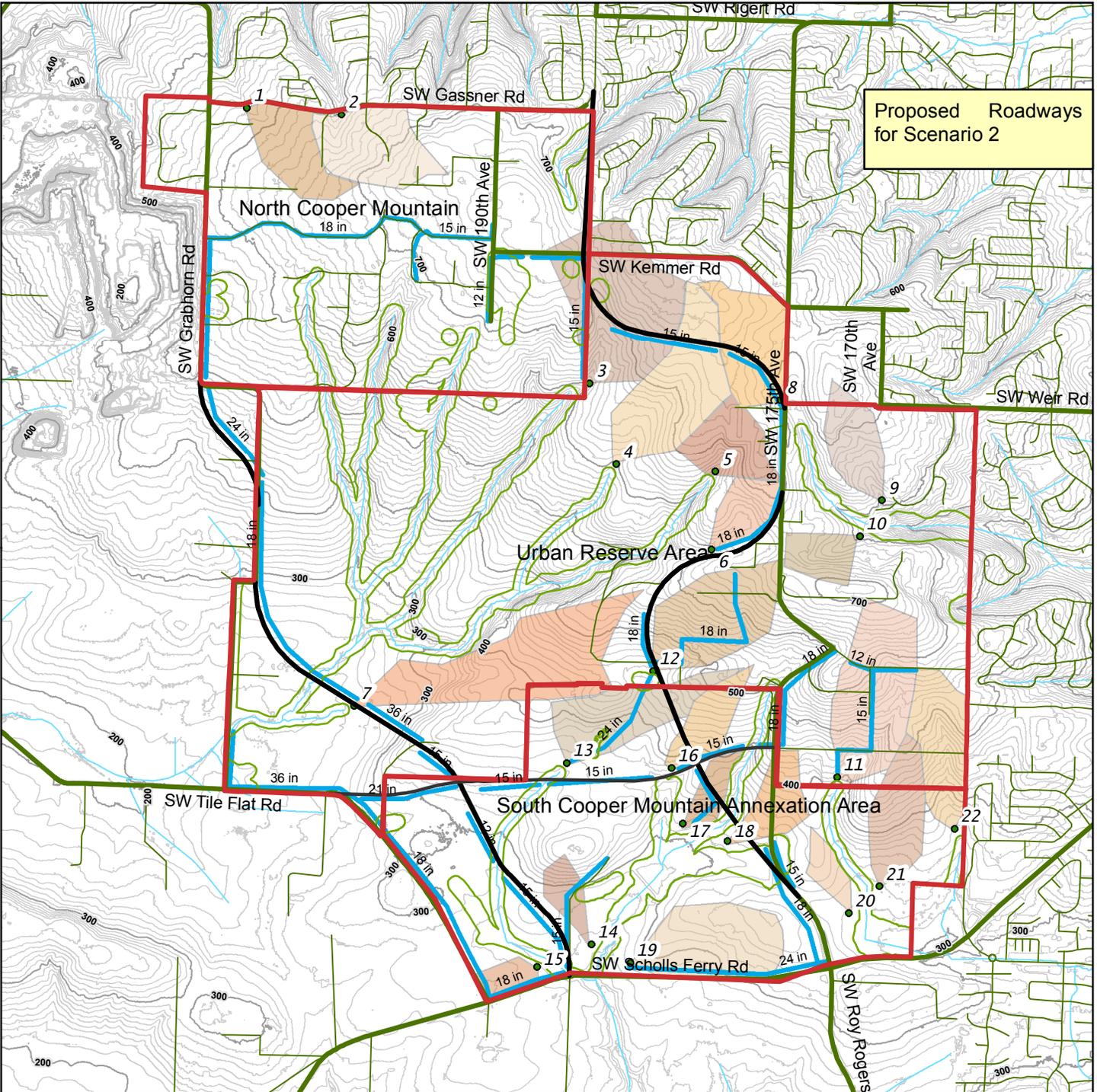
South Cooper Mountain Study Area	Streams	Pond Area			
CWS Vegetated Corridor	Major Contour (100' interval)	1	7	12	18
Existing Arterials	Minor Contour (10' interval)	2	8	13	19
New Arterial	Storm Pipes Scenario 1	3	9	14	20
New Collector	Stormwater Ponds	4	10	15	21
Streets		5	11	16	22

Prepared By: David Evans and Associates, Inc. Date: 11/1/2013

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl

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Proposed Roadways for Scenario 2

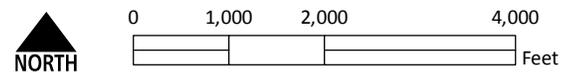
South Cooper Mountain Potential Stormwater System--Scenario 2

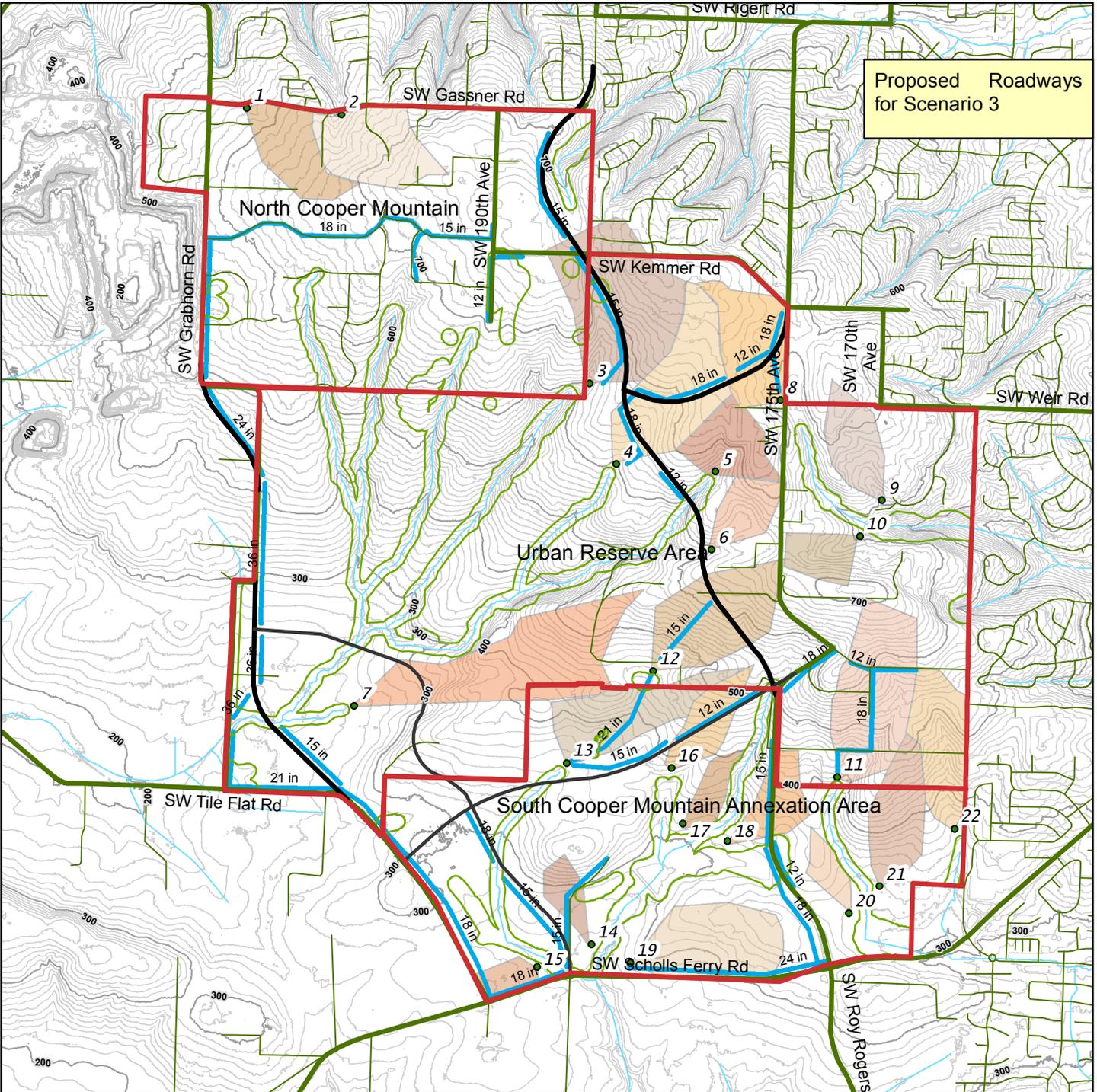
Legend

- South Cooper Mountain Study Area
- Streams
- Pond Area 6
- CWS Vegetated Corridor
- Major Contour (100' interval)
- Pond Area 12
- Existing Arterials
- Minor Contour (10' interval)
- Pond Area 18
- New Arterial
- Storm Pipes Scenario 2
- Pond Area 24
- Streets
- Stormwater Ponds
- Pond Area 30

Prepared By: David Evans and Associates, Inc. Date: 11/1/2013

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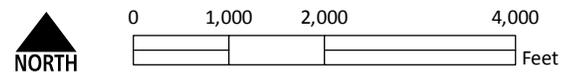
South Cooper Mountain Potential Stormwater System--Scenario 3

Legend

- South Cooper Mountain Study Area
- Streams
- Pond Area**
- CWS Vegetated Corridor
- Major Contour (100' interval)
- 6
- Existing Arterials
- Minor Contour (10' interval)
- 7
- New Arterial
- Storm Pipes Scenario 3
- 8
- New Collector
- 9
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MEMORANDUM

DATE: June 27, 2014
TO: South Cooper Mountain Technical Advisory Committee
Cc: South Cooper Mountain Project Management Team
FROM: Carl Springer, Kevin Chewuk
SUBJECT: Transportation Findings for Preferred Scenario

P13036-000

This memorandum summarizes the future transportation conditions under the preferred land use scenario and transportation framework associated with the South Cooper Mountain Concept Plan.¹ Included is documentation of the assumptions and methodologies, an analysis of future motor vehicle conditions and an identification of multi-modal improvements needed to support future growth within the South Cooper Mountain Concept Plan area.

FUTURE GROWTH IN SOUTH COOPER MOUNTAIN

Land use is a key factor in developing a functional transportation system. The amount of land that is planned to be developed, the type of land uses, and how the land uses are mixed together have a direct relationship to the expected demands on the transportation system. Understanding the amount and type of land use is critical to maintaining or enhancing transportation system operations.

The 544 acres within the South Cooper Mountain annexation area, coupled with another 1,232 acres in the adjacent Urban Reserve and 510 acres in North Cooper Mountain are being studied together to create a cohesive vision for the area and identify appropriate areas for urbanization, natural resource protection, and trunk infrastructure. Prior to establishing and as a part of adopting the needed zoning to allow for development in suitable areas, the city is required to update all public facilities plans, including the 2035 Transportation System Plan (TSP). Land with the South Cooper Mountain Annexation Area and North Cooper Mountain are within the Urban Growth Boundary (UGB) and will be addressed in community plans that will describe their intended zoning and development implementation. Land in the Urban Reserve is not available for urban development until and unless it is brought into the UGB in the future.

¹ The Preferred Concept Scenario and transportation frameworks are in the memorandum titled “Preferred Concept Plan Scenario for South Cooper Mountain”, March 27, 2014, by Angelo Planning Group. The Preferred Concept Plan scenario was endorsed by the City Council on April 8, 2014 in Resolution 4232. The memorandum and resolution are available from the project’s webpage: www.beavertonoregon.gov/southcooperplan



The long range build-out of the area (both UGB areas and Urban Reserve) is estimated to include over 7,400 housing units and more than 480 jobs. In addressing changing transportation needs in the area with the Concept Plan growth, the impact of the increased vehicle trip generation on the surrounding transportation system, as a result of full build-out over the long term, will be evaluated through the year 2035.² The new information obtained from this system analysis has been used to develop a set of transportation improvements and standards that served to inform the creation of the preferred Concept Plan Scenario, ongoing infrastructure funding analysis, and updates to the comprehensive plans and Transportation System Plans for the South Cooper Mountain Concept Plan area.

Estimating Driving Trips

A determination of future street network needs requires the ability to accurately forecast travel demand resulting from estimates of future population and employment for the South Cooper Mountain Concept Plan area, and the rest of the City and Metro region. The objective of the transportation planning process is to provide the information necessary for making decisions about how and where improvements should be made to create a safe and efficient transportation system that provides travel options.

The travel demand forecasting process generally involves estimating travel patterns for new development based on the decisions and preferences demonstrated by existing residents, employers and institutions around the region. Travel demand models are mathematical tools that help us understand future commuter, school and recreational travel patterns including information about the length, mode and time of day a trip will be made. The latest travel models are suitable for motor vehicle and transit planning purposes, and can produce total volumes for autos, trucks and buses on each street and highway in the system. Model forecasts are refined by comparing outputs with observed counts and behaviors on the local. This refinement step is completed before any evaluation of system performance is made. Once the traffic forecasting process is complete, the 2035 volumes are used to determine the areas of the street network that are expected to be congested and that may need future investments to accommodate growth.

Washington County has a travel demand model that is based on Metro's Regional travel demand model. For the South Cooper Mountain Concept Plan, the Washington County travel demand model was refined to reflect the planned land use and roadway network envisioned as part of the Concept Plan.

Land Use and Motor Vehicle Trip Assumptions

As shown in Table 1, the South Cooper Mountain Concept Plan includes about 7,400 housing units and about 480 employees in the Preferred Scenario.

Vehicle trips that would be generated by the Concept Plan area were estimated by applying travel demand model trip generation rates by land use type, which were developed by Washington County staff based on westside trip patterns in the Metro model. Overall, the South Cooper Mountain Concept Plan area is expected to generate about 3,800 motor vehicle trips during the p.m. peak hour of the Preferred Scenario,

² Actual build-out will not likely occur by 2035. The portions of the Urban Reserve that would be developed are dependent upon future decisions regarding expansion of the UGB.



which is about 400 more than what would be expected during the p.m. peak hour of the TSP Baseline Scenario (about 3,400 trip ends).

Table 1: Land Use Assumptions for South Cooper Mountain Concept Plan

Scenario	Housing Units	Retail Employees	Other Employees	PM Peak Hour Vehicle Trips Ends
2035 TSP Baseline (Beaverton TSP)*	6,996	70	390	3,378
2035 Preferred Scenario	7,430	46	436	3,790

*Based on the disaggregated Washington County Model

Serving Growth

The starting point for the 2035 performance analysis relied on the list of street system improvement projects contained in the Metro Regional Transportation Plan, Beaverton Transportation System Plan, Washington County Transportation System Plan, and Hillsboro Transportation System Plans. These projects represent only those that have been previously planned, and therefore are not directly related to the growth in the South Cooper Mountain Concept Plan area. Additional transportation projects will be needed to support growth in the South Cooper Mountain Concept Plan area, however, they cannot be assumed for the baseline traffic analysis. The improvements that were assumed include:

- Scholls Ferry Road widening to five lanes from Teal-Horizon Boulevard to west of 175th Avenue-Roy Rogers Road (Washington County)
- Traffic signal installations at the Scholls Ferry Road/Tile Flat Road, Roy Rogers Road/Beef Bend Road, and Roy Rogers Road/Scholls-Sherwood Road intersections (Washington County)
- Extension of Weir Road from 170th Avenue to 175th Avenue (Beaverton TSP)
- Extension of Kemmer Road from 170th Avenue to Nora Road (Beaverton TSP)
- Add a westbound right turn lane at the Murray Boulevard/Beard Road-Brockman Road intersection (Beaverton)
- Widen 209th Avenue-Grabhorn Road to five lanes, north of Leland Drive (Hillsboro TSP/ South Hillsboro Concept Plan)
- Widen Farmington Road to five lanes through the 185th Avenue intersection (Metro Regional Transportation Plan)
- Install a traffic signal at the Roy Rogers Road/Bull Mountain Road intersection (Washington County TSP/ West Bull Mountain Concept Plan)
- Widen Roy Rogers Road-175th Avenue to five-lanes from just north of Scholls Ferry Road to just south of Beef Bend Road (Washington County TSP/ West Bull Mountain Concept Plan)
- Construct a regional shared-use path (Cooper Mountain Regional Trail) between the 175th Avenue/Weir Road intersection, the 185th Avenue/Gassner Road intersection (along the west side of the 185th Avenue extension), and the Grabhorn Road/Gassner Road intersection (Metro Regional Transportation Plan)



2035 MOTOR VEHICLE OPERATIONS

Future traffic forecasts were prepared for 2035 for the following scenarios:

- **2035 TSP Baseline**– this assumes the land use within Washington County’s version of Metro’s Regional Travel Demand Forecast Model. This scenario includes 6,996 households in the South Cooper Mountain area and is assumed to match the forecast of the current Beaverton Transportation System Plan. It includes the improvement projects listed in the “Serving Growth” section and the traffic volumes shown in Figures 1a and 1b.
- **2035 Preferred Scenario**– this scenario assumes slightly higher amounts of potential development for the South Cooper Mountain area compared to the TSP Baseline Scenario (7,430 households and 482 employees). It also includes the improvement projects listed in the “Serving Growth” section and the traffic volumes shown in Figures 2a and 2b.

In addition, future traffic forecasts were developed for the Preferred Scenario with only the growth in the South Cooper Mountain Annexation Area. For this scenario, no growth was assumed in North Cooper Mountain or in the Urban Reserves as a sensitivity test to evaluate the short term impacts of growth in the South Cooper Mountain Annexation Area.

Metro’s Regional Travel Demand Model assumes build-out of these areas through the planning horizon of 2035; however, the project team assumes that this is likely to happen beyond that timeline, if it happens at all.³ It was found that after assuming no growth in the in North Cooper Mountain or Urban Reserves areas, the associated vehicle trips that would take up the available capacity on adjacent streets is often back-filled with other regional traffic. In other words, future congestion on parallel arterials routes (such as Murray Boulevard, or Highway 217) could potentially cause drivers to re-route to major streets in the South Cooper Mountain Concept Plan area (such as 175th Avenue, Grabhorn Road or Kemmer Road), therefore, the traffic operational results shown in Table 2 are often similar between the South Cooper Mountain Annexation Area Only Scenarios and the Preferred Scenario.

