Memorandum

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Date: December 9, 2008

Subject: East Happy Valley Buildable Lands and Residential Capacity Analysis

Project No.: 13812

Summary

This memorandum provides an analysis of buildable lands and residential capacities within the East Happy Valley planning area. Metro's Urban Growth Management Functional Plan (UGMFP), section 3.07.1120(C) requires that new urban areas include the "provision for average residential densities of at least 10 dwelling units per net developable residential acre or such other densities that the Council specifies pursuant to section 3.01.040 of the Urban Growth Management Functional Plan." Happy Valley's requirement is 9.1 dwelling units per net residential acre because the area was part of the intergovernmental Damascus/Boring Concept Plan process. The Concept Plan's Technical Appendix provides an analysis buildable lands and density capacities – an average net residential density of 9.1 dwelling units per acre for the East Happy Valley portion of the recommended concept plan is cited (*Appendix to the Report on the Damascus/Boring Concept Plan*, 2006, pg. 312).

Utilizing the methodology as described below, the following estimates are derived for the East Happy Valley planning area:

Net buildable residential acres:	513.65 acres
Dwelling units:	4717 dwellings
Net residential density:	9.18 dwelling units per net residential acre
Net buildable employment acres:	259.10 acres

The analysis is based on the East Happy Valley Comprehensive Plan Map as of November 24, 2008 (attached) and Draft Happy Valley Development Code Amendments as of December 9, 2008. The remainder of this memorandum provides the methodology for the estimation of buildable land and residential dwelling unit capacity. Included in the methodology is a list of land use districts and summary of resource overlay districts that apply in the East Happy Valley planning area, an

EXHIBIT N

explanation of assumptions for determining buildable land and residential capacity, and the GIS procedures used to carry out each phase of the analysis.

Methodology

Land Use Districts

Employment Districts

- Community Commercial Center (CCC)
- Mixed Commercial Center (MCC)
- Employment Center (EC)
- Industrial Campus (IC)

Residential Districts

- Residential 20,000 Square Feet (R-20)
- Residential 15,000 Square Feet (R-15)
- Residential 10,000 Square Feet (R-10)
- Residential 7,000 Square Feet (R-7)
- Residential 5,000 Square Feet (R-5)
- Single Family Attached (SFA)
- Mixed Use Residential – Single Family (MUR-S)
- Mixed Use Residential – Multi-family (MUR-M2)

Resource Overlays

Development code chapters 16.32 (Steep Slopes Development Overlay) and 16.34 (Natural Resources Overlay Zone) provide additional regulations intended to preserve steep slopes and natural resources. The intent of these regulations is to balance conservation and development by clustering development on lands unconstrained by steep slopes or natural resources. To do this, the overlays define constrained, partially constrained, and unconstrained land. The lands designated as constrained are not buildable; a density of two units/acre is applied to them for density transfer to buildable areas. The overlays establish the amount of partially constrained land that can be developed. Partially constrained land is also assigned a density of two units/acre. Buildable portions of partially constrained land may be developed at two units/acre and density may be transferred from unbuildable portions to buildable portions of the site or adjacent properties. Unconstrained lands develop at the prescribed densities of the residential land use district. Unconstrained land and buildable partially constrained land may receive transfers from constrained land, unbuildable partially constrained land, and/or adjacent properties. With the use of density transfers pursuant to Section 16.63.020(F)(2), unconstrained land may not exceed 175 percent of the

maximum density of the applicable underlying land use district and buildable partially constrained land may not exceed 175 percent of 2 units/acre (3.5 units/acre).

Determining Buildable Land

The East Happy Valley Comprehensive Plan area is approximately 2,118 acres. For the buildable land analysis, vacant and redevelopable land was identified. Vacant land was identified using Metro data from 2005 and 2007 and aerial data. Redevelopable land was created using Metro building improvement data. For land in residential and industrial districts, any parcel with an improvement valued at less than $300,000 is considered redevelopable. Additionally, all land in commercially zoned districts (Community Commercial Center and Mixed Commercial Center) was deemed redevelopable. Land designated Institutional and Public Use (IPU) was not included in this analysis.