Motor vehicle conditions were evaluated during the 2035 evening peak hour at the twenty-six study intersections (shown in Table 2). The evaluation utilized 2000 Highway Capacity Manual methodology for signalized and 2010 Highway Capacity Manual methodology for unsignalized intersections.

After assuming the street system improvement projects listed in the “Serving Growth” section above, several intersections are expected to exceed mobility targets under each scenario. Many of these intersections were previously forecasted to exceed standards in the Beaverton, and Washington County Transportation System Plans. In fact, the Preferred Scenario improves operations at a few intersections compared to the TSP Base Case Scenario since traffic would be expected to reroute after assuming the improvements needed to support growth within the South Cooper Mountain Concept Plan area.

³ Urban levels of development in the Urban Reserve cannot occur unless the Urban Growth Boundary is expanded to include some or all of those lands.



It should be noted that the Metro Regional Transportation Plan, Beaverton Transportation System Plan, Washington County Transportation System Plan, and Hillsboro Transportation System Plans recommend various improvements, including widening of Farmington Road to five lanes at 185th Avenue, widening 209th Avenue to five lanes at the Farmington Road intersection, installing a westbound right-turn lane at the Murray Boulevard/Beard Road-Brockman Road intersection, widening Roy Rogers Road to five lanes, and installing a traffic signal at the Roy Rogers Road/Bull Mountain Road intersection. This updated system analysis re-affirms the need for improvements at these locations.



Table 2: Study Intersection Operations (2035 p.m. peak)

Intersection (traffic control)*	Mobility Target	TSP Baseline		Preferred Scenario - South Cooper Mountain Annexation Area Only		Preferred Scenario		Planned Intersection Solution
		Volume/ Capacity	Level of Service	Volume/ Capacity	Level of Service	Volume/ Capacity	Level of Service	
Farmington Road/ Grabhorn Road-209th Avenue (signalized)	0.99 v/c	0.86	C	0.82	C	0.83	C	Widen 209th Avenue-Grabhorn Road to five lanes
Farmington Road/ Miller Hill Road (unsignalized)	0.99 v/c	0.77	F	0.80	F	0.80	F	N/A
Farmington Road/ 185th Avenue (signalized)	0.99 v/c	0.99	E	0.95	E	0.99	E	Widen Farmington Road to five lanes
Gassner Road/ Grabhorn Road (unsignalized)	0.99 v/c	0.61	D	0.35	C	0.66	E	N/A
Gassner Road/ 190th Avenue (all-way stop)	0.99 v/c	0.64	C	0.52	B	0.57	B	N/A
Bany Road/ 185th Avenue (unsignalized)	0.99 v/c	0.35	F	0.25	D	0.28	E	N/A
Bany Road/ 170th Avenue (signalized)	0.99 v/c	1.05	E	0.93	D	0.98	D	N/A
Rigert Road/ 170th Avenue (all-way stop)	0.99 v/c	1.32	F	0.97	F	1.10	F	N/A
Kemmer Road/ 175th Avenue (all-way stop)	0.99 v/c	>1.50	F	1.19	F	1.35	F	N/A
Weir Road/ 155th Avenue (all-way stop)	45 seconds	0.54	B	0.47	B	0.65	C	N/A
Murray Boulevard/ Beard Road-Brockman Road (signalized)	0.99 v/c	0.89	D	0.88	D	0.89	D	Add a westbound right turn lane
Murray Boulevard/ Weir Road (signalized)	0.99 v/c	0.61	A	0.55	A	0.58	A	N/A
Tile Flat Road/ Grabhorn Road (unsignalized)	0.90 v/c	0.78	D	0.01	B	0.09	B	N/A
Scholls Ferry Road/ River Road (roundabout)	0.90 v/c	0.56	A	0.47	A	0.51	A	N/A
Scholls Ferry Road/ Clark Hill Road (unsignalized)	0.90 v/c	0.70	F	0.41	F	0.45	F	N/A

Transportation Findings for Preferred Scenario

June 27, 2014

Page 7 of 21

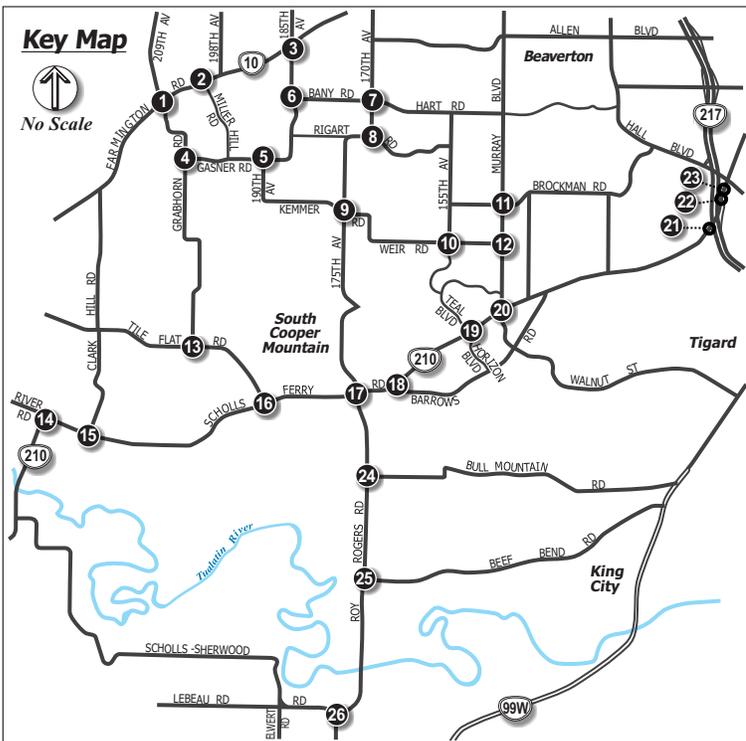


Scholls Ferry Road/ Tile Flat Road (unsignalized)	0.99 v/c	1.08	D	0.84	C	0.73	C	Install a traffic signal
Scholls Ferry Road/ Roy Rogers Road-175th Avenue (signalized)	0.99 v/c	1.09	E	0.79	D	0.80	D	Widen Roy Rogers Road-175th Avenue to five lanes; Widen Scholls Ferry Road to five lanes
Scholls Ferry Road/ Barrows Road (signalized)	0.98 v/c	0.76	C	0.74	B	0.68	C	Widen Scholls Ferry Road to five lanes
Scholls Ferry Road/ Horizon-Teal Boulevard (signalized)	0.99 v/c	1.11	F	1.00	E	1.06	F	Widen Scholls Ferry Road to five lanes
Scholls Ferry Road/ Murray Boulevard (signalized)	0.99 v/c	1.06	F	1.02	E	1.07	F	N/A
Scholls Ferry Road/ Highway 217 Southbound Ramps (signalized)	0.85 v/c	0.84	C	0.84	C	0.85	C	N/A
Scholls Ferry Road/ Highway 217 Northbound Off-Ramp (signalized)	0.85 v/c	0.54	B	0.54	B	0.54	B	N/A
Scholls Ferry Road/ Highway 217 Northbound On-Ramp (signalized)	1.10 v/c	0.71	C	0.71	C	0.71	C	N/A
Roy Rogers Road/ Bull Mountain Road (unsignalized)	0.99 v/c	0.68	B	0.87	C	0.84	C	Install a traffic signal; Widen Roy Rogers Road-175th Avenue to five-lanes
Roy Rogers Road/ Beef Bend Road (unsignalized)	0.90 v/c	0.72	B	0.74	B	0.73	B	Install a traffic signal; Widen Roy Rogers Road-175th Avenue to five-lanes
Roy Rogers Road/ Scholls-Sherwood Road (unsignalized)	0.90 v/c	0.93	C	0.92	C	0.94	C	Install a traffic signal

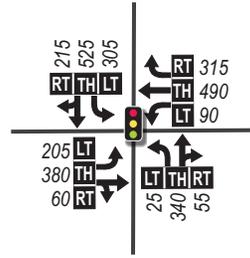
Bolded Red indicates intersection exceeds mobility target

Note: * V/C ratio, LOS and delay reported as the intersection average at signalized locations and worst stop controlled approach at unsignalized locations

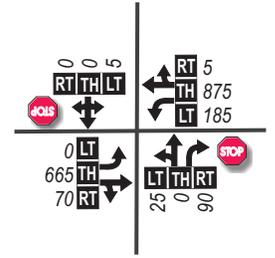
** V/C ratio reported for worst movement



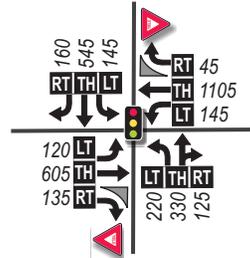
1 Farmington Rd./Grabhorn Rd.-209th Ave.



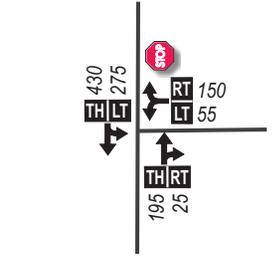
2 Farmington Rd./Miller Hill Rd.



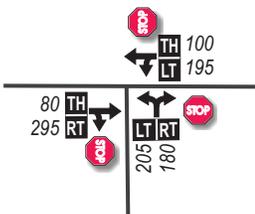
3 Farmington Rd./185th Ave.



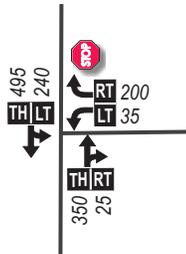
4 Gassner Rd./Grabhorn Rd.



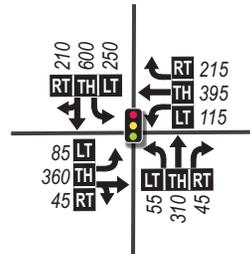
5 Gassner Rd./190th Ave.



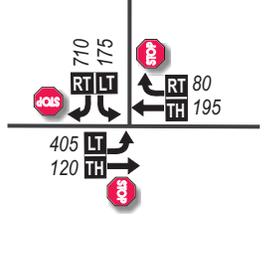
6 Bany Rd./185th Ave.



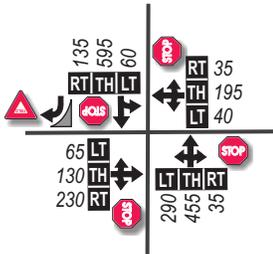
7 Bany Rd./170th Ave.



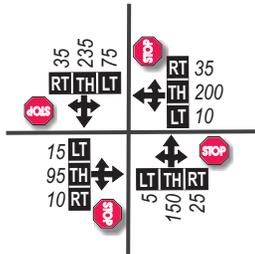
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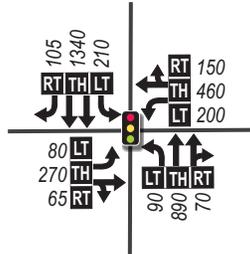
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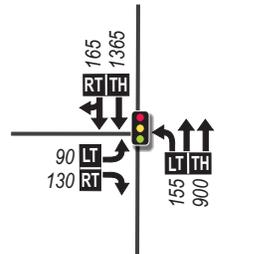
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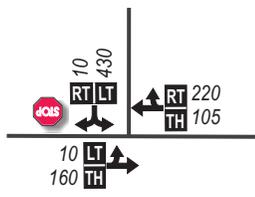
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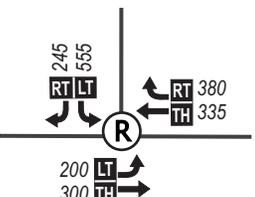
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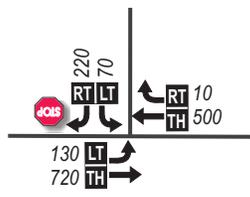
13 Tile Flat Rd./Grabhorn Rd.



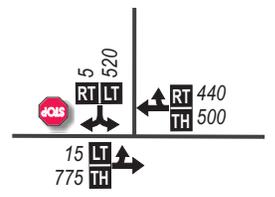
14 Scholls Ferry Rd./River Rd.



15 Scholls Ferry Rd./Clark Hill Rd.



16 Scholls Ferry Rd./Tile Flat Rd.



LEGEND

- - Study Intersection
- 🚦 - Traffic Signal
- 🛑 - Stop Sign

Ⓜ - Roundabout

← - Lane Configuration

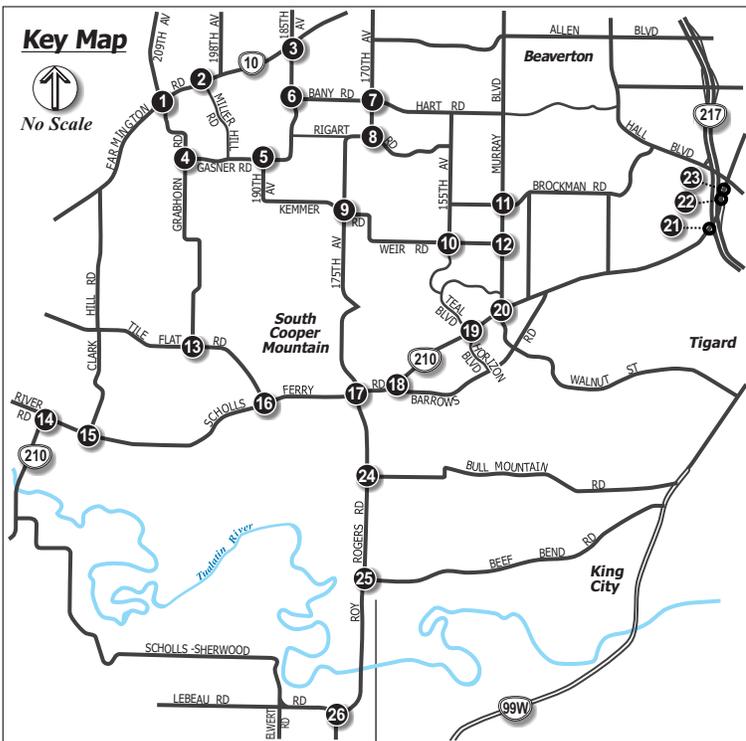
000 - PM Peak Hour Traffic Volumes

LT TH RT - Volume Turn Movement
Left • Thru • Right

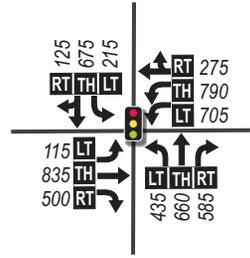
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Figure 1a

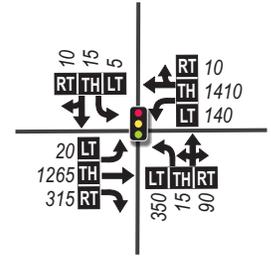
**2035 TSP BASELINE SCENARIO
TRAFFIC VOLUMES
(PM Peak Hour)**



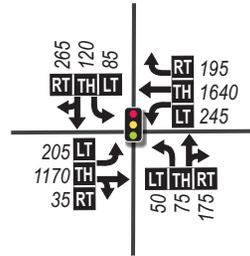
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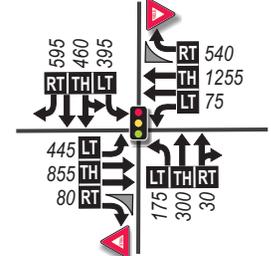
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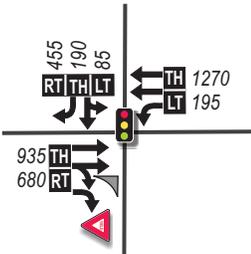
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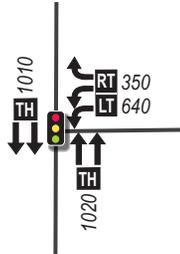
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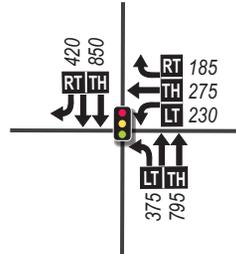
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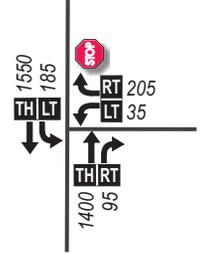
22 Scholls Ferry Rd./ SR 217 NB Off-Ramp



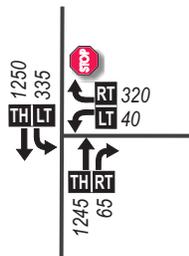
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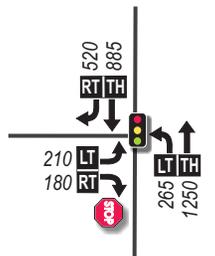
24 Roy Rogers Rd./Bull Mtn. Rd.