Land Categories

To account for the resource overlays, the vacant and redevelopable land was categorized as constrained, partially constrained, or unconstrained land for the purposes of this analysis as follows:

Constrained Land

- Conservation Slope Area
  - Slopes 25 percent and greater (for designation as conservation slope area, the minimum contiguous extent for slopes 25 percent and greater shall be 1,000 square feet).
  - Potentially Hazardous Analysis Areas (lands within 25 feet of the top or toe of slopes 25 percent and greater).
  - Areas containing potentially rapidly moving landslide hazard areas mapped by the Oregon Department of Geology and Mineral Industries (DOGAMI)
- Water Quality Resource Area, as defined in Section 16.34.060.
- High and Moderate Value Habitat Conservation Areas, as defined in 16.34.020.D2.*
- Major Utility Corridors**

Partially Constrained Land

- Transition Slope Area
  - Slopes 15 to 24.99 percent (for designation as transition slope area, the minimum contiguous extent for slopes 15 to 24.99 percent shall be 1,000 square feet and the land must not be otherwise designated as a conservation slope area)
  - The percentage of the Transition Slope Area that is buildable based on the sliding scale below.

% of the parcel that is constrained or partially constrained	% of Transition Slope Area that is buildable
0 to 19.99%,	30%
20 to 49.99%	40%
50%	50%

Unconstrained Land

- Any land not designated as Constrained Land or Partially Constrained Land.

  * Metro's UGMFP Title 13 Habitat Conservation Areas (HCAs) protect additional land around a protected water feature and are treated as partially constrained land. For each of the three HCA land designations (low, moderate, and high) a different maximum portion of the HCA may be developed as follows:

    - Low: 50 percent of the HCA
    - Moderate: 15 percent of the HCA
    - High: 10 percent of the HCA

    Although HCAs are partially constrained land, this analysis treats the moderate and high HCAs as constrained land and the low HCAs as unconstrained.

  ** Major Utility Corridors behave as constrained land for the designation of buildable land. However, although these lands are not buildable, for the transfer of units, the otherwise unconstrained land within a major utility corridor is calculated at the underlying development district.

As shown in Table 1 below, vacant and redevelopable land comprises 1,757 acres in East Happy Valley. The remaining 362 acres within the plan area are designated committed lands. These lands include parcels or portions of parcels that are neither vacant nor redevelopable, lands designated IPU, current rights-of-way, and lands removed for planned arterial and collector rights-of-way. Of the 1,757 acres, 742 are constrained, 130 are partially constrained, and 884 are unconstrained. Tables 2 and 3 display vacant and redevelopable land for employment and residential land.

Table 1: East Happy Valley Vacant and Redevelopable Land

Land Category	Gross Acres
Committed	362.03
Vacant or Redevelopable	1,756.56
Constrained	741.87
Partially Constrained	130.41
Unconstrained	884.28
East Happy Valley	2,118.59

Table 2: Gross Employment Vacant and Redevelopable Land

Employment Land	Gross Acres
Constrained	139.30
Partially Constrained	8.33
Unconstrained	313.70
Vacant or Redevelopable	461.33

Table 3: Gross Residential Vacant and Redevelopable Land

Residential Land	Gross Acres
Constrained	602.57
Partially Constrained	122.08
Unconstrained	570.58
Vacant or Redevelopable	1,295.23

Buildable Land Transportation Assumptions

The following transportation assumptions were used to establish buildable land:

1. Planned arterials and collectors were previously removed from all vacant and redevelopable land.
2. For commercial land, an additional 15 percent of unconstrained land was removed for local rights-of-way.
3. For residential land, an additional 20 percent of unconstrained land was removed for local rights-of-way.
4. No additional land is removed from buildable transition slope areas for local rights-of-way.

Tables 4 and 5 show the removal of land for rights-of-way and net buildable land for employment and residential land. In the tables, the buildable transition slope area has already been calculated from gross transition slope land according to the sliding scale. Tables 6 and 7 display net buildable land by employment and residential land use districts.