25 Roy Rogers Rd./Beef Bend Rd.



26 Roy Rogers Rd./ Scholls-Sherwood Rd.

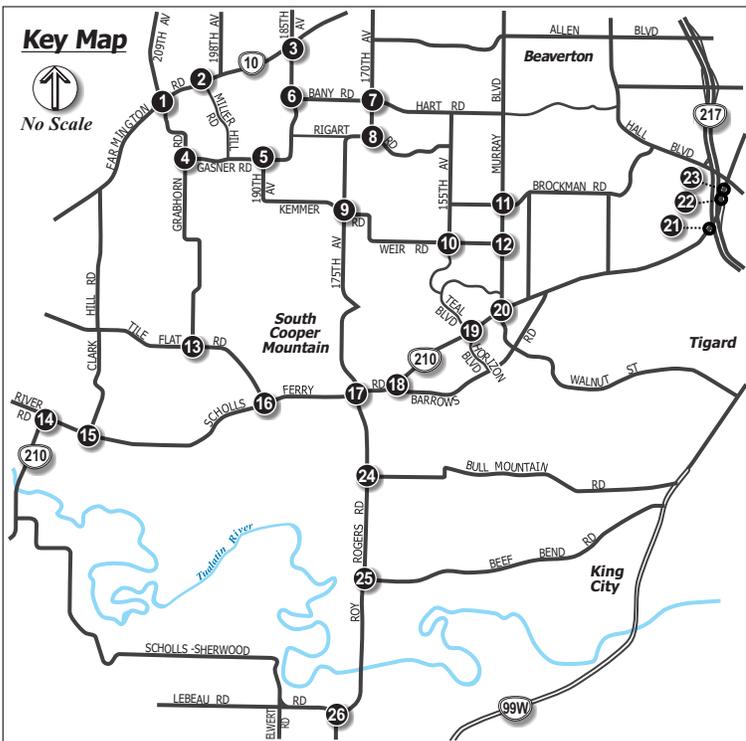


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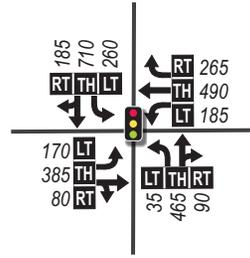
- Study Intersection
- Traffic Signal
- Stop Sign
- Yield Sign
- Lane Configuration
- 000 - PM Peak Hour Traffic Volumes
- Volume Turn Movement
Left•Thru•Right

DKS

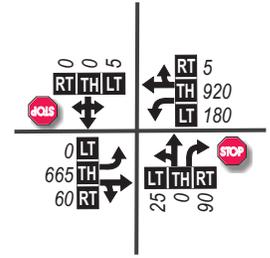
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2035 TSP BASELINE SCENARIO
TRAFFIC VOLUMES
(PM Peak Hour)



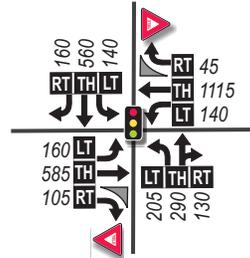
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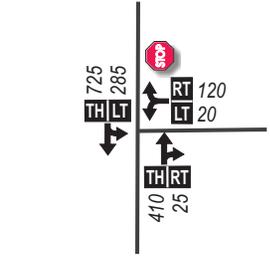
2 Farmington Rd./Miller Hill Rd.



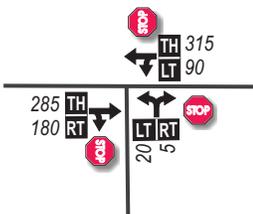
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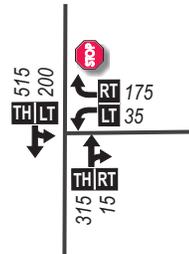
4 Gassner Rd./Grabhorn Rd.



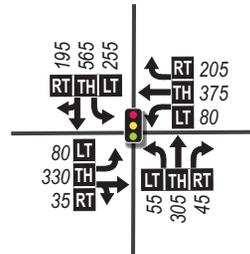
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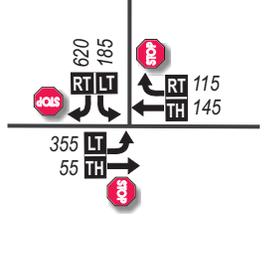
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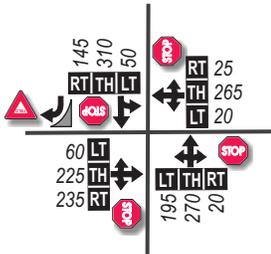
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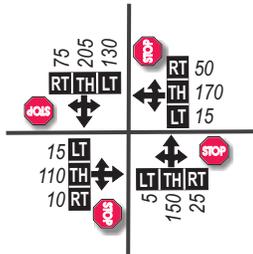
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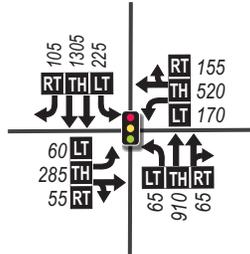
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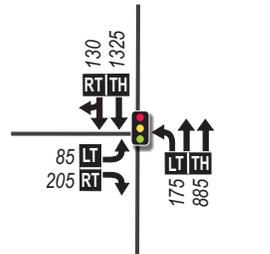
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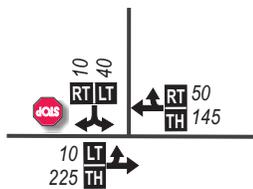
11 Murray Blvd./Beard Rd.-Brockman Rd.



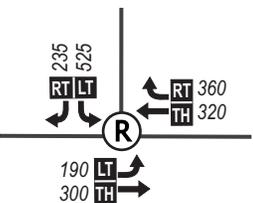
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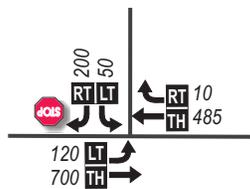
13 Tile Flat Rd./Grabhorn Rd.



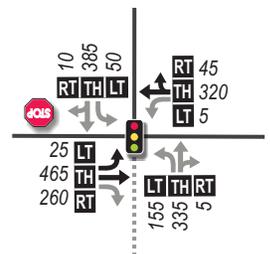
14 Scholls Ferry Rd./River Rd.



15 Scholls Ferry Rd./Clark Hill Rd.



16 Scholls Ferry Rd./Tile Flat Rd.



LEGEND

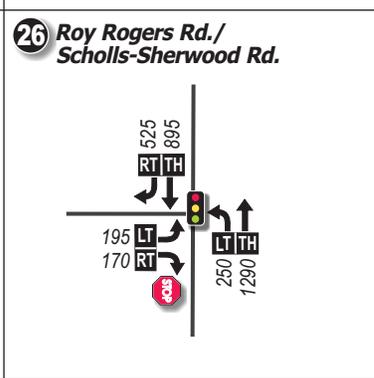
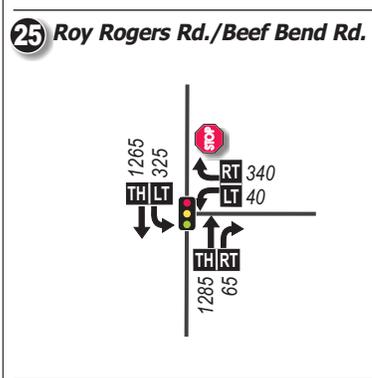
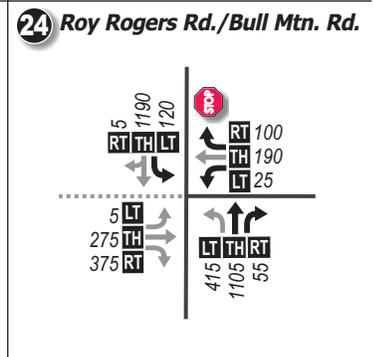
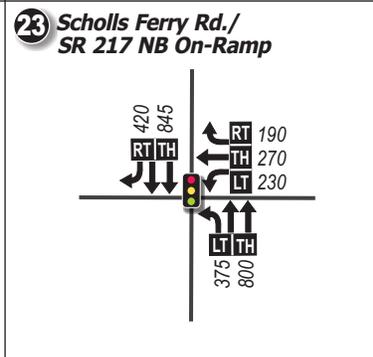
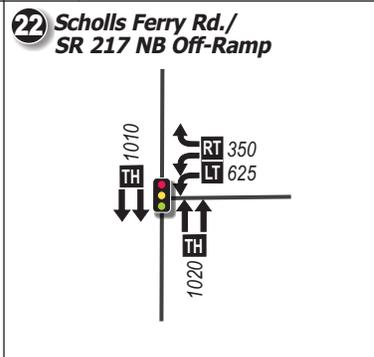
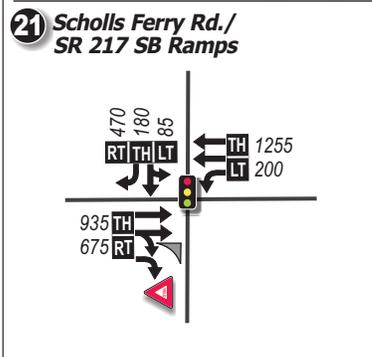
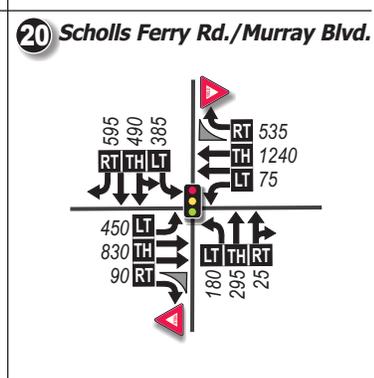
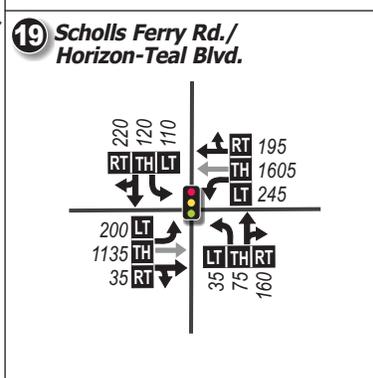
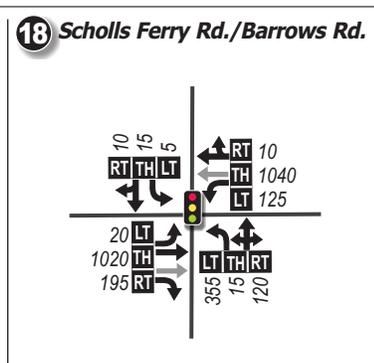
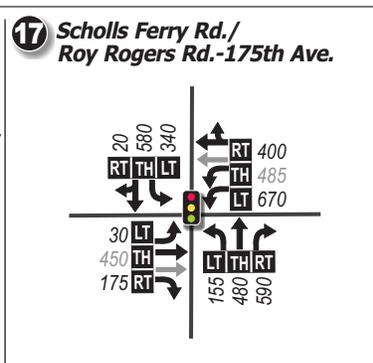
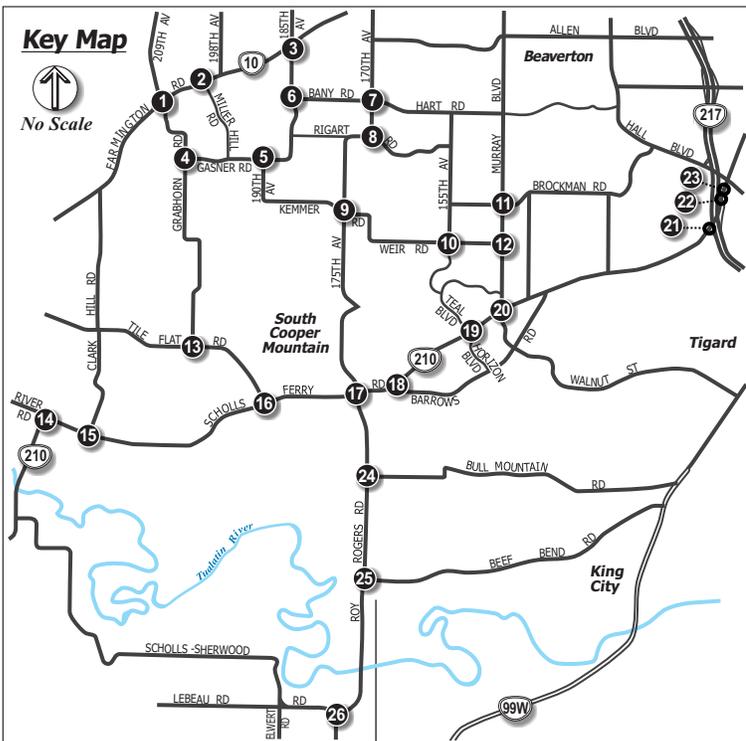
- Study Intersection
- Traffic Signal
- Stop Sign
- Yield Sign

- Roundabout
- Lane Configuration
- 000 - PM Peak Hour Traffic Volumes
- Volume Turn Movement
- LT•TH•RT - Left•Thru•Right

DKS

Figure 2a

**2035 PREFERRED SCENARIO
TRAFFIC VOLUMES
(PM Peak Hour)**



LEGEND

- Study Intersection
- Traffic Signal
- Stop Sign
- Yield Sign
- Lane Configuration
- 000 - PM Peak Hour Traffic Volumes
- Volume Turn Movement (Left•Thru•Right)

DKS **Figure 2b**

2035 PREFERRED SCENARIO
TRAFFIC VOLUMES
(PM Peak Hour)



STREET FUNCTIONAL CLASSIFICATION

The functional classification of roadways is a common practice in the United States. Traditionally, roadways are classified based on the type of vehicular travel it is intended to serve (local versus through traffic). In Beaverton, the functional classification of a roadway (shown later in this document in Figure 4 for the South Cooper Mountain Concept Plan area) determines the level of mobility for all travel modes, defining its design characteristics (such as minimum amount of travel lanes), level of access and usage within the City and region. The street functional classification system recognizes that individual streets do not act independently of one another but instead form a network that works together to serve travel needs on a local and regional level. From highest to lowest intended usage, the classifications are arterials, collectors, neighborhood routes, and local streets. Roadways with a higher intended usage generally provide more efficient motor vehicle traffic movement (or mobility) through the City, while roadways with lower intended usage provide greater access for shorter trips to local destinations.

These classifications were designated for the South Cooper Mountain Concept Plan Concept Plan area, including Arterial Streets (including Scholls Ferry Road, 175th Avenue, Grabhorn Road, and Kemmer Road), Collector Streets (including Gassner Road, a new east-to-east route between Loon Drive and Tile Flat Road, and a new north-to-south route between Scholls Ferry Road and Grabhorn Road, east of Tile Flat Road), Neighborhood Routes (including Alvord Lane extension between Tile Flat Road and 175th Avenue), and local streets (most streets in the South Cooper Mountain Concept Plan area). The applicable typical street sections for South Cooper Mountain Concept Plan can be seen in Figures A1, A2, A3, and A4 in the appendix.

WALKING AND BIKING

Residents in the South Cooper Mountain Concept Plan area will be able to safely and efficiently travel between destinations via any number of active transportation modes, such as walking, biking, or skating. A system of on-street sidewalks and bikeways, and shared use paths will provide quality access to key destinations—improving the overall health and livability of the neighborhood.

Walking and Biking Facilities

The proximity to the Cooper Mountain Nature Park and the potential for the development of many smaller neighborhood and larger community parks, is a significant asset for the future of South Cooper Mountain. To better serve the access needs of existing and future residents to these scenic natural and recreational areas, a high quality network of low-stress pedestrian and bicycle facilities is envisioned. Many proposed streets in the South Cooper Mountain area will include large vegetated medians and/or buffers to help maintain a natural, rural feel to the street. In addition to serving a traffic calming function, these streets will also provide informal areas for social activity, recreation, and play. For pedestrians, this means that sidewalks will be provided on all proposed streets—completely separate from the motor vehicle travelway. For bicyclists, dedicated facilities will vary based on roadway classification. Local streets will include shared lane markings to demonstrate where bicyclists should operate on the roadway—outside the parking lane door zone—and alert motorists to expect bicyclists on the roadway. Arterial and Collector streets will have physically separated facilities, such as bike lanes or shared-use paths, or will have accommodations on



adjacent routes. Wayfinding signage should also be developed to highlight key destinations, such as parks and shopping, and the best routes for pedestrians and bicyclists. These signs will improve destination and route finding for residents and visitors alike, encouraging exploration and activity.

Both the trail and on-street pedestrian and bicycle network are context sensitive, addressing the rural character of the South Cooper Mountain area, while also meeting the expressed community desire to have increased opportunities for walking and biking. Moreover, these networks will be fully integrated with the existing trail and bikeway network and the planned active transportation projects in the Metro Regional Trail and Greenways Plan. These measures help ensure that existing and future residents of South Cooper Mountain can access goods and services, without the need for an automobile, within and outside of the area.

Shared Use Paths

Figure 3 illustrates the potential active transportation network for the South Cooper Mountain neighborhood. The emphasis of this network is on connecting residents to existing and future trails, as defined in the Metro Regional Trail and Greenways Plan, as well as key destinations within and near to South Cooper Mountain. Trail access to important viewsheds in the South Cooper Mountain area will also be taken advantage of. For example, several trails will follow creeks (outside of vegetated corridors) through the middle and southern edge of the site, including the McKernan Creek Trail. The types of trails that are provided will vary by context—anything from pervious paver walking paths to concrete shared use paths for pedestrians and bicyclists. On many streets, there is also the potential to designate a path through an adjacent shared-use path. User comfort on these trails will be maximized due to the physical distance and separation from motor vehicle traffic.

On-Street Facilities

For pedestrians, sidewalks are the predominant facility type, and these will be installed on both sides of the roadways with an Arterial or Collector classification (as shown Figure 3). Local streets will be more flexible in their approach and could include pervious pavers or other surface types as a trail or sidewalk. The trails will maintain physical separation, via a landscaped buffer, from motor vehicle traffic, but will help to retain the rural character of South Cooper Mountain.

On Collector and Arterial streets—streets where traffic speeds and volumes are higher, bicyclists will be provided with physically separated facilities, such as a bike lane or shared-use path. However, the majority of streets in the South Cooper Mountain neighborhood will be Local streets, with lower traffic speeds and volumes.

TRANSIT

Based on discussions with Tri-Met officials and Tri-Met's Westside Service Enhancement Plan, the most likely near-term extension of transit service to the planning area is the extension of bus service from Washington Square to the SCMAA along Scholls Ferry Road. This route will likely include a stop at Progress Ridge as well. A future stop to serve the SCMAA could potentially be located at the planned Beaverton School District high school or at the Main Street, if the necessary facilities, including a bus pullout area and access to amenities for drivers (such as restrooms or shops) are available and if there is a logical way for the



bus to turn around. Service would potentially run daily throughout most of the day with fairly frequent service (15 to 20 minute headways) during peak times and half-hour to hour headways during off times.