Table 4: Net Buildable Employment Land

Buildable Employment Land		Acres
Gross Unconstrained Land		313.70
Less local ROW (18.5%)	-	58.03
Net Unconstrained Land		255.67
Buildable Transition Slope Area	+	3.43
Net Buildable Land		259.10

Table 5: Net Buildable Residential Land

Buildable Residential Land		Acres
Gross Unconstrained Land		570.58
Less local ROW (20%)	-	114.12
Net Unconstrained Land		456.46
Buildable Transition Slope Area	+	57.19
Net Buildable Land		513.65

Table 6: Net Buildable Employment Lands by Comprehensive Plan District

Zone	Net Unconstrained Acres	Buildable Transition Slope Area	Total Net Buildable Acres
CCC	15.06	0.11	15.17
MCC	20.54	0.08	20.62
EC	109.23	0.59	109.82
IC	110.83	2.65	113.48
Total	255.67	3.43	259.10

Table 7: Net Buildable Residential Lands by Comprehensive Plan District

Zone	Net Unconstrained Acres	Buildable Transition Slope Area	Total Net Buildable Acres
R20	38.39	41.39	79.78
R15	81.94	3.38	85.32
R10	127.32	6.97	134.29
R7	41.77	2.15	43.92
R5	60.77	1.29	62.06
SFA	44.49	1.22	45.71
MURS	11.81	0	11.81
MURM2	49.98	0.79	50.77
Total	456.46	57.19	513.65

Determining Residential Capacity

In order to estimate the residential capacity of the East Happy Valley Comprehensive Plan Area several assumptions and simplifications must be made. This is due to the complicated calculation of developable residential units for a parcel of land that is ultimately dependent upon site specific conditions and analysis. Table 8 summarizes residential capacity and average net density for the East Happy Valley Comprehensive Plan. Table 9 provides the data calculation for each assumption. The assumptions are listed below:

1. The analysis assumes that net unconstrained land will develop at the maximum density of the applicable residential land use district as follows:

Residential District	Density*
Residential 20,000 SF (R-20)	2.18
Residential 15,000 SF (R-15)	2.90
Residential 10,000 SF (R-10)	4.36
Residential 7,000 SF (R-7)	6.22
Residential 5,000 SF (R-5)	8.71
Single Family Attached (SFA)	15.00
Mixed Use Residential - Single Family (MUR-S)	15.00
Mixed Use Multi-family (MUR-M2)	34.00

* Density in dwelling units per acre

2. The analysis assumes that buildable portions of the transition slope area will reach maximum density at the two units/acre base density.
3. Properties completely encumbered by constrained land will produce 1 unit/parcel as all lots of record are allowed at least one unit.
4. The analysis also assumes that one half of all properties in residential districts R15 and R20 will receive full density transfers. These properties will receive density transfers from constrained and partially constrained land to reach 175 percent of the zoned maximum density on unconstrained land and the buildable portions of partially constrained land allowed by the overlay zones. R15 is concentrated on the flat top of Scouter's Mountain and R20 is generally restricted to the steep sides of the mountain. Much of the R20 lands are either constrained or partially constrained land. Thus, the density from the slopes will shift to the top of the mountain.
5. After accounting for the transfer in R15 and R20, the analysis assumes twenty percent of the remaining transferable units generated by constrained and partially constrained land will be built.

Table 8: Residential Capacity and Average Net Density

Source of Residential Units	Units
Net Unconstrained	4,209
Buildable TSA	114
100% Constrained	23
R15 and R20 Transfers	120
Remaining Transfers at 20%	251
Total	4,717
Total Number of Units	4,717
Net Buildable Land Acres	514
Average Net Density	9.18

GIS Methodology and Procedures

Step 1. Create Vacant Land

1. The previous buildable lands analyses used Metro 2005 vacant land data rubbersheeted to 2006 taxlots. This was necessary because the Metro 2005 vacant land data had been registered to the 2004 taxlots, which in 2006 shifted between 30 and 150 feet in the southern half of the EHV study area. This process resulted in the shapefile: **vacant_land_2007_adjusted.** For this analysis, the vacant_land_2007_adjusted shapefile was further edited to reflect some of the changes incorporated in the Metro 2007 vacant land data update.

   a. Add "Vacant" field to this shapefile and assigned all records a value of "Yes."
   b. Note: From here on, all vacant land is assumed to be adjusted and the "adjusted" portion of the shapefile name is excluded.

2. Intersect "vacant_land_2007_adjusted" and "taxlots" and call this shapefile **vacant_land_taxlots**. Then delete parcels with Vacant not equal to "Yes".

3. Intersect "vacant_land_taxlots" and "zoning" and call this shapefile **Vacant_land_tl_zoning.**

Step 2. Create Redevelopable Land

The goal of this step is to assign non-vacant land as "Redevelopable" based on certain criteria. In this section, a "parcel" refers to either an entire taxlot (if the entire taxlot is non-vacant) or the non-vacant portion of a taxlot. Land that was determined to be vacant above cannot then be determined to be redevelopable.

The criteria used in this analysis are as follows:

1. For residential parcels or industrial parcels (zoning = residential, RSIA or EC), if the building value is < $300,000, that land is redevelopable.
2. For commercial parcels (zoning = CC or MCC), all land is redevelopable.
3. For institutional parcels (zoning = IPU), no land is redevelopable.

Steps:

1. Create inverse of "vacant_land_taxlots" (this is land that is not vacant). To create this, union "taxlots_mp" and "vacant_land_taxlots" and call the resultant shapefile **vacant_land_not_tl**, then remove all parcels with "Vacant" = "Yes". Assign a value of "No" to all resulting records.
2. Intersect "vacant_land_not_tl" with "zoning" to add zoning information. Call it **redevelopable**. Add a 5-character text field called "Redevel" and assign to "No" for all records. This is the default value which will be modified in the next step.

3. From the redevelopable file, assign records to have "Redevel" = "Yes" based on the following criteria (Note: used predefined ArcGIS expressions instead of typing in this data):

    a. Select records that have zoning = residential (MUR-M2, MUR-S, SFA, R5, R7, R10, R15, or R20) or zoning = industrial (EC, IC). From these records, select the records that have BLDGVAL < 300,000. Assign these records "Redevel" = "Yes." Then clear the selection.
    b. Select records that have zoning = commercial (CCC, MCC). For these records, assign "Redevel" = "Yes" (i.e., all commercial land). Then clear the selection.
    c. Note: Do not change the "Redevel" status from "No" for any IPU land, since none of this land is redevelopable.

4. Delete all records that are not redevelopable (have "Redevel" = "No"). Then calculate polygon area and delete slivers (polygons < 100 sq. feet).

To combine Vacant and Redevelopable land, do the following:

a. Union "vacant_land_tl_zoning" (created above) with "redevelopable" and call this shapefile **redevelopable_or_vacant**.
b. Add a field "VacRedev" and populate with either "Vacant" or "Redevelopable". Delete slivers.

Step 3. Create Constrained Land and Transition Slope Area

1. Add all layers (describe them) and union them. The constraints include:
    - Slopes greater than 25%
    - Potentially Hazardous Analysis Areas (25 foot buffer surrounding Slopes greater than 25%)
    - Habitat Conservation Areas - High and Moderate
    - Water Quality Areas
    - Major Utility Corridor - Natural gas easements (buffers)
    - Major Utility Corridor - Power line easements (buffers)

    Union all constraints and call the resultant shapefile **constraints**.

2. Create Transition Slope Area
    - Find slopes 15 to 24.99% with extents greater than 1,000 square feet and call this shapefile "transition_slope_area." Add a text field called transition and populate with "Transition Slope Area."
    - Union "transition_slope_area" with "constraints" and call the shapefile **transition_without_constraints**.

Step 4. Create Buildable Lands

1. Union "constraints" and "transition_without_constraints" and call this shapefile **constraints_transition** and add a text field called "Const_TSA" and populate with "Constrained and TSA."