In the longer-term, limited-stop commuter-oriented transit service could be provided from Sherwood to Hillsboro along Roy Rogers and 175th Avenue through the planning area. Future stops could be located adjacent to higher density nodes along 175th Avenue. Service would likely be limited to peak commute hours, and could be provided in a single direction (north) in the morning and the reverse direction (south) in the evening. This line would likely utilize the connection from 175th to 185th Avenue. Improvements to 175th to eliminate the sharp turn at “the kink” would be required in order to provide bus service on 175th Avenue.

South Cooper Mountain Concept & Community Plans

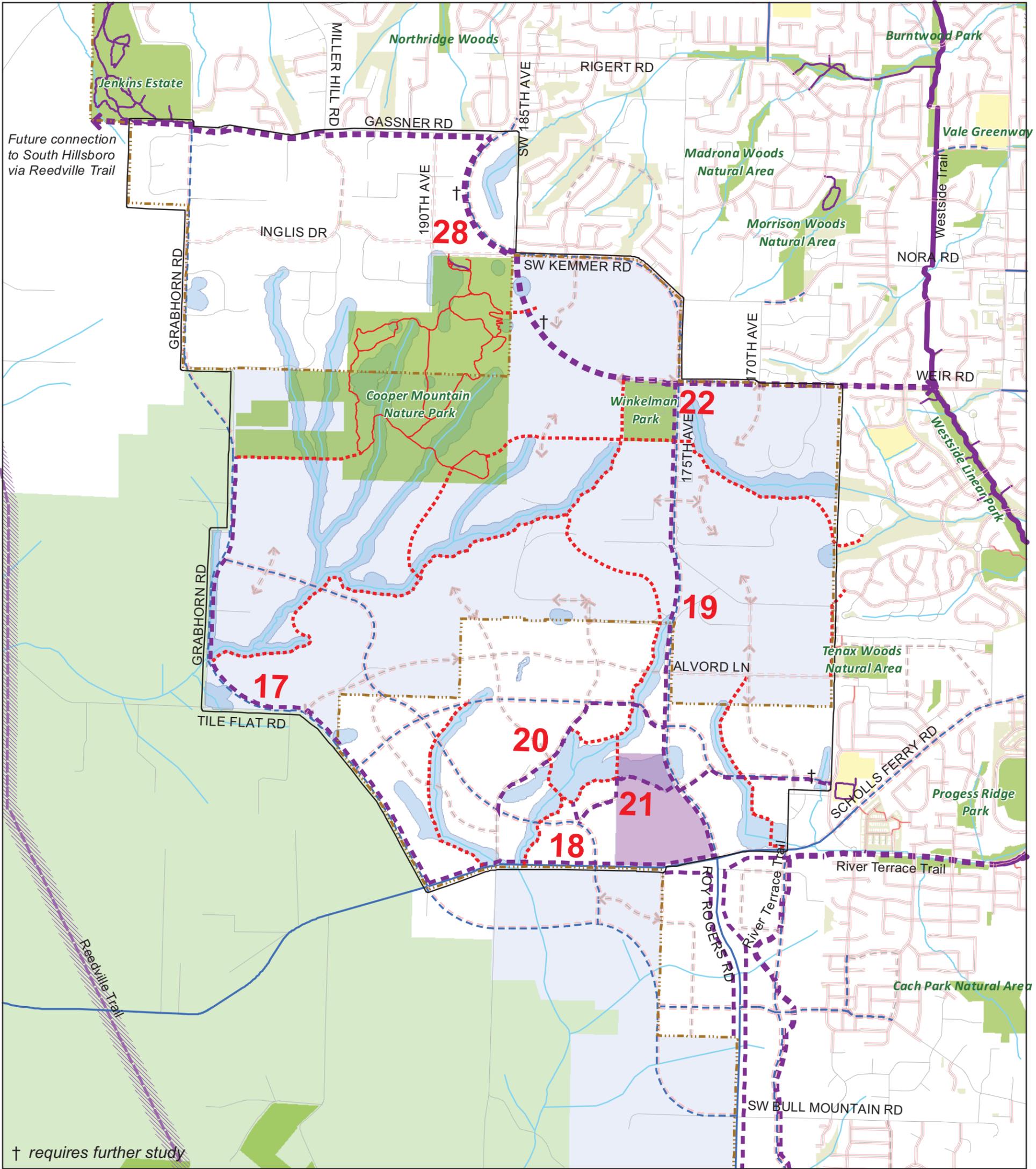
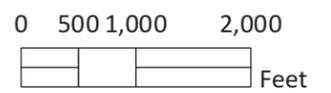


Figure 3: Final Preferred Bicycle & Pedestrian Framework



* New local streets (not shown) will have sidewalks.
** As amended by HB 4078A.





SUMMARY OF TRANSPORTATION SYSTEM RECOMMENDATIONS

Transportation improvements needed to support future growth and new development within the South Cooper Mountain Concept Plan area are summarized in Table 4. Overall, an estimated \$132 million in transportation system improvements are expected to be needed to support the growth conceptually planned for the full planning area (see Table 4). About 40 percent of the total project costs of these improvements (approximately \$48.3 million of the \$132 million) are expected to be caused by regional traffic growth. Forecasted traffic growth associated with development in the South Cooper Mountain Concept Plan area is expected to drive the need for about \$83.7 million worth of the total project costs. Of these total project costs, growth in the South Cooper Mountain Annexation area is expected to cause the need for about \$44.4 million, \$3.6 million in North Cooper Mountain, and \$35.7 million in the Urban Reserves, of the total project costs.

In addition, several projects were identified in previous studies or plans surrounding the South Cooper Mountain Concept Plan area. This updated system analysis re-affirmed the need for improvements at many of these locations. Since the need for these improvements are generally driven by regional traffic issues, and are not entirely caused by growth within the South Cooper Mountain Concept Plan area, they are shown separately in Table 5. Overall, an estimated \$88 million worth of improvements were previously identified in the Metro Regional Transportation Plan, Beaverton Transportation System Plan, Washington County Transportation System Plan, and Hillsboro Transportation System Plans. Of these previously planned projects, about \$30.8 million worth of the total improvement costs would be driven by growth within the South Cooper Mountain Concept Plan area.

The recommended improvements can be seen in Figure 3 (shown earlier in this document) and Figure 4, with the project numbers corresponding with those in Tables 4 and 5. Not all recommended improvements are required to be in place prior to developing land within the South Cooper Mountain Concept Plan area. The need to upgrade the existing streets will be driven by the multi-modal access needs of the adjacent properties. Many of the street extensions or realignments, including the Tile Flat extension to Bull Mountain Road, and some the curve realignments on Grabhorn Road will be dependent on permitting within their areas.

Tables 4 and 5 provide a general guide for the phasing of recommended transportation improvements. The year of need for each improvement was estimated based on an assumption of even and linear development growth over the planning period. Tables 4 and 5 also illustrate the relative proportion of future traffic growth for the South Cooper Mountain Annexation area, North Cooper Mountain, the Urban Reserves and other Regional Traffic growth, in relation to overall transportation improvement costs. Using the Regional Travel Demand Model, percentages of total traffic volume and/or growth using specific streets or intersections were derived for each of the recommended transportation system improvements. These percentages were used to estimate the share of the improvement costs for the separate areas of the South Cooper Mountain Concept Plan, since they will likely develop to and through the planning horizon of 2035.



Table 4: Recommended Transportation System Improvements

ID	Project Description	Total Estimated Cost	Concept Plan Share of Total Cost by Area				Estimated Year of Need
			South Cooper Mountain Annexation Area Share	North Cooper Mountain Share	Urban Reserve Share	Regional Traffic Growth Share	
Projects Constructing or Realigning Streets On-site							
1	Extend 185th Avenue from Gassner Road to Kemmer Road as a 3-lane County arterial.	\$5,760,000	\$440,000	\$750,000	\$1,550,000	\$3,020,000	-
2	Realign 175th Avenue between Outlook Lane and Cooper Mountain Lane, as a 3-lane County arterial.	\$5,695,000	\$805,000	\$55,000	\$1,210,000	\$3,625,000	-
3	Realign the curve along Grabhorn Road near Stone Creek Drive, as a 3-lane County arterial.	\$4,575,000	\$695,000	\$115,000	\$585,000	\$3,185,000	-
4	Realign the curve along Grabhorn Road north of Tile Flat Road, as a 3-lane County arterial.	\$2,930,000	\$445,000	\$75,000	\$375,000	\$2,040,000	-
5	Realign Grabhorn Road east to provide a through connection with Tile Flat Road, as a 3-lane County arterial.	\$4,710,000	\$75,000	\$150,000	\$75,000	\$4,410,000	-
6a	Create a new east-to-west 3-lane City Collector street from Tile Flat Road to the new north-to-south Collector Street.	\$3,255,000	\$950,000	\$0	\$2,100,000	\$205,000	-
6b	Create a new east-to-west 3-lane City Collector street from the new north-to-south Collector Street to 175th Avenue.	\$10,970,000	\$3,205,000	\$0	\$7,080,000	\$685,000	-
6c	Create a new east-to-west 3-lane City Collector street from 175th Avenue to Loon Drive.	\$8,530,000	\$2,490,000	\$0	\$5,505,000	\$530,000	-
7	Extend Tile Flat Road between Scholls Ferry Road and the Roy Rogers Road/Bull Mountain Road intersection, as a 3-lane County arterial.	\$18,780,000	\$1,355,000	\$355,000	\$315,000	\$16,755,000	-
8a	Create a new north-to-south 2-lane City collector street between Grabhorn Road and the UGB	\$9,465,000	\$6,180,000	\$65,000	\$960,000	\$2,260,000	-
8b	Create a new north-to-south 2-lane City collector street between the UGB and Scholls Ferry Road	\$11,020,000	\$7,195,000	\$75,000	\$1,115,000	\$2,630,000	-
8c	Create a new north-to-south 2-lane City collector street between Scholls Ferry Road and the Tile Flat Road extension.	\$1,935,000	\$1,265,000	\$15,000	\$195,000	\$460,000	-



Subtotals (Percent share of subtotal cost)		\$87,625,000	\$25,100,000 (29%)	\$1,655,000 (2%)	\$21,065,000 (24%)	\$39,805,000 (45%)	-
Projects Improving Existing Intersections							
9	Improve the Rigert Road/170th Avenue intersection.	\$2,000,000	\$560,000	\$50,000	\$1,160,000	\$230,000	2030
10	Improve the Kemmer Road/175th Avenue intersection.	\$2,500,000	\$650,000	\$165,000	\$1,280,000	\$405,000	2020
11	Improve the Scholls Ferry Road/ Horizon-Teal Boulevard intersection.	\$500,000	\$205,000	\$5,000	\$155,000	\$135,000	2030
Subtotals (Percent share of subtotal cost)		\$5,000,000	\$1,415,000 (28%)	\$220,000 (4%)	\$2,595,000 (52%)	\$770,000 (15%)	-
Projects Upgrading Existing County Streets to Urban Standards							
12	Improve Scholls Ferry Road from Roy Rogers Road-175th Avenue to Tile Flat Road as a 5-lane County arterial.	\$8,165,000	\$6,815,000	\$0	\$360,000	\$990,000	N/A
13a	Improve Tile Flat Road from Scholls Ferry Road to the UGB, as a 3-lane County arterial.	\$3,025,000	\$750,000	\$125,000	\$635,000	\$1,520,000	N/A
13b	Improve Tile Flat and Grabhorn Roads from the UGB, north of the new east-to-west Collector Street, to the UGB, near Stone Creek Drive, as a 3-lane County arterial.	\$4,170,000	\$1,035,000	\$170,000	\$875,000	\$2,090,000	
13c	Improve Grabhorn Road from the UGB, near Stone Creek Drive, to Gassner Road, as a 3-lane County arterial.	\$4,335,000	\$1,075,000	\$175,000	\$905,000	\$2,175,000	
14a	Improve 175th Avenue from Scholls Ferry Road to the UGB, north of Alvord Lane, as a 3-lane County arterial, with right-of-way dedications to 5-lane width.	\$3,985,000	\$2,480,000	\$0	\$1,235,000	\$265,000	
14b	Improve 175th Avenue from the UGB, north of Alvord Lane, to Kemmer Road as a 3-lane County arterial.	\$3,940,000	\$2,455,000	\$0	\$1,225,000	\$265,000	N/A
15	Improve Kemmer Road from 175th Avenue to the 185th Avenue extension as a 3-lane County arterial.	\$2,590,000	\$270,000	\$235,000	\$1,760,000	\$325,000	N/A
16	Improve Gassner Road from Grabhorn Road to the 185th Avenue extension as a 2-lane County collector.	\$2,475,000	\$35,000	\$625,000	\$1,625,000	\$190,000	N/A
Subtotals (Percent share of subtotal cost)		\$32,685,000	\$14,915,000 (46%)	\$1,330,000 (4%)	\$8,620,000 (26%)	\$7,820,000 (24%)	-
Projects to Construct Community Shared-Use Paths or Enhanced Street Crossings							
17	Construct a community shared-use path (South Cooper Loop Trail) along the east side of Grabhorn Road and Tile Flat Road, between the west side of the Cooper Mountain	\$1,830,000	\$795,000	\$105,000	\$930,000	\$0	N/A



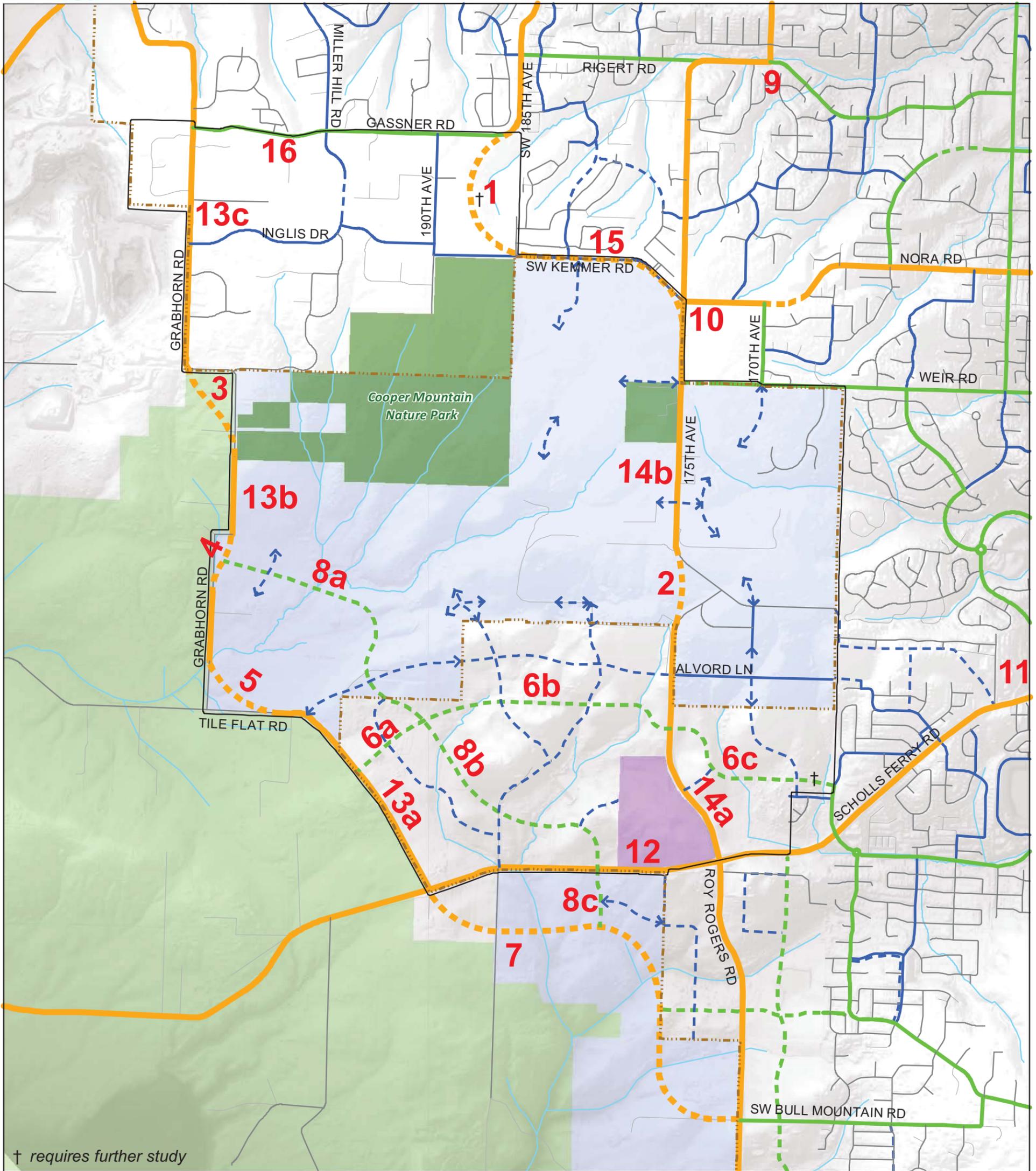
	Nature Park and Scholls Ferry Road.						
18	Construct a community shared-use path (South Cooper Loop Trail) along the north side of Scholls Ferry Road, between Tile Flat Road and 175th Avenue.	\$1,000,000	\$435,000	\$60,000	\$510,000	\$0	N/A
19	Construct a community shared-use path (South Cooper Loop Trail) along the west side of 175th Avenue, between Scholls Ferry Road and Weir Road.	\$2,725,000	\$1,180,000	\$160,000	\$1,385,000	\$0	N/A
20	Construct a community shared-use path, along the south side of the proposed neighborhood route between the proposed north-to-south collector street and 175th Avenue.	\$650,000	\$280,000	\$40,000	\$330,000	\$0	N/A
21	Construct a community shared-use path, along the north side of the proposed neighborhood route connecting the proposed north-to-south collector street with the proposed east-to-west collector street, east of 175th Avenue	\$560,000	\$245,000	\$35,000	\$285,000	\$0	
22	Install crosswalk and pedestrian activated flasher on 175th Avenue at Weir Road.	\$80,000	\$35,000	\$5,000	\$40,000	\$0	N/A
	Subtotals <i>(Percent share of subtotal cost)</i>	\$6,845,000	\$2,970,000 <i>(43%)</i>	\$405,000 <i>(6%)</i>	\$3,480,000 <i>(51%)</i>	\$0 <i>(0%)</i>	-
	Total Costs of Recommended Transportation System Improvements <i>(Percent share of total cost)</i>	\$132,155,000	\$44,400,000 <i>(34%)</i>	\$3,610,000 <i>(3%)</i>	\$35,755,000 <i>(27%)</i>	\$48,395,000 <i>(37%)</i>	-



Table 5: Projects Identified in Previous Studies or Plans that were Re-Affirmed by the South Cooper Mountain Concept Plan

ID	Project Description	Total Estimated Cost	South Cooper Mountain Annexation Area Share	North Cooper Mountain Share	Urban Reserve Share	Regional Traffic Growth Share	Estimated Year of Need
-	Widen 209th Avenue-Grabhorn Road to five-lanes, north of Leland Drive.	\$27,390,000	\$3,270,000	\$1,310,000	\$3,925,000	\$18,880,000	2030
-	Widen Farmington Road to five-lanes through the 185th Avenue intersection.	\$24,000,000	\$2,850,000	\$1,140,000	\$3,420,000	\$16,590,000	2015
-	Add a westbound right turn lane at the Murray Boulevard/Beard Road-Brockman Road intersection.	\$240,000	\$5,000	\$5,000	\$40,000	\$195,000	2035
-	Install a traffic signal at the Roy Rogers Road/Bull Mountain Road intersection.	\$355,000	\$50,000	\$50,000	\$50,000	\$205,000	2015
-	Widen Roy Rogers Road-175th Avenue to five-lanes from Scholls Ferry Road to just south of Beef Bend Road.	\$33,085,000	\$6,355,000	\$1,155,000	\$5,770,000	\$19,805,000	2035
23	Construct a regional shared-use path (Cooper Mountain Regional Trail) between the 175th Avenue/Weir Road intersection, the 185th Avenue/Gassner Road intersection (along the west side of the 185th Avenue extension), and the Grabhorn Road/Gassner Road intersection.	\$2,915,000	\$610,000	\$85,000	\$760,000	\$1,460,000	N/A
Total Cost of Projects Identified in Previous Studies or Plans		\$87,985,000	\$13,140,000 (15%)	\$3,745,000 (4%)	\$13,965,000 (16%)	\$57,135,000 (65%)	-

South Cooper Mountain Concept & Community Plans



† requires further study

Figure 4: Recommended Transportation System Improvements

- | | |
|--|--|
| Proposed Functional Classification* | Rural Reserve** |
| Arterial | Urban Reserve |
| Collector | Study Area |
| Neighborhood Route | Urban Growth Boundary |
| Local | Existing Parks |
| Private | Planned High School Site |
| | Streams |
| | # Transportation Improvement ID |

* Realignments and new roads are shown in dashed lines. New roads east of study area are based on Washington County's Transportation System Plan; new roads within UGB south of study area are based on current River Terrace Community Plan transportation planning. All new road alignments are conceptual.

** As amended by HB 4078A.

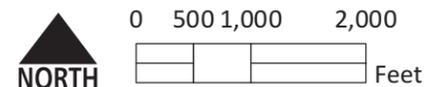
Prepared By: Angelo Planning Group

As approved by Beaverton City Council, April 8, 2014

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl

DISCLAIMER

This map is intended for informational purposes only. It is not intended for legal, engineering, or surveying purposes. While this map represents the best data available at the time of publication, the City of Beaverton makes no claims, representations, or warranties as to its accuracy or completeness. Metadata available upon request.





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Transportation Findings- Appendix



TYPICAL STREET DESIGNS

The applicable typical street sections for South Cooper Mountain Concept Plan can be seen in Figures A1, A2, A3, and A4. These are based on Washington County and Beaverton minimum street widths.

Figure A1: Typical Section for a Three Lane County Arterial

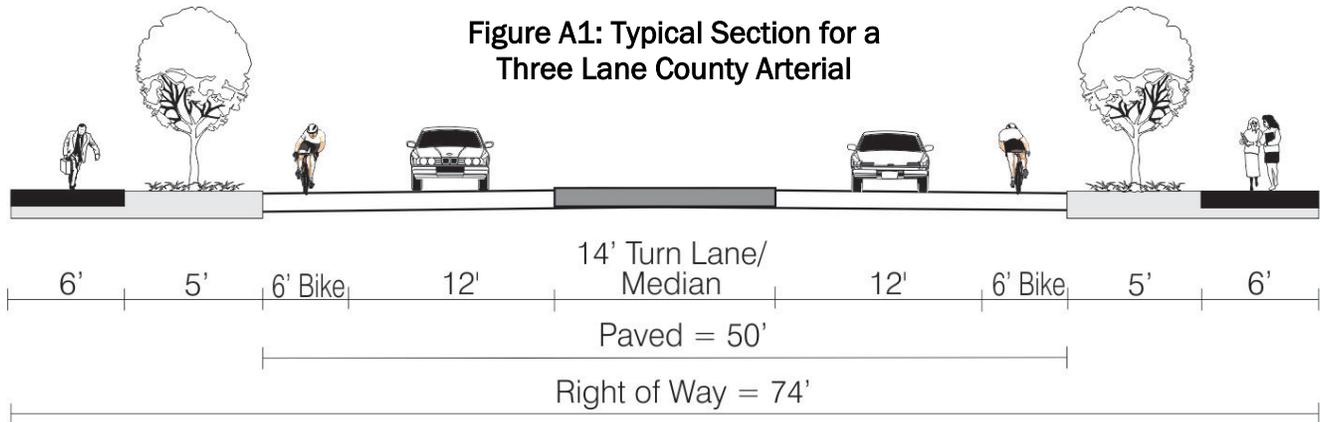


Figure A2: Typical Section for a Three Lane County Arterial with a Streetside Shared Use Path

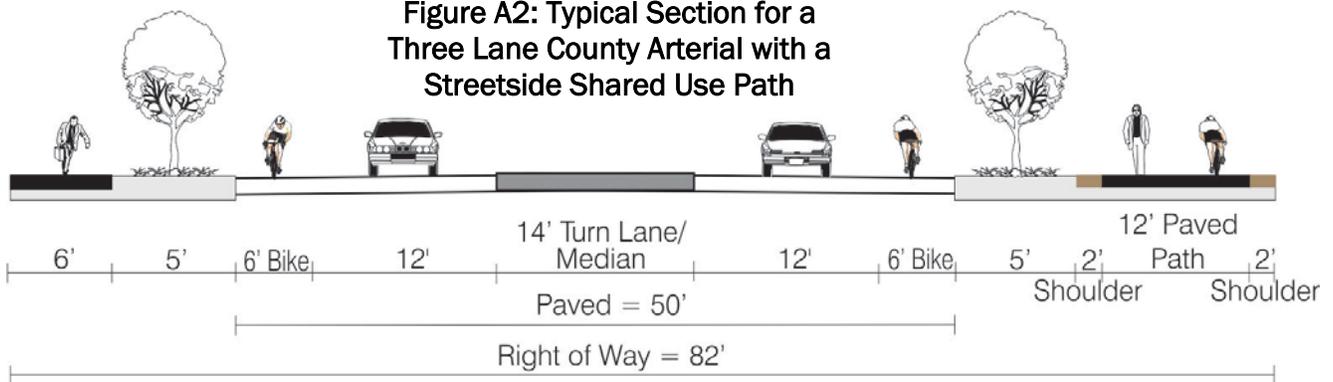


Figure A3: Typical Section for a Three Lane City Collector

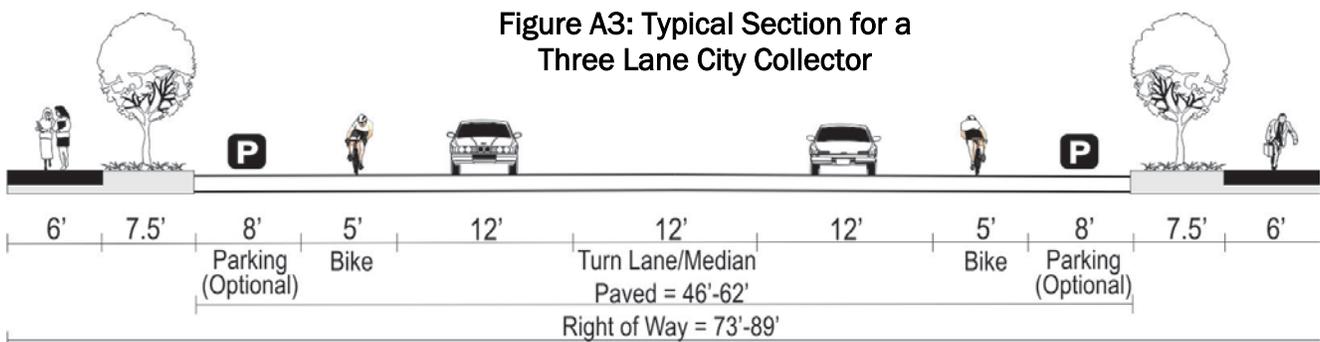
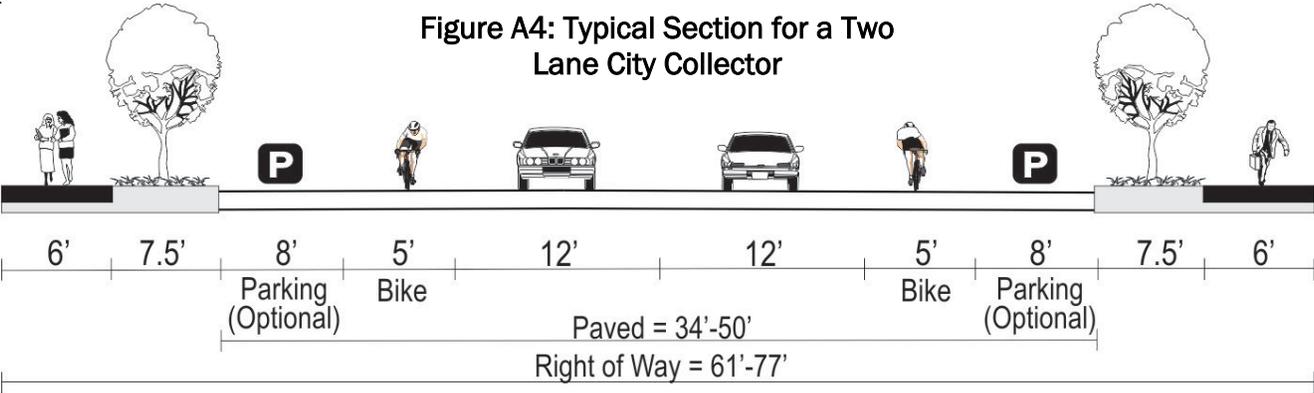




Figure A4: Typical Section for a Two Lane City Collector



Design Elements for Streets

To better represent and strengthen the character of the South Cooper Mountain Concept Plan area, and to further enhance planned driving, walking and biking infrastructure, the following design elements should be implemented as appropriate:

- **Permeable Pavement:** Permeable pavements are paved surfaces that infiltrate, treat, and/or store rainwater where it falls. Permeable pavements may be constructed from pervious concrete, porous asphalt, permeable interlocking pavers, and several other materials.
- **Bioswales:** Bioswales are vegetated, mulched, or xeriscaped channels that provide treatment and retention as they move stormwater from one place to another. Vegetated swales slow, infiltrate, and filter stormwater flows. As linear features, vegetated swales are particularly suitable along streets and parking lots.
- **Stormwater Planter Boxes:** Planter boxes are urban rain gardens with vertical walls and open or closed bottoms that collect and absorb runoff from sidewalks, parking lots, and streets. Planter boxes are ideal for space-limited sites in dense urban areas and as a streetscaping element.
- **Green Parking:** Many of the green infrastructure elements described above can be seamlessly integrated into parking lot designs. Permeable pavements can be installed in sections of a lot and rain gardens and bioswales can be included in medians and along a parking lot perimeter. Benefits include urban heat island mitigation and a more walkable built environment.
- **Traffic Calming:** Traffic calming refers to street design techniques used to re-create safe, slow collector, neighborhood route and local streets without significantly changing vehicle capacity and to mitigate the impacts of traffic on neighborhoods and business districts where a greater balance between safety and mobility is needed. Traffic calming seeks to influence driver behavior through physical and psychological means, resulting in lower vehicle speeds or through traffic volumes. Physical traffic calming techniques include:
 - Narrowing the street by providing curb extensions or bulbouts, or mid-block pedestrian refuge islands
 - Deflecting the vehicle path vertically by installing speed humps, speed tables, or raised intersections
 - Deflecting the vehicle path horizontally with chicanes, roundabouts, and mini-roundabouts
 - Narrowing travel lanes and providing visual cues such as placing buildings, street trees, on-street parking, and landscaping next to the street also create a sense of enclosure that prompts drivers to reduce vehicle speeds.



An example of permeable pavers



An example of a planter box adjacent to the sidewalk



Appendix C: Infrastructure Funding

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South Cooper Mountain

Infrastructure Funding Plan

November 24, 2014

Prepared for:
City of Beaverton

Contact Information

Nick Popenuk prepared this report. ECONorthwest is solely responsible for its content.

ECONorthwest specializes in economics, planning, and finance. Established in 1974, ECONorthwest has four decades of experience helping clients make sound decisions based on rigorous economic, planning and financial analysis.

ECONorthwest gratefully acknowledges the substantial assistance provided by staff at Angelo Planning Group, David Evans and Associates, and DKS. Many other firms, agencies, and staff contributed to other research that this report relied on.

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Table of Contents

1	Introduction	2
2	Methods	3
3	Funding Plan.....	4
3.1	Parks.....	4
3.2	Water	6
3.3	Sanitary Sewer	9
3.4	Stormwater.....	11
3.5	Transportation.....	14
4	Implications	19

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1 Introduction

This memorandum describes a plan and strategy for how infrastructure in the South Cooper Mountain area could be funded. This analysis is driven, in part, by Metro Title 11 Functional Plan requirements that state, for areas added to the Urban Growth Boundary, that “Comprehensive plan provisions for the area shall include... provision for the financing of local and state public facilities and services.” Areas within Urban Reserves are required by Title 11 to provide more generalized information in concept plans, including: “...Preliminary estimates of the costs of the systems and facilities in sufficient detail to determine feasibility and allow comparisons to other areas; and... Proposed methods to finance systems and facilities.”

In addition to meeting these regulatory requirements, the analysis is intended to serve several practical purposes. First, it fulfills the projects guiding principle to “Prepare a realistic financing plan for infrastructure and feasible implementation strategies.” This is consistent with the City’s Capital Improvement Program (CIP), which identifies geographic priority areas for infrastructure investment. One of those priorities is to “Plan and prepare infrastructure and infrastructure financing for South Cooper Mountain/6B area development.”

The analysis also informed selection of the final preferred land use and transportation scenarios, and is intended to increase developer and property owner confidence in the process by addressing financing and implementation strategies early on. This document is a revised version of the “Early Funding Analysis” completed in March 2014. The document has been updated to reflect refined development scenarios and infrastructure costs, and to address feedback provided by the South Cooper Mountain Finance Task Force.

This memorandum is organized in three main sections:

- **Methods** describes the steps that were taken to conduct the analysis.
- **Funding plan** identifies the key conclusions of the analysis, organized by type of infrastructure.
- **Implications** summarizes the important implications of the analysis.

2 Methods

This Infrastructure Funding Plan was created through a collaborative process, involving the consultant team, City staff, representatives of local and regional governments and service providers responsible for building and maintaining infrastructure in the South Cooper Mountain area, and private property owners and developers. The process was both technical (identifying what infrastructure improvements are needed and how much they would cost), and political (discussing who should pay and how much). Although this was an iterative process, the methods generally followed the following steps:

- **Land use scenarios.** Multiple scenarios were developed to show what potential development in South Cooper Mountain might look like, including what types of development would occur where at what densities.
- **Infrastructure analysis.** The land use scenarios were evaluated to determine the infrastructure that would be necessary to accommodate the projected new development. This resulted in a list of specific infrastructure projects with cost estimates for each project.
- **Basic revenue estimates.** For “basic” sources of revenue (i.e., fundamental revenue sources assumed to be available for South Cooper Mountain infrastructure, like Systems Development Charges (SDCs), and Transportation Development Tax (TDT)) we estimated the amount of revenue that could be generated at full build-out of the land use scenarios.
- **Consultation with public and private partners.** A series of interviews were conducted with private developers and public infrastructure providers to understand their perspectives on who should pay for infrastructure, through what sources, and what amounts. Additionally, a Finance Task Force was convened to bring these various public and private parties together to discuss these issues. Meetings were held with Washington County to discuss issues and options for funding transportation facilities.
- **Early Funding Analysis.** An Early Funding Analysis was completed, showing total project costs and projected allocation of basic funding sources for each type of infrastructure. In situations where basic funding sources were projected to be insufficient to cover the total project costs, funding gaps were identified.
- **Infrastructure Funding Plan.** Following the Early Funding Analysis, the final land use scenario was determined, and infrastructure project cost estimates were refined. The Early Funding Analysis was updated to reflect a different allocation of resources for each infrastructure project to eliminate the funding gap.