2. Remove "rights-of-way" (arterials and collectors) from "redevelopable_or_vacant" and call this shapefile **redevelopable_or_vacant_without_ROW**.

3. Union "redevelopable_or_vacant_without_ROW" with "constraints_transition" and call this shapefile **buildable_land**. Calculate acreage. Then delete all parcels that have "Const_TSA" equal to "Constrained and TSA."

4. Intersect "buildable_land" with "zoning" and call this shapefile **buildable_land_dissolve_int_zoning** and calculate acres.

5. Open **buildable_land_dissolve_tlotid_int_zoning.dbf** and create pivot table to add to calculation. From this step:
   - Unconstrained residential acres by zone
   - Unconstrained employment acres by zone

Step 5. Determine Buildable and Unbuildable Transition Slope Area

1. Intersect "constrained_transition" with "redevelopable_or_vacant_without_ROW" and call this shapefile "redevelopable_or_vacant_int_const_trans."

2. Add a field called "C_T_Acre" and calculate acres.

3. Add a field called "Per_C_T" and calculate the field equal to "C_T_Acre" / "TlotAcres."

4. Add a field called "Per_B_T" and calculate the field based on the sliding scale where:

Field Per_C_T	Field Per_B_T
0 to 19.99%,	30%
20 to 49.99%	40%
≥ 50%	50%

5. Intersect "redevelopable_or_vacant_int_const_trans" with "transition" and call this shapefile **buildable_TSA**.

6. Intersect "buildable_TSA" with "zoning" and call this shapefile **buildable_TSA_int_zoning**.

7. Add a field called "Trans_Acre" and calculate acres.

8. Add a field called "Build_TSA" and calculate the field equal to "Per_B_T" * "Trans_Acre."

9. Open **buildable_TSA_int_zoning.dbf** and create pivot table to add to calculation. From this data:
   - Buildable TSA – find total acreage, multiply 2 units/acre
   - Unbuildable TSA – subtract Buildable TSA acres from Total TSA acres
   - Number of properties completely constrained (1 unit per property)

Step 6. Determine Constrained Transferable Units

1. Intersect "constraints" with "redevelopable_or_vacant_without_ROW" and call this shapefile **constrained_redevelopable_or_vacant**.

2. Intersect "constrained_redevelopable_or_vacant" with "zoning" and call this shapefile **constrained_int_zoning**.

3. Add a field called "ConstAcre" and calculate acreage.

4. Open **constrained_int_zoning.dbf** and create pivot table to add to calculation. From this data:
   - Find total acreage and add Unbuildable TSA acres from Step 5
   - Multiply the result of the previous step by 2 units/acre

Step 7. Determine Unconstrained Transferable Units from Major Utility Corridors

Create Constrained Land and Transition Slope Area

1. Create constrained land and transition land without major utility corridors. The constraints include:
   - Slopes greater than 25%
   - Potentially Hazardous Analysis Areas (25 foot buffer surrounding Slopes greater than 25%)
   - Habitat Conservation Areas - High and Moderate
   - Water Quality Areas

   Union all constraints and call the resultant shapefile **constraints_without_MUC**

2. Create Transition Slope Area

- Find slopes 15 to 24.99% with extents greater than 1,000 square feet and call this shapefile **transition_slope_area** add a text field called transition and populate with "Transition Slope Area."

3. Union "constraints_without_MUC" and "transition_without_constraints" and call this shapefile **constraints_transition_without_MUC**. Add a text field called "Const_TSA" and populate with "Constrained and TSA."

4. Union "major_utility_corridors" with "constrained_transition_without_MUC" and call this shapefile **major_utility_unconstrained**. Then delete all parcels that have "Const_TSA" equal to "Constrained and TSA."

5. Intersect "major_utility_unconstrained" with "zoning" and call this shapefile **major_utility_unconstrained_int_zoning**. Calculate acreage.

6. Open **major_utility_unconstrained_int_zoning.dbf** and create pivot table to add to calculation. From this data:
   - Find total acreage and multiply by 2 units/acre. Remove this from the total constrained transferable units in step 6.
   - Find transferable units from major utility corridor unconstrained land based on zone districts and add to the result of the previous step.

Table 9: Residential Capacity and Average Net Density

Unconstrained Land	Gross Buildable Acres	Less 20% ROW Takeout	Net Buildable Acres	Density (100%)	Units Without Transfer	Total Units	Average Net Density (units/acre)
MURM2	62.47	(12.49)	49.98	34.00	1699.18	1699	
MURS	14.76	(2.95)	11.81	15.00	177.12	177	
R10	159.15	(31.83)	127.32	4.36	554.61	555	
R15	102.43	(20.49)	81.94	2.90	237.97	238	
R20	47.99	(9.60)	38.39	2.18	83.62	84	
R5	75.96	(15.19)	60.77	8.71	529.41	529	
R7	52.21	(10.44)	41.77	6.22	259.92	260	
SFA	55.61	(11.12)	44.49	15.00	667.32	667	
Partially Constrained Land							
Buildable TSA	57.19	0.00	57.19	2.00	114.38	114	
Constrained Land							
Properties 100% Constrained	0.00	0.00	0.00	0.00	23	23	
Subtotal 1	**627.77**	**(114.12)**	**513.65**		**4346.52**	**4346**	**8.46**

Residential Unit Transfer to Buildable Land

One half of properties in R15 and R20 receive full transfer	Gross Buildable Acres	Less 20% ROW Takeout	Net Buildable Acres	Density (37.5%)	Transfer Units	Total Units
R15	102.43	(20.49)	81.94	1.09	89.24	89
R20	47.99	(9.60)	38.39	0.82	31.36	31
Subtotal 2						**120**

Transfer to other Residential Zones and Buildable TSA	Total Transferable Units	Less R15 & R20 Transfer (Subtotal 2)	Remaining Transfer	Untransferred Units	Transfer at 20%	Total Units
Transferable Units	1375	(120)	1255	1004	251	251
Subtotal 3						**251**