This analysis was conducted for each of the three constituent subareas of South Cooper Mountain: the South Cooper Mountain Annexation Area (SCMAA), North Cooper Mountain (NCM), and the Urban Reserve Area (URA). One caveat when reading this report: all dollar amounts stated in this report are in constant 2014 dollars, and have not been adjusted for inflation.

3 Funding Plan

3.1 Parks

Overall strategy

Tualatin Hills Parks and Recreation District (THPRD) is responsible for providing park infrastructure in South Cooper Mountain. Representatives of THPRD stated that Systems Development Charges (SDCs) are the only funding source that can be counted on for park projects in South Cooper Mountain. Any funding from grants and general obligation bonds would be speculative.

The amount of the THPRD SDC varies depending on the type of development. The following rates were used to forecast SDC revenue generated by development in South Cooper mountain: \$5,524 per single-family home, \$4,131 per unit of multifamily residential, and \$143 per employee for commercial development, as determined by THPRD’s employee formula.¹

SCMAA funding plan

Exhibit 1 shows the funding plan for parks in the SCMAA. Total project costs are estimated to be \$9,012,000, and 100% of these costs would be funded by SDCs. Note that land acquisition is a significant component of the cost of parks projects, and the ultimate cost of these projects may differ from the projections shown in Exhibits 1 – 3, if land values in the area change before THPRD purchases their sites for future park development. Development in the SCMAA is forecast to generate \$15,443,721 in parks SDCs, which is more than what is needed for parks projects in the area. However, new development is expected to generate more SDCs than what is needed for the immediate geographic area, as they fund other facilities throughout the district.

Exhibit 1. SCMAA parks infrastructure funding plan

Project Type	Cost	Funding Sources	
		SDC	Developer
Community Parks	\$ -	\$ -	\$ -
Neighborhood Parks	\$ 8,500,000	\$ 8,500,000	\$ -
Trails	\$ 512,000	\$ 512,000	\$ -
Total Costs	\$ 9,012,000	\$ 9,012,000	\$ -
SDC Revenues		\$ 15,443,721	
SDC Surplus (Deficit)		\$ 6,431,721	

Source: Angelo Planning Group. Park Acreages and Costs – updated 052714.xlsx. From Becky Hewitt. May 27, 2013.

¹ City of Beaverton, “System Development Fees (SDC).” Revised February 2014.

UR funding plan

Exhibit 2 shows the funding plan for parks in the UR. Total project costs are estimated to be \$28,520,000. THPRD could consider purchasing land in the UR before the area is brought into the UGB. This strategy may help prevent cost increases due to future increases in land values. Although SDCs are the only funding source identified for parks projects in the UR, SDCs generated within the UR are projected to be only \$19,373,886, which would be insufficient to pay for the cost of these park projects. This is because a neighborhood park is planned to be located in the UR. The community park would be intended to serve residents from all of South Cooper Mountain as well as the surrounding neighborhoods. Thus, Exhibit 2 shows a parks SDC funding gap of \$10,704,473 for the UR.

The first logical source of funding to fill this gap would be surplus parks SDC revenues from elsewhere on South Cooper Mountain. Both the SCMAA and NCM are estimated to generate surplus parks SDC revenues totaling \$7,990,080. Even with these SDCs, there remains a gap of \$2,714,393. If capital costs for parks facilities in the area cannot be reduced, then it may be necessary for an additional funding source to be used in the future. The potential need for additional revenues is also driven by the fact that SDCs generated in the area should actually exceed the total project costs in the area, as these SDCs are also intended to contribute to district-wide facilities like an aquatic center.

One potential strategy for reducing the cost of parks infrastructure in the area is for THPRD to collaborate with the school district on shared park facilities. THPRD has noted that they have begun exploring park and recreation facilities in conjunction with the proposed new high school; this may influence the size and location of a future community park elsewhere on South Cooper Mountain.

Exhibit 2. UR parks infrastructure funding plan

Project Type	Cost	Funding Sources	
		SDC	Developer
Community Parks	\$ 20,700,000	\$ 20,700,000	\$ -
Neighborhood Parks	\$ 6,800,000	\$ 6,800,000	\$ -
Trails	\$ 1,020,000	\$ 1,020,000	\$ -
Total Costs	\$ 28,520,000	\$ 28,520,000	\$ -
SDC Revenues		\$ 17,815,527	
SDC Surplus (Deficit)		\$ (10,704,473)	

Source: Angelo Planning Group. Park Acreages and Costs – updated 052714.xlsx. From Becky Hewitt. May 27, 2013.

NCM funding plan

Exhibit 3 shows the funding plan for parks in NCM. There are no planned park projects in NCM. Development in NCM is forecast to generate \$1,558,359 in parks SDCs, which would potentially be available to contribute to the cost of park facilities elsewhere on South Cooper Mountain.

Exhibit 3. NCM parks infrastructure funding plan

Project Type	Cost	Funding Sources	
		SDC	Developer
Community Parks	\$ -	\$ -	\$ -
Neighborhood Parks	\$ -	\$ -	\$ -
Trails	\$ -	\$ -	\$ -
Total Costs	\$ -	\$ -	\$ -
SDC Revenues		\$ 1,558,359	
SDC Surplus (Deficit)		\$ 1,558,359	

Source: Angelo Planning Group. Park Acreages and Costs – updated 052714.xlsx. From Becky Hewitt. May 27, 2013.

3.2 Water

Overall strategy

The City of Beaverton would be responsible for providing water service to the SCMAA and any areas within the Urban Reserve that are annexed to the City. The Tualatin Valley Water District currently provides water to the North Cooper Mountain area. For any new extensions with the TVWD district, the funding strategy assumes those are paid for by developing properties.

The City levies an SDC on new development to pay for the “public” share of water infrastructure costs. Private developers are also responsible for funding the “private” share of water infrastructure costs. Water infrastructure in South Cooper Mountain would be covered by these two sources. The public-private split of costs is determined by the demand from new development. For our analysis, we assume pipes 12” or less in diameter are the responsibility of private developers. Pipes larger than 12” in diameter are paid for jointly between the public and private sector. The costs are divided proportionately based on the diameter of the pipe, with the public sector paying for the portion of the cost of pipe larger than 12” in diameter. Although the proportionality of funding for pipes does not have a hard break at 12” diameter, input from the City and TVWD indicated this was a good rule-of-thumb assumption to use for the purposes of this analysis.

The water SDC rate, effective February 1st, 2014, varies depending on the size of the water meter, ranging from \$5,293 for a 5/8-inch meter, up to \$30,497 for a 1.5-inch meter.²

² City of Beaverton. “Exhibit 2 – Current Water SDCs and Revised.” From Barnett, Brion, Project Engineer, Public Works Department. December 3, 2013.

SCMAA funding plan

Exhibit 4 shows the funding plan for water infrastructure in the SCMAA. Total project costs are estimated to be \$9,146,924. Developers would be expected to pay for \$5,727,198 of these costs. SDCs would pay for the public share of costs, \$3,419,726. Development in the SCMAA is forecast to generate \$18,133,818 in water SDCs, which is more than what is needed for water infrastructure projects in the area. This is expected, as the cost of distribution pipes is typically a fraction of the total cost of facilities needed to serve an area, and new development is expected to generate more SDCs than what is needed for the immediate geographic area, as they fund other regional facilities throughout the district, like upsizing lines and building more storage capacity. The City's CIP specifically identifies a new reservoir on South Cooper Mountain as the City's sole focus for water storage capital projects. This proposed new reservoir would bolster the capacity provided by the existing Cooper Mountain Reservoir No. 1, and would provide service to future residents of South Cooper Mountain, as well as other residents of the City's upper elevation service areas.

Exhibit 4. SCMAA water infrastructure funding plan

Project Type	Cost	Funding Sources	
		SDC	Developer
12" Pipe	\$ 1,678,019	\$ -	\$ 1,678,019
16" Pipe	\$ 1,258,905	\$ 314,726	\$ 944,179
20" Pipe	\$ -	\$ -	\$ -
24" Pipe	\$ 6,210,000	\$ 3,105,000	\$ 3,105,000
Total Costs	\$ 9,146,924	\$ 3,419,726	\$ 5,727,198
SDC Revenues		\$ 18,133,818	
SDC Surplus (Deficit)		\$ 14,714,092	

Source: David Evans and Associates, Inc. memorandum on "Water System Concept Plan – Summary Findings and Planning Level Cost Estimates." From Steven Harrison. To South Cooper Mountain Technical Advisory Committee. May 7, 2014.

UR funding plan

Exhibit 5 shows the funding plan for water infrastructure in the UR. Total project costs are estimated to be \$10,409,625. The privately-funded share of these costs are estimated to be \$7,234,344. The public-share of these costs, covered by SDCs, are estimated to be \$3,175,281. Development in the UR is forecast to generate \$19,917,559 in water SDCs, which is substantially more than what is needed for water infrastructure projects in the area.

Exhibit 5. UR water infrastructure funding plan

Project Type	Cost	Funding Sources	
		SDC	Developer
12" Pipe	\$ 1,792,500	\$ -	\$ 1,792,500
16" Pipe	\$ 3,037,125	\$ 759,281	\$ 2,277,844
20" Pipe	\$ 3,740,000	\$ 1,496,000	\$ 2,244,000
24" Pipe	\$ 1,840,000	\$ 920,000	\$ 920,000
Total Costs	\$ 10,409,625	\$ 3,175,281	\$ 7,234,344
SDC Revenues		\$ 19,917,559	
SDC Surplus (Deficit)		\$ 16,742,278	

Source: David Evans and Associates, Inc. memorandum on "Water System Concept Plan – Summary Findings and Planning Level Cost Estimates." From Steven Harrison. To South Cooper Mountain Technical Advisory Committee. May 7, 2014.

NCM funding plan

Exhibit 6 shows the funding plan for water infrastructure in NCM. Total project costs are estimated to be \$2,093,547. The privately-funded share of these costs are estimated to be \$1,570,160. The public-share of these costs, covered by SDCs, are estimated to be \$523,387. Development in NCM is forecast to generate \$1,572,021, in water SDCs, which is substantially more than what is needed for water infrastructure projects in the area.

Exhibit 6. NCM water infrastructure funding plan

Project Type	Cost	Funding Sources	
		SDC	Developer
12" Pipe	\$ -	\$ -	\$ -
16" Pipe	\$ 2,093,547	\$ 523,387	\$ 1,570,160
20" Pipe	\$ -	\$ -	\$ -
24" Pipe	\$ -	\$ -	\$ -
Total Costs	\$ 2,093,547	\$ 523,387	\$ 1,570,160
SDC Revenues		\$ 1,572,021	
SDC Surplus (Deficit)		\$ 1,048,634	

Source: David Evans and Associates, Inc. memorandum on "Water System Concept Plan – Summary Findings and Planning Level Cost Estimates." From Steven Harrison. To South Cooper Mountain Technical Advisory Committee. May 7, 2014.

3.3 Sanitary Sewer

Overall strategy

The City of Beaverton would be responsible for providing sanitary sewer infrastructure for South Cooper Mountain. The City of Beaverton collects an SDC on new development to pay for the public portion of sanitary sewer infrastructure. The City has an intergovernmental agreement (IGA) with Clean Water Services (CWS) to provide sanitary sewer service, which results in ninety-six percent of this SDC being passed through to CWS. Private developers are also responsible for paying for a portion of sanitary sewer infrastructure, including all pipes 12-inches or less in diameter, and a portion of all pipes larger than 12-inches.

SCMAA funding plan

Exhibit 7 shows the funding plan for sanitary sewer infrastructure in the SCMAA. Total project costs are estimated to be \$13,942,169. Developers would be expected to pay for \$10,825,168 of these costs. SDCs would pay for the public share of costs, \$3,117,001. Development in the SCMAA is forecast to generate \$16,444,800 in sanitary sewer SDCs (\$15,787,008 for CWS and \$657,792 for the City), which is more than what is needed for water infrastructure projects in the area. However, new development is expected to generate more SDCs than what is needed for the immediate geographic area, as they fund other regional facilities throughout the district (for example, wastewater treatment plants).

Exhibit 7. SCMAA sanitary sewer infrastructure funding plan

Project Type	Cost	Funding Sources	
		SDC	Developer
Gravity Sewer Lines			
8" Pipe	\$ 5,082,405	\$ -	\$ 5,082,405
12" Pipe	\$ 4,553,040	\$ -	\$ 4,553,040
15" Pipe	\$ 1,487,154	\$ 297,431	\$ 1,189,723
Pump Stations			
Tile Flat Road	\$ -	\$ -	\$ -
River Terrace	\$ 2,819,570	\$ 2,819,570	\$ -
Total Costs	\$ 13,942,169	\$ 3,117,001	\$ 10,825,168
SDC Revenues		\$ 16,444,800	
SDC Surplus (Deficit)		\$ 13,327,799	

Source: David Evans and Associates, Inc. memorandum on "Sanitary Sewer Concept Plan – Summary Findings and Planning Level Cost Estimates." From Steven Harrison. To South Cooper Mountain Technical Advisory Committee. May 7, 2014.

UR funding plan

Exhibit 8 shows the funding plan for sanitary sewer infrastructure in the UR. Total project costs are estimated to be \$21,037,775. The privately-funded share of these costs are estimated to be \$19,521,920. Private developers would pay for the bulk of the project costs, because most of the project costs are for 8-inch diameter gravity sewer lines. The public-share of these costs, covered by SDCs, are estimated to be \$1,515,855. Development in the UR is forecast to generate \$17,170,545 in sanitary sewer SDCs (\$16,483,723 for CWS and \$686,822 for the City), which is substantially more than what is needed for sanitary sewer infrastructure projects in the area.

Exhibit 8. UR sanitary sewer infrastructure funding plan

Project Type	Cost	Funding Sources	
		SDC	Developer
Gravity Sewer Lines			
8" Pipe	\$ 15,573,615	\$ -	\$ 15,573,615
12" Pipe	\$ 3,496,884	\$ -	\$ 3,496,884
15" Pipe	\$ 564,276	\$ 112,855	\$ 451,421
Pump Stations			
Tile Flat Road	\$ 1,403,000	\$ 1,403,000	\$ -
River Terrace (Phase 2)	\$ -	\$ -	\$ -
Total Costs	\$ 21,037,775	\$ 1,515,855	\$ 19,521,920
SDC Revenues		\$ 18,686,400	
SDC Surplus (Deficit)		\$ 17,170,545	

Source: David Evans and Associates, Inc. memorandum on "Sanitary Sewer Concept Plan – Summary Findings and Planning Level Cost Estimates." From Steven Harrison. To South Cooper Mountain Technical Advisory Committee. May 7, 2014.

NCM funding plan

Exhibit 9 shows the funding plan for sanitary sewer infrastructure in NCM. Total project costs are estimated to be \$9,967,695. One hundred percent of these costs would be privately funded, as they are all for 8" gravity sewer lines. Development in the NCM is forecast to generate \$2,505,600 in sanitary sewer SDCs (\$2,405,376 for CWS and \$100,224 for the City), which would not be needed for sanitary sewer infrastructure projects in the area.

Exhibit 9. NCM sanitary sewer infrastructure funding plan

Project Type	Cost	Funding Sources	
		SDC	Developer
Gravity Sewer Lines			
8" Pipe	\$ 9,967,695	\$ -	\$ 9,967,695
12" Pipe	\$ -	\$ -	\$ -
15" Pipe	\$ -	\$ -	\$ -
Pump Stations			
Tile Flat Road	\$ -	\$ -	\$ -
River Terrace (Phase 2)	\$ -	\$ -	\$ -
Total Costs	\$ 9,967,695	\$ -	\$ 9,967,695
SDC Revenues		\$ 2,505,600	
SDC Surplus (Deficit)		\$ 2,505,600	

Source: David Evans and Associates, Inc. memorandum on "Sanitary Sewer Concept Plan – Summary Findings and Planning Level Cost Estimates." From Steven Harrison. To South Cooper Mountain Technical Advisory Committee. May 7, 2014.

3.4 Stormwater

Overall strategy

Unlike parks, water, and sanitary sewer, the costs for stormwater infrastructure is not typically covered by an SDC. Traditionally, detention facilities have been the responsibility of private developers, with individual developers building detention facilities onsite that are sufficient to manage the stormwater generated on that individual property. Under the traditional model, the cost of stormwater detention facilities would be excluded from a funding analysis like this.

Based on preliminary stormwater planning, CWS and the City of Beaverton have identified the use of regional stormwater facilities as the preferred approach for South Cooper Mountain. Regional facilities can offer several benefits compared to traditional onsite detention facilities in regards to meeting natural resource objectives. Regional facilities can create wildlife and aquatic life habitat, and be integrated into a network of green spaces that provide recreational opportunities in addition to stormwater drainage.

Due to the challenges associated with regional facilities (see discussion below), more traditional site-scale facilities may be used in place of, or in combination with, regional facilities. Our funding analysis assumes a regional stormwater facility approach is used, in which large-scale dry detention ponds are used to manage stormwater for the surrounding areas, which could include multiple private property owners. These facilities would be funded using either a new Regional Facility Fee (RFF), or a private reimbursement district.

The concept of a regional facility fee is relatively new, and is currently being used in only one other location in the Portland region, North Bethany. CWS adopted a Regional Stormwater Management Charge for North Bethany. The methodology applied to North Bethany, could also be applied to South Cooper Mountain to fund stormwater infrastructure. This methodology is based on the total capital cost of all regional stormwater facilities in the area, and the total stormwater treatment volume that would be handled by these facilities. Note that stormwater conveyance facilities are excluded from this cost estimate, and are assumed to be the responsibility of private developers. The regional stormwater management charge is also adjusted annually for inflation of previous project costs, to compensate CWS for the time value of money.