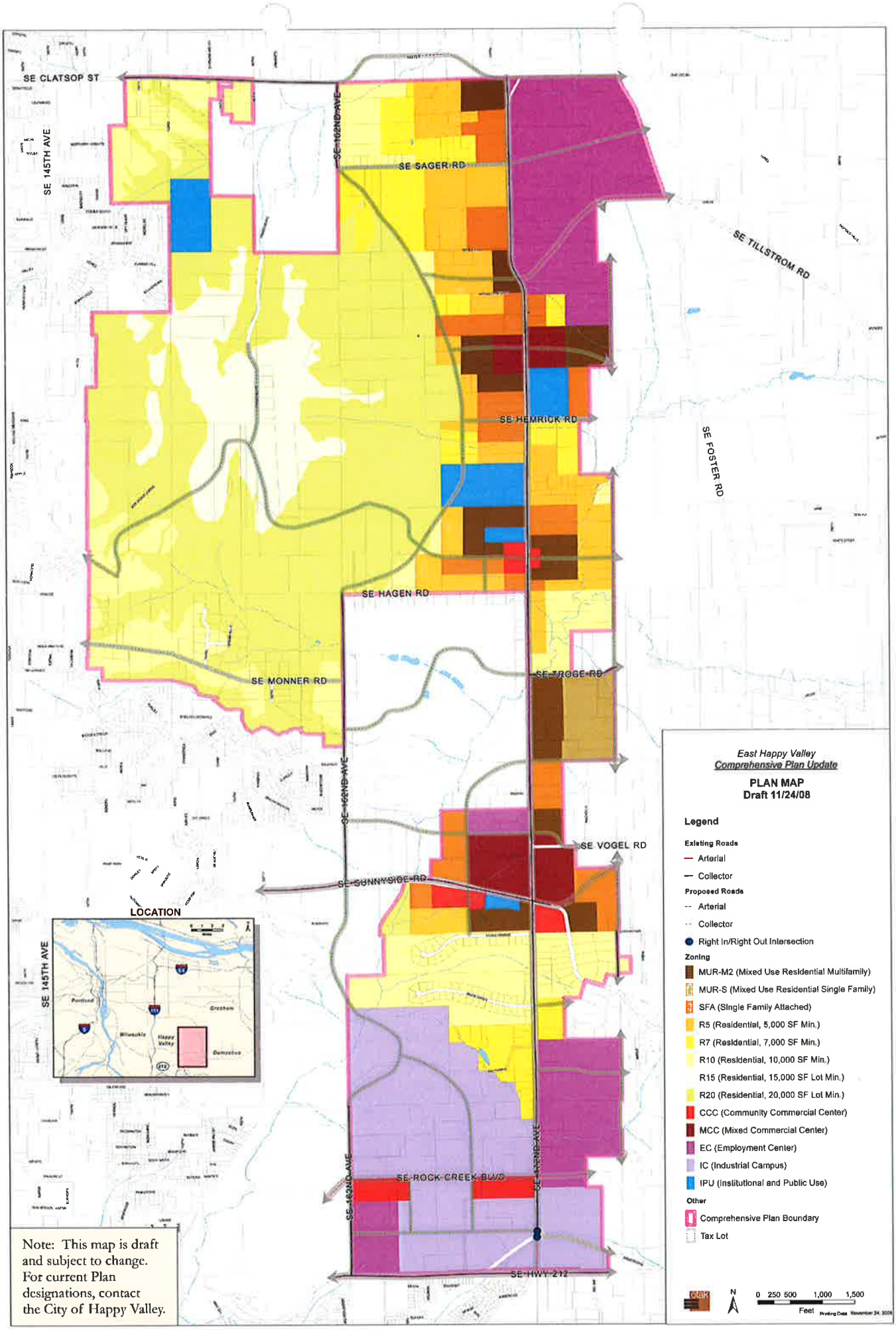
Total Residential Units and Average Net Density

	Net Buildable Acres	Total Units	Average Net Density (units/acre)
Total	**513.65**	**4717**	**9.18**

Transferable Units

Residential Land	Gross Acres	Density	Transferable Units
Constrained Land	602.57	2	1205
Unbuildable TSA	64.89	2	130
Major Utility Corridor Difference*	0.00	By Zone	40
Total Transferable Units			**1375**

*The difference in units between the constrained land density (2 units/acre) and the underlying land use district for otherwise unconstrained land in Major Utility Corridors.


SE CLATSOP ST
SE 145TH AVE
SE 162ND AVE
SE SAGER RD
SE TILLSTROM RD
SE HEMRICK RD
SE FOSTER RD
SE HAGEN RD
SE MONNER RD
SE 172ND AVE
SE VOGEL RD
SE SUNNYSIDE RD
SE 162ND AVE
SE ROCK CREEK BLVD
SE 172ND AVE
SE HWY 212
LOCATION
Portland
Gresham
Milwaukie
Happy Valley
Damascus
East Happy Valley
Comprehensive Plan Update
PLAN MAP
Draft 11/24/08
Legend
Existing Roads
Arterial
Collector
Proposed Roads
Arterial
Collector
Right In/Right Out Intersection
Zoning
MUR-M2 (Mixed Use Residential Multifamily)
MUR-S (Mixed Use Residential Single Family)
SFA (Single Family Attached)
R5 (Residential, 5,000 SF Min.)
R7 (Residential, 7,000 SF Min.)
R10 (Residential, 10,000 SF Min.)
R15 (Residential, 15,000 SF Lot Min.)
R20 (Residential, 20,000 SF Lot Min.)
CCC (Community Commercial Center)
MCC (Mixed Commercial Center)
EC (Employment Center)
IC (Industrial Campus)
IPU (Institutional and Public Use)
Other
Comprehensive Plan Boundary
Tax Lot
N
0 250 500 1,000 1,500
Feet
Note: This map is draft and subject to change. For current Plan designations, contact the City of Happy Valley.