In a nutshell, the regional stormwater management charge for North Bethany determines the volume of stormwater that a specific development would contribute to the system as a percentage of the total stormwater capacity of the system, and assesses that development a proportional share of the regional stormwater facility system costs. Because this method is based on the actual costs incurred, the calculation balances itself out, so that development should always pay for itself. If a similar approach were to be adopted for South Cooper Mountain, further analysis would be required to estimate the magnitude of the new regional facility fee on a per household basis.

As an alternative to a RFF, these types of regional facilities could be financed using a reimbursement district. Such a district would allow for private developers to build stormwater facilities that benefit an area larger than their own property. Neighboring properties that specially benefit from the privately-built regional facility would then be relieved of obligations to construct their own storm and surface water improvements, but would be required to pay a separate Reimbursement Charge to repay the capital investment made by the initial developer.

It is worth noting that the regional stormwater management approach is not without challenges. Several private developers on the Finance Task Force voiced concerns about the regional stormwater management approach based on their experiences with North Bethany. These concerns include:

- **Coordination among property owners.** If one property owner is ready to develop, but has to cross through other properties to connect to the regional stormwater retention pond, and if those property owners are not ready to develop, then it can cause costly development delays.
- **Prevailing wage.** Because the regional facilities are publicly funded, they must be constructed using “prevailing wage rates,” which typically results in a cost-premium compared to privately-funded projects. This can increase project costs 30% or more.
- **Upfront funding.** These shared facilities need to be in place prior to the surrounding development. That means that someone needs to provide upfront funding, to be reimbursed by subsequent development. In North Bethany, CWS provided \$1 million of seed money to jump start the first regional stormwater facility, but no such seed money has been identified for South Cooper Mountain.
- **Size and location.** While regional facilities may require fewer acres overall, compared to the traditional site-specific approach, the large-scale facilities do require large, consolidated areas of land. This land is then unavailable for private development. With the traditional approach, stormwater facilities could be small, and tucked away on otherwise unusable portions of a site.

SCMAA funding plan

Exhibit 10 shows the funding plan for stormwater infrastructure in the SCMAA. Total project costs are estimated to be \$14,432,400. These costs would be funded either through a new RFF or directly by private developers using a reimbursement district, or through a combination of both approaches.

Exhibit 10. SCMAA stormwater infrastructure funding plan

Project Type	Cost	Funding Sources	
		SDC	RFF or Developer
Detention Facilities	\$ 7,952,300	\$ -	\$ 7,952,300
Conveyance Facilities	\$ 6,480,100	\$ -	\$ 6,480,100
Total Costs	\$ 14,432,400	\$ -	\$ 14,432,400
SDC Revenues		\$ -	
SDC Surplus (Deficit)		\$ -	

Source: David Evans and Associates, Inc. memorandum on "Stormwater and Water Quality Scenario Summary." From Claudia Sterling. To South Cooper Mountain Beaverton Core Project Team. November 5, 2013 (draft).

Note: Detention facilities cost estimates do not include the cost of land acquisition.

UR funding plan

Exhibit 11 shows the funding plan for stormwater infrastructure in the UR. Total project costs are estimated to be \$17,213,100, with all funding estimated to come from a new RFF, or direct developer funding, or a combination of both.

Exhibit 11. UR stormwater infrastructure funding plan

Project Type	Cost	Funding Sources	
		SDC	RFF or Developer
Detention Facilities	\$ 9,739,100	\$ -	\$ 9,739,100
Conveyance Facilities	\$ 7,474,000	\$ -	\$ 7,474,000
Total Costs	\$ 17,213,100	\$ -	\$ 17,213,100
SDC Revenues		\$ -	
SDC Surplus (Deficit)		\$ -	

Source: David Evans and Associates, Inc. memorandum on "Stormwater and Water Quality Scenario Summary." From Claudia Sterling. To South Cooper Mountain Beaverton Core Project Team. November 5, 2013 (draft).

Note: Detention facilities cost estimates do not include the cost of land acquisition.

NCM funding plan

Exhibit 12 shows the funding plan for stormwater infrastructure in NCM. Total project costs are estimated to be \$4,336,500, with all funding estimated to come from a new RFF, or direct developer funding, or a combination of both.

Exhibit 12. NCM stormwater infrastructure funding plan

Project Type	Cost	Funding Sources	
		SDC	RFF or Developer
Detention Facilities	\$ 1,330,400	\$ -	\$ 1,330,400
Conveyance Facilities	\$ 3,006,100	\$ -	\$ 3,006,100
Total Costs	\$ 4,336,500	\$ -	\$ 4,336,500
SDC Revenues		\$ -	
SDC Surplus (Deficit)		\$ -	

Source: David Evans and Associates, Inc. memorandum on “Stormwater and Water Quality Scenario Summary.” From Claudia Sterling. To South Cooper Mountain Beaverton Core Project Team. November 5, 2013 (draft).
Note: Detention facilities cost estimates do not include the cost of land acquisition.

3.5 Transportation

The transportation funding strategy described below is preliminary and subject to change. The intent of this document is to estimate transportation costs and revenues, identify gaps and potential strategies to fill those gaps.

One of the key findings of this work is that a new transportation system development charge is a needed and appropriate tool. The specification of this tool - the final rate, compliance with state law – requires further technical and legal work that is beyond the scope of this funding plan. The City will initiate that work in parallel with the adoption of this preliminary transportation funding strategy. Additional funding tools may be identified to complement a transportation system development charge.

As discussed below, the Funding Task Force and others have expressed interest in providing additional revenue sources for funding transportation. This is another area that will be explored further after the adoption of this preliminary transportation funding strategy.

Overall strategy

Transportation infrastructure in the South Cooper Mountain area will largely be the responsibility of the County (and to a lesser extent, the City) to build and maintain. Thus, County and City representatives were interviewed and invited to participate in the Finance Task Force. Existing sources of funding for these types of City and County transportation infrastructure projects are essentially limited to developer funding, the Transportation Development Tax (TDT) and the Major Streets Transportation Improvement Program (MSTIP).

The existing rates for TDT vary based on use. Townhomes pay \$4,919 for TDT, apartments pay \$5,381, and single-family detached homes pay \$8,225. Commercial uses vary greatly based on

the type of business. Some of the likely types of commercial development in South Cooper Mountain include shopping centers, and general office uses, which pay \$11,293 and \$8,632 respectively in TDT for every 1,000 SF. MSTIP is an annual property tax rate, as opposed to a one-time fee at the time of development. The property tax rate amounts to \$0.6520 per \$1,000 of assessed value.

Based on input from the Finance Task Force and other key stakeholders, it was determined that these funding sources should provide the bulk of the funding for the public share of transportation costs in South Cooper Mountain. However, these funding sources would be insufficient, requiring an additional funding mechanism, like a new site-specific SDC. Additionally, a sizable portion of project costs would be the responsibility of the private sector to fund directly. The Finance Task Force also directed the team to look not only at project costs versus revenues, but also what types of funds are appropriate for specific projects. This is particularly true for use of MSTIP funds, which are limited, in high demand, allocated on a discretionary basis, and must be applied to roads of countywide significance.

For the purposes of this analysis, we assumed that roughly 80% of the TDT generated by new development in each subarea could be used to pay for projects in that subarea. Additionally, we assumed preliminarily that a new transportation SDC of \$6,000 per housing unit could be applied to the area, and that 100% of the SDC funds generated in each subarea could be used to pay for projects in that subarea.³ The assumptions made here are solely for the purpose of estimating revenues and funding strategies. As described in the footnote below, the actual rate of the proposed new transportation SDC will require further detailed technical and legal analysis, followed by review by stakeholders and City decision makers.

Note that the inclusion of MSTIP revenue in this funding strategy does not in any way guarantee that those funds would be available for these projects. MSTIP is a discretionary allocation of the County general fund. As such, it is subject to the policy direction of future Boards of County Commissioners, including the potential of being used for non-transportation purposes. Under current direction, adding South Cooper Mountain transportation projects to the MSTIP list will require the recommendation of the Washington County Coordinating Committee (WCCC) and Board of County Commissioners in the next MSTIP allocation process, scheduled to be in FYE 2017. Despite the inherent uncertainty of long-term MSTIP funding for any specific project, many projects in South Cooper Mountain appear to be a good fit for MSTIP funding, given their importance to regional traffic patterns. Thus, this funding strategy assumes

³ Although this analysis assumes a supplemental transportation SDC of \$6,000 per housing unit, the actual SDC rate may differ, and would need to be determined through further analysis and negotiation between the City and private developers and property owners. Furthermore, the SDC rate would likely vary for different types of development (e.g., residential versus commercial) and different housing types (e.g., single-family detached homes versus multifamily apartments). For the purposes of our analysis, we have simply shown an average SDC rate across all types of residential development.

that multiple projects will receive MSTIP funding. These projects were specifically identified by members of the Finance Task Force, based on their importance to the region.

This funding strategy does not assume any revenue will be provided by Federal, State, or regional sources. This assumption was based on current policies regarding the allocation of those funds, which emphasize projects on State-owned facilities, and/or projects in industrial and commercial areas that directly support job creation or enhance freight routes. Because SCM is one of several urban planning efforts occurring simultaneously in Washington County (other efforts include South Hillsboro, River Terrace, and Area 93), it is possible that a coordinated effort by multiple jurisdictions could result in a change in regional or State policy, potentially securing transportation funding revenue that is not anticipated at this time. If the City does secure Federal, State, or regional funding, then it could potential reduce the funding burden for local and County sources.

SCMAA funding plan

Exhibit 13 shows the funding plan for transportation infrastructure in the SCMAA. This funding plan is preliminary and subject to change, based upon further detailed technical and legal analysis, and review by stakeholders and City decision makers. Total project costs are estimated to be \$62,910,000.⁴ Developers could be expected to directly pay for \$16,935,500 of these costs. TDT, MSTIP, and a new SDC could pay for the public share of costs, \$45,974,500. Note that although TDT and SDC are listed as funding sources, many projects will actually be built and paid for entirely by private developers with those developers earning TDT and SDC credits from the City. Those credits could likely be transferrable throughout all of South Cooper Mountain.

Although this credit-based approach to infrastructure finance works well in most situations, there are potentially serious timing issues that can arise. For example, if a property owner is not yet ready to develop, but a road is needed through their property to serve developments on either side of it, the City and adjacent developers will need to find a way to finance construction of that road. Similarly, if there are certain transportation projects planned for a given property that serve the larger area and are very expensive relative to the value of development that will occur on that property, then the property owner may be unable or unwilling to pay for the full cost of the project upfront in exchange for TDT and SDC credits that may not be able to be redeemed until years later. Due to these timing issues, it will be important for the City (or County or some other public entity) to have sufficient resources on hand, and or work to develop a funding mechanism, to fill these funding gaps if and when they arise.

The \$16,935,500 million in developer costs are largely for new collector roads in the area. It may be possible to add these collector roads to the TDT list, which would make them 100 percent

⁴ Cost estimates for all transportation projects include cost of right-of-way acquisition, which was assumed to be between \$9 and \$14 per square foot.

creditable, reducing the portion of project costs to be funded directly by developers. Given the existing funding sources assumed in this Infrastructure Funding Plan, there is insufficient revenue to make these collector projects 100% creditable. However, if additional funding sources are identified (e.g., a county service district), then the City may want to explore the possibility of adding these projects to the TDT list.

Development in the SCMAA is forecast to generate \$22,089,441 in TDT, roughly 80% of which is anticipated to be needed for transportation infrastructure projects in the area, with the remainder assumed to be used for infrastructure projects elsewhere in Washington County.⁵ The new transportation SDC for the area could generate \$19,901,051 in the SCMAA. The funding plan shows that virtually all of these proposed supplemental SDC revenues (\$19,826,825) could be needed to fund projects in the subarea. Allocations of TDT and MSTIP funds are discretionary, and subject to approval by Washington County and the City of Beaverton. Attachment A to this report shows a more detailed breakdown of the SCMAA transportation infrastructure funding plan, including the amount of funding from each source for each specific project.

Exhibit 13. Preliminary SCMAA transportation infrastructure funding plan

Timing	Cost	Funding Sources				
		TDT	New SDC	MSTIP	Developer	Other
Years 0-10	\$ 54,075,000	\$ 15,492,175	\$ 17,607,075	\$ 5,715,750	\$ 15,260,000	\$ -
Years 10-20	\$ 8,270,000	\$ 1,937,250	\$ 1,937,250	\$ 2,420,000	\$ 1,675,500	\$ 300,000
Years 20+	\$ 565,000	\$ 282,500	\$ 282,500	\$ -	\$ -	\$ -
Total Costs	\$ 62,910,000	\$ 17,711,925	\$ 19,826,825	\$ 8,135,750	\$ 16,935,500	\$ 300,000
TDT / SDC Revenues		\$ 22,089,441	\$ 19,901,051			
TDT / SDC Surplus (Deficit)		\$ 4,377,516	\$ 74,226			

Source: DKS memorandum on “Transportation Findings for Preferred Scenario.” From Carl Springer, Kevin Chewuk. To South Cooper Mountain Technical Advisory Committee. June 23, 2014.

Note that “other” funding in Years 10–20 is assumed to come from THPRD and Metro grants for a trail improvement project. Numbers are preliminary and subject to change.

The funding plan for the SCMAA has a slim cushion, should project costs exceed current estimates. These cost estimates do include \$1,000,000 in contingency for street extensions. There is roughly \$4,377,516 million in TDT revenues generated in the subarea that are not expected to be spent in the subarea. Virtually all new SDC revenues that would be generated in the subarea, have been allocated to project costs in this subarea.

Note that the bulk of the spending for the SCMAA is anticipated to occur during years 0-10. If private development occurs over a longer period of time, then funding may not be available for all of these short-term projects, which may cause the timeline for some capital projects to be delayed until funding is available.

⁵ For all forecasts of TDT and new transportation SDC revenue, we assume 10% under-build for private development.

UR funding plan

Exhibit 14 shows the funding plan for transportation infrastructure in the UR. This funding plan is preliminary and subject to change, based upon further detailed technical and legal analysis, and review by stakeholders and City decision makers. Total project costs are estimated to be \$47,635,500. The share of these costs paid directly by developers is estimated to be \$5,080,500. The public-share of these costs, covered by TDT, a new SDC, and MSTIP is estimated to be \$42,554,500. Development in the UR area is forecast to generate \$23,124,317 in TDT, 80% of which is anticipated to be needed for transportation infrastructure projects in the area, with the remainder assumed to be used for infrastructure projects elsewhere in Washington County. The new transportation SDC is anticipated to generate \$20,833,753 in the UR, 95% of which is anticipated to be spent on transportation projects in the UR. This subarea appears to have a slim cushion, should project costs exceed current estimates.

Exhibit 14. Preliminary UR transportation infrastructure funding plan

Timing	Cost	Funding Sources			
		TDT	New SDC	MSTIP	Developer
Years 0-10	\$ -	\$ -	\$ -	\$ -	\$ -
Years 10-20	\$ 31,065,000	\$ 12,494,450	\$ 13,949,550	\$ 4,321,000	\$ 300,000
Years 20+	\$ 16,570,000	\$ 5,894,750	\$ 5,894,750	\$ -	\$ 4,780,500
Total Costs	\$ 47,635,000	\$ 18,389,200	\$ 19,844,300	\$ 4,321,000	\$ 5,080,500
TDT / SDC Revenues		\$ 23,124,317	\$ 20,833,753		
TDT / SDC Surplus (Deficit)		\$ 4,735,117	\$ 989,453		

Source: DKS memorandum on "Transportation Findings for Preferred Scenario." From Carl Springer, Kevin Chewuk. To South Cooper Mountain Technical Advisory Committee. June 23, 2014.
Numbers are preliminary and subject to change.

NCM funding plan

Exhibit 15 shows the funding plan for transportation infrastructure in NCM. This funding plan is preliminary and subject to change, based upon further detailed technical and legal analysis, and review by stakeholders and City decision makers. Total project costs are estimated to be \$2,475,000. Development in NCM is forecast to generate \$2,149,841 in TDT, 58% of which is anticipated to be needed for transportation infrastructure projects in the area, with the remainder assumed to be used for infrastructure projects elsewhere in Washington County. The new transportation SDC is anticipated to generate \$1,936,891 in NCM, 64% of which is shown to be needed for projects in NCM.

Exhibit 15. Preliminary NCM transportation infrastructure funding plan

Timing	Cost	Funding Sources			
		TDT	New SDC	MSTIP	Developer
Years 0-10	\$ -	\$ -	\$ -	\$ -	\$ -
Years 10-20	\$ 2,475,000	\$ 1,237,500	\$ 1,237,500	\$ -	\$ -
Years 20+	\$ -	\$ -	\$ -	\$ -	\$ -
Total Costs	\$ 2,475,000	\$ 1,237,500	\$ 1,237,500	\$ -	\$ -
TDT / SDC Revenues		\$ 2,149,841	\$ 1,936,891		
TDT / SDC Surplus (Deficit)		\$ 912,341	\$ 699,391		

Source: DKS memorandum on "Transportation Findings for Preferred Scenario." From Carl Springer, Kevin Chewuk. To South Cooper Mountain Technical Advisory Committee. June 23, 2014.
Numbers are preliminary and subject to change.

4 Implications

Implementing this plan will take the hard work and cooperation of numerous public- and private-sector partners over the course of several decades. During that period of time, we can be assured that changes will occur, affecting the key assumptions that underpin this analysis: the addition (or not) of Urban Reserve areas to the Urban Growth Boundary; the timing of new development, the cost of needed infrastructure projects, the availability of funding sources, and the rates that are charged to new developers. As development on South Cooper Mountain unfolds, the South Cooper Mountain Infrastructure Funding Plan will need to be amended in response to these changes.

Thus, the primary purpose of this document isn't to set in stone the exact dollar amount that a certain funding source will contribute to a specific project that will be built decades from now. Instead, the document is intended to identify the types of infrastructure projects that appear to have adequate funding from existing sources, and the types of infrastructure projects that appear to require new funding tools and inter-jurisdictional collaboration. With that purpose in mind, we draw the following implications from the analysis:

- **Parks, water, and sanitary sewer infrastructure in the SCMAA should be adequately funded by existing SDCs and private developer contributions.** For these three types of infrastructure the projected SDCs to be generated by new development significantly exceeds the estimated project costs in the area. This surplus is expected, because the SDCs are intended to serve system-wide needs as well as local needs. The phasing of private development relative to the timing of infrastructure construction could lead to some cash flow issues, but these issues can be mitigated if infrastructure is generally extended incrementally to coincide with the timing of private development.
- **A regional facility approach to stormwater infrastructure will likely be challenging.** This approach requires cooperation among multiple private property owners, who may have different development timelines. Additionally, these facilities often require someone to fund the initial facility construction upfront, with private developers paying fees over time to finance the project. Without a source of seed-money to cover the upfront costs early on, this approach may not be feasible, which means that a traditional, site-specific approach to stormwater management needs to be available as a backup plan for the South Cooper Mountain area. The City, Clean Water Services, and private developers should work together to identify places and projects where the regional approach can be implemented through a cooperative approach.
- **Transportation infrastructure will be the most challenging component of the Infrastructure Funding Plan.** Transportation is the most expensive category of infrastructure for South Cooper Mountain, accounting for roughly \$113.0 million of the \$253.1 million in total infrastructure costs. This is particularly true in the SCMAA, where transportation projects account for over half of the total infrastructure costs. While new development in the area will generate a substantial amount of TDT and MSTIP revenue, a portion of those funds will be needed to pay for transportation projects all across

Washington County. The City and Washington County will need to continue to work together, over many years, to identify the specific funding mechanisms for specific projects. This Infrastructure Funding Plan provides an initial platform to work from. Private developers have expressed a willingness to adopt an additional transportation funding source for the area, like a supplemental SDC, which is clearly needed to fill the gap in transportation revenue. As described in the footnote below, the actual rate of the proposed new transportation SDC will require further detailed technical and legal analysis, followed by review by stakeholders and City decision makers.

- **Some transportation projects related to SCM are not included in the Infrastructure Funding Plan.** Attachment A to this report identifies a list of projects not included in the Infrastructure Funding Plan. These projects are located off-site, and were previously identified in City and County plans, and are needed to accommodate traffic regardless of potential future development in SCM. These projects range in cost from \$245,000 for adding a turn lane at Murray Boulevard and Beard Road, to \$27.4 million to widen 209th Avenue-Grabhorn Road to five lanes north of Leland Drive. The total cost for these eight projects is \$108.7 million. Our analysis assumes that these projects will be funded following the typical process for transportation infrastructure projects of regional importance.

Attachment A: Transportation Infrastructure Funding Plan - Detailed Tables

Projects not included in SCM Infrastructure Funding Plan

ID	Project Description	Total Cost
7	Extend Tile Flat Road between Scholls Ferry Road and the Roy Rogers Road/Bull Mountain Road intersection, as a 3-lane County arterial.	\$ 18,780,000
8c	Create a new north-to-south 2-lane City collector street between Scholls Ferry Road and the Tile Flat Road extension.	\$ 1,935,000
N/A	Widen 209th Avenue-Grabhorn Road to five-lanes, north of Leland Drive.	\$ 27,385,000
N/A	Widen Farmington Road to five-lanes through the 185th Avenue intersection.	\$ 24,000,000
N/A	Add a westbound right turn lane at the Murray Boulevard/Beard Road-Brockman Road intersection.	\$ 245,000
N/A	Install a traffic signal at the Roy Rogers Road/Bull Mountain Road intersection.	\$ 355,000
N/A	Widen Roy Rogers Road-175th Avenue to five-lanes from Scholls Ferry Road to just south of Beef Bend Road.	\$ 33,085,000
23	Construct a regional shared-use path (Cooper Mountain Regional Trail) between the 175th Avenue/Weir Road intersection, the 185th Avenue/Gassner Road intersection (along the west side of the 185th Avenue extension), and the Grabhorn Road/Gassner Road intersection.	\$ 2,915,000
		\$ 108,700,000

Urban Reserve Area

	ID	Project Description	Revenue by Source				
			TDT	New SDC	MSTIP	Developer	Total
Years 0-10		No Projects	\$ -	\$ -	\$ -	\$ -	\$ -
		Subtotal	\$ -	\$ -	\$ -	\$ -	\$ -
Years 10-20	3	Realign the curve along Grabhorn Road near Stone Creek Drive, as a 3-lane County arterial.	\$ 2,287,500	\$ 2,287,500	\$ -	\$ -	\$ 4,575,000
	4	Realign the curve along Grabhorn Road north of Tile Flat Road, as a 3-lane County arterial.	\$ 1,465,000	\$ 1,465,000	\$ -	\$ -	\$ 2,930,000
	5	Realign Grabhorn Road east to provide a through connection with Tile Flat Road, as a 3-lane County arterial.	\$ 2,355,000	\$ 2,355,000	\$ -	\$ -	\$ 4,710,000
	9	Improve the Rigert Road/170th Avenue intersection.	\$ 1,100,000	\$ 900,000	\$ -	\$ -	\$ 2,000,000
	11	Improve the Scholls Ferry Road/ Horizon-Teal Boulevard intersection.	\$ 100,000	\$ 100,000	\$ -	\$ 300,000	\$ 500,000
	13b	Improve Grabhorn Road from the UGB, north of the new east-to-west Collector Street, to the UGB, near Stone Creek Drive, as a 3-lane County arterial.	\$ 417,000	\$ 417,000	\$ 3,336,000	\$ -	\$ 4,170,000
	13c	Improve Grabhorn Road from the UGB, near Stone Creek Drive, to Gassner Road, as a 3-lane County arterial.	\$ 1,517,250	\$ 2,817,750	\$ -	\$ -	\$ 4,335,000
	14b	Improve 175th Avenue from the UGB, north of Alvord Lane, to Kemmer Road, as a 3-lane County arterial.	\$ 1,300,200	\$ 1,654,800	\$ 985,000	\$ -	\$ 3,940,000
	15	Improve Kemmer Road from 175th Avenue to the 185th Avenue extension as a 3-lane County arterial.	\$ 1,295,000	\$ 1,295,000	\$ -	\$ -	\$ 2,590,000
	19b	Construct a community shared-use path (South Cooper Loop Trail) along the west side of 175th Avenue, between the UGB and Weir Road.	\$ 657,500	\$ 657,500	\$ -	\$ -	\$1,315,000 *
	Subtotal	\$ 12,494,450	\$ 13,949,550	\$ 4,321,000	\$ 300,000	\$ 31,065,000	
Years 20+	1	Extend 185th Avenue from Gassner Road to Kemmer Road as a 3-lane County arterial.	\$ 2,880,000	\$ 2,880,000	\$ -	\$ -	\$ 5,760,000
	8a	Create a new north-to-south 2-lane City collector street between Grabhorn Road and the UGB, just south of the Alvord Lane Extension.	\$ 2,366,250	\$ 2,366,250	\$ -	\$ 4,732,500	\$ 9,465,000
	17b	Construct a community shared-use path (South Cooper Loop Trail) along the east side of Grabhorn Road and Tile Flat Road, between the west side of the Cooper Mountain Nature Park and the UGB.	\$ 632,500	\$ 632,500	\$ -	\$ -	\$1,265,000 *
	22	Install crosswalk and pedestrian activated flasher on 175th Avenue at Weir Road.	\$ 16,000	\$ 16,000	\$ -	\$ 48,000	\$80,000
		Subtotal	\$ 5,894,750	\$ 5,894,750	\$ -	\$ 4,780,500	\$ 16,570,000
Total: All Years			\$ 18,389,200	\$ 19,844,300	\$ 4,321,000	\$ 5,080,500	\$ 47,635,000

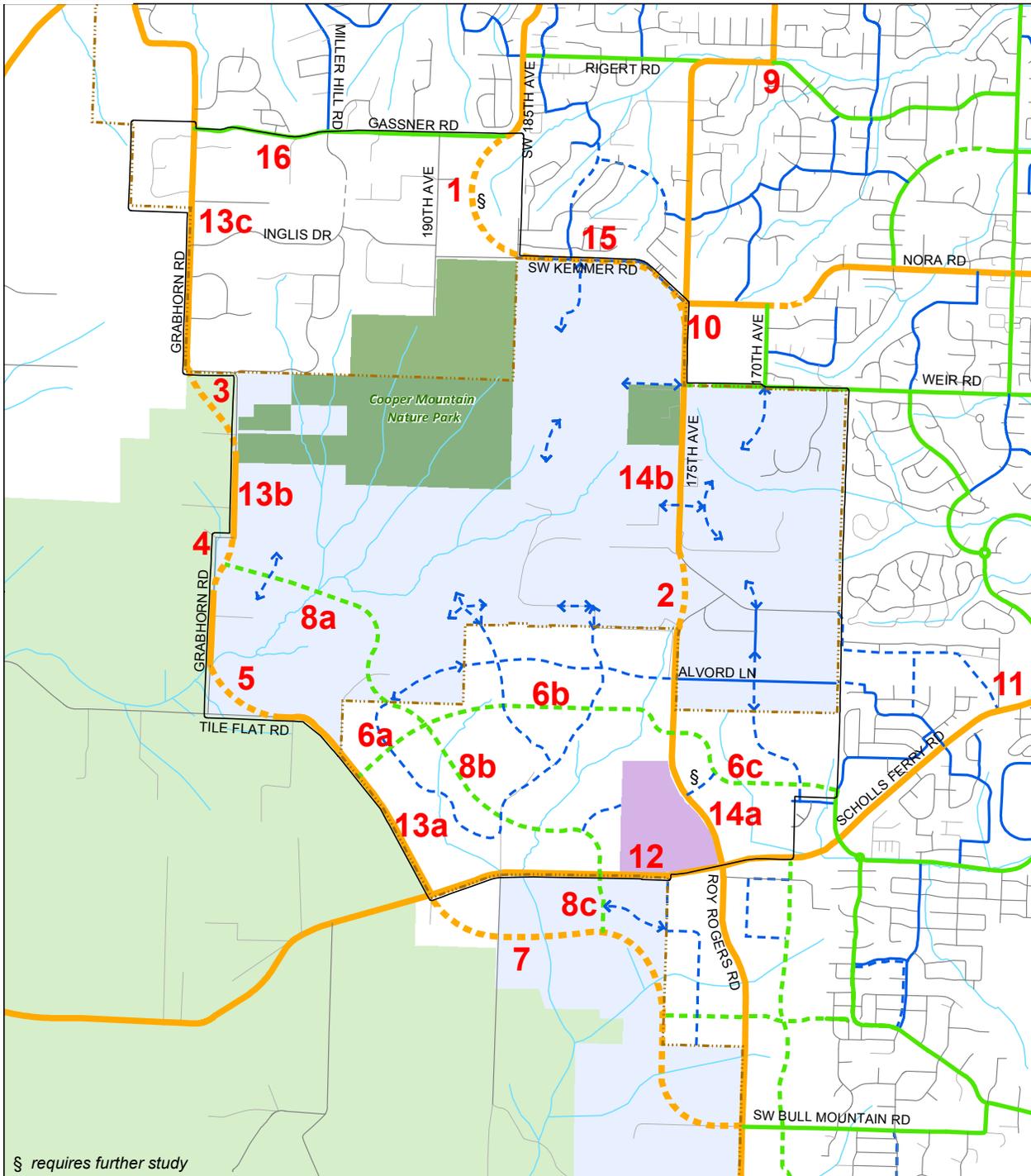
South Cooper Mountain Annexation Area

	ID	Project Description	Revenue by Source					Total
			TDT	New SDC	MSTIP	Developer	Other	
Years 0-10	2	Realign 175th Avenue between Outlook Lane and Cooper Mountain Lane, as a 3-lane County arterial.	\$ 427,125	\$ 427,125	\$ 4,840,750	\$ -	\$ -	\$ 5,695,000
	6b	Create a new east-to-west 3-lane City Collector street from the new north-to-south Collector Street to 175th Avenue.	\$ 2,742,500	\$ 2,742,500	\$ -	\$ 5,485,000	\$ -	\$ 10,970,000
	6c	Create a new east-towest 3-lane City Collector street from 175th Avenue to Loon Drive.	\$ 2,132,500	\$ 2,132,500	\$ -	\$ 4,265,000	\$ -	\$ 8,530,000
	8b	Create a new north-to-south 2-lane City collector street between the UGB, just south of the Alvord Lane Extension and Scholls Ferry Road.	\$ 2,755,000	\$ 2,755,000	\$ -	\$ 5,510,000	\$ -	\$ 11,020,000
	10	Improve the Kemmer Road/175th Avenue intersection.	\$ -	\$ 1,625,000	\$ 875,000	\$ -	\$ -	\$ 2,500,000
	12	Improve Scholls Ferry Road from Roy Rogers Road-175th Avenue to Tile Flat Road as a 5-lane County arterial.	\$ 3,837,550	\$ 4,327,450	\$ -	\$ -	\$ -	\$ 8,165,000
	14a	Improve 175th Avenue from Scholls Ferry Road to the UGB, north of Alvord Lane, as a 3-lane County arterial, with right of way dedications to a 5 lane width.	\$ 1,992,500	\$ 1,992,500	\$ -	\$ -	\$ -	\$ 3,985,000
	18	Construct a community shared-use path (South Cooper Loop Trail) along the north side of Scholls Ferry Road, between Tile Flat Road and 175th Avenue.	\$ 500,000	\$ 500,000	\$ -	\$ -	\$ -	\$ 1,000,000
	20	Construct a community shared-use path, along the south side of the proposed neighborhood route between the proposed north-to-south collector street and 175th Avenue.	\$ 325,000	\$ 325,000	\$ -	\$ -	\$ -	\$ 650,000
	21	Construct a community shared-use path, along the north side of the proposed neighborhood route connecting the proposed north-to-south collector street with the proposed east-to-west collector street, east of 175th Avenue	\$ 280,000	\$ 280,000	\$ -	\$ -	\$ -	\$ 560,000
	C	Contingency Fund for Street Extensions	\$ 500,000	\$ 500,000	\$ -	\$ -	\$ -	\$ 1,000,000
		Subtotal	\$ 15,492,175	\$ 17,607,075	\$ 5,715,750	\$ 15,260,000	\$ -	\$ 54,075,000
Years 10-20	6a	Create a new east-to-west 3-lane City Collector street from Tile Flat Road to the new north-to-south Collector Street.	\$ 813,750	\$ 813,750	\$ -	\$ 1,627,500	\$ -	\$ 3,255,000
	11	Improve the Scholls Ferry Road/ Horizon-Teal Boulevard intersection.	\$ 100,000	\$ 100,000	\$ -	\$ -	\$ 300,000	\$ 500,000
	13a	Improve Tile Flat Road from Scholls Ferry Road to the UGB, as a 3-lane County arterial.	\$ 302,500	\$ 302,500	\$ 2,420,000	\$ -	\$ -	\$ 3,025,000
	19a	Construct a community shared-use path (South Cooper Loop Trail) along the west side of 175th Avenue, between Scholls Ferry Road and the UGB.	\$ 705,000	\$ 705,000	\$ -	\$ -	\$ -	\$ 1,410,000
	22	Install crosswalk and pedestrian activated flasher on 175th Avenue at Weir Road.	\$ 16,000	\$ 16,000	\$ -	\$ 48,000	\$ -	\$ 80,000
		Subtotal	\$ 1,937,250	\$ 1,937,250	\$ 2,420,000	\$ 1,675,500	\$ 300,000	\$ 8,270,000
20+	17a	Construct a community shared-use path (South Cooper Loop Trail) along the east side of Grabhorn Road and Tile Flat Road, between the UGB and Scholls Ferry Road.	\$ 282,500	\$ 282,500	\$ -	\$ -	\$ -	\$ 565,000
		Subtotal	\$ 282,500	\$ 282,500	\$ -	\$ -	\$ -	\$ 565,000
Total: All Years			\$ 17,711,925	\$ 19,826,825	\$ 8,135,750	\$ 16,935,500	\$ 300,000	\$ 62,910,000

North Cooper Mountain

	ID	Project Description	Revenue by Source				
			TDT	New SDC	MSTIP	Developer	Total
Years 0-10		No Projects					
		Subtotal	\$ -	\$ -	\$ -	\$ -	\$ -
Years 10-20							
	16	Improve Gassner Road from Grabhorn Road to the 185th Avenue extension as a 2-lane County collector.	\$ 1,237,500	\$ 1,237,500	\$ -	\$ -	\$ 2,475,000
		Subtotal	\$ 1,237,500	\$ 1,237,500	\$ -	\$ -	\$ 2,475,000
20+		No Projects					
		Subtotal	\$ -	\$ -	\$ -	\$ -	\$ -
Total: All Years			\$ 1,237,500	\$ 1,237,500	\$ -	\$ -	\$ 2,475,000

South Cooper Mountain Concept & Community Plans



§ requires further study

Draft Concept Plan Transportation Framework

- Proposed Functional Classification***
- Arterial
 - Collector
 - Neighborhood Route
 - Local
 - Private
 - Rural Reserve**
 - Urban Reserve
 - Study Area
 - Urban Growth Boundary
 - Existing Parks
 - Planned High School Site
 - Streams

* Realignments and new roads are shown in dashed lines. New roads east of study area are based on Washington County's Transportation System Plan; new roads within UGB south of study area are based on current River Terrace Community Plan transportation planning. All new road alignments are conceptual.

** As amended by HB 4078A.

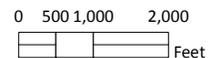
Prepared By: Angelo Planning Group

Date: 8/29/2014

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl

DISCLAIMER

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Beaverton
South Cooper Mountain
The Region's Next Great Community

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