APPENDIX A. IMPLEMENTATION GUIDEBOOK

Background and Purpose

This guidebook provides step-by-step instructions for completing the Land Value Potential (LVP) methodology for identifying redevelopable lands. The purpose of the guidebook is to help prospective analysts understand LVP assumptions and replicate calculations.

The implementation guidebook aims to supplement the report. The report provides a "high-elevation" orientation to the proposed LVP analysis and possible outcomes. The guidebook presents LVP methods in a process-oriented manner and provides a detailed documentation of methodologies and assumptions.

This guidebook is designed for prospective analysts or stakeholders interested in learning more about LVP calculations and assumptions. This document can be used to support further refinement of the LVP approach; fostering the LVP method through a formalization process with the goal of implementation in Pierce County to support 2012 buildable lands calculations. The current LVP method presented here is a *proposed* approach for demonstration purposes. Further analysis, adjustments and public review are required before the LVP approach can be finalized for Countywide implementation.

Organization of the Guidebook

The LVP methodology is defined by four key stages. The guidebook is organized around these stages, which include:

1. Define Scope of Analysis and Data Inputs
2. Calculate Land Value Potential
3. Calculate Growth Capacity of Redevelopable Lands and Evaluate Outcomes
4. Forecast Redevelopment Absorption

Required Technologies and Applications

The LVP approach requires use of two primary tools, applied in the following manner:

- **ArcGIS** is used to analyze and join data spatially and map LVP outcomes
- **Microsoft Excel** is used to create a spreadsheet model for conducting LVP calculations and storing input data. The spreadsheet model is connected to GIS for mapping.

Stage 1. Define Scope of Analysis and Data Inputs

Define the scope of the analysis, project inputs and assumptions prior to conducting LVP calculations.

Step 1. Answer key questions and define the scope of the analysis

Answer three key questions to determine scope and approach for analysis.

Key Question 1: What areas should the LVP method be applied to?
The LVP method can be applied to contiguous market areas, comprising urban centers and industrial corridors, or specific areas where re-development interest aligns with planning objectives. Applications to residential neighborhoods where a greater degree of mixed-use or increases in density is desired may also be appropriate. Answers may vary if the analysis is conducted for multiple municipalities or a single jurisdiction. The study area chosen for this pilot study is Downtown Tacoma and Puyallup.

Key Question 2: Should the method be applied to all existing land uses and parcels within the study area? Traditional methods for identifying redevelopable lands are applied to parcels with existing commercial or industrial uses only. The LVP method can be applied to all existing land uses, including vacant land to determine economic feasibility of redevelopment. Consider approaches for "protected" or "sensitive" lands such as religious land uses, schools or wetlands. This analysis excludes public and quasi-public land uses such as right of way, parks, religious and educational institutions.

Question 3: What types of land uses should be analyzed to determine redevelopment feasibility?
Question three references prospective development that will likely take place in the future (opposed to question two which references existing land uses). This analysis examines prospective commercial and multi-family developments. Examining multiple land uses requires collection of unique market and zoning inputs for each respective use. Analyzing multiple land uses requires re-iterative LVP calculations but also enables analysis of mixed-use options.

Upon answering these questions, the analyst is prepared to gather data efficiently and effectively.

Step 2. Preliminary data collection

The goal of step two is to create a preliminary database of information that can be used to define project inputs and complete LVP calculations. **Exhibit A-1** below demonstrates the data types, required inputs and sources of data used to conduct LVP calculations; user tips follow.

Exhibit A-1
Data Inputs and Sources

Data Type	Required Fields	Source
Parcel shapefile (a)	• Parcel Identification Number • ShapeArea "lot size"	
County Assessor's Data Extracts (b)	ACCOUNT (c) • Bldgs "Number of buildings" • Groupaccountno ATREXTRACT • Landval "land value" • Impval "improvement or building value" • Totalval "total value" • Usecd-descr "land use description" IMPROVEMENT (d) • Units • SF "square footage of building"	Pierce County Assessor/Treasurer Office
Zoning Data (f)	• Zoning district in shapefile format • FAR • Parking requirements by land use type • Allowable land uses • Other key factors that determine development capacity such as bonuses, height, lot covereage, etc.	Municipal sources, Pierce County Assessor also maintains a "zoning field," however
Market Data (g)	• Construction costs by building type • Parking construction costs • Rent by building type and parking • Capitalization rate • Vacancy	Construction costs Market data (Sources presented later in the guidebook)

USER TIPS AND NOTES FOR PRELIMINARY DATA COLLECTION

a) A parcel shapefile serves as a foundation for spatial analysis and cartography. Join the parcel file with other data files (primarily assessor's data using the PIN-parcel identification number).

b) Create one complete database of assessor's information. To reduce double counting in growth estimates, group assessor parcel records by PIN, average improvement and land value fields, number of units and buildings and sum building sf. This eliminates duplicate parcel records where numerous buildings are found on a single parcel.

c) Zoning data recorded by the assessor may not be up to date with municipal records, therefore analysts should use this information with caution. "Landnetacres" can provide lot size information, however GIS parcel files often provide a more accurate source of information.

d) The IMPROVEMENT extract has a wealth of potentially useful information. Fields such as condition, quality and age can be used to help analyze the "desirability of redevelopment" amongst re-developable parcels.

e) Collect zoning information is a GIS format. Join zoning districts to respective parcels within zoning district boundaries by PIN or use a spatial join if the PIN field is not available. More information on zoning data is discussed later on in the guidebook.

f) Collect data for land uses specified in step 1 question 3 (above). Compare data across comparable cities and geographies to understand current market conditions in defined study area. More information on market data is discussed later on in the guidebook.

Step 3. Define Market Districts

Market districts are used to determine the "attractiveness" or "market potential" of a specific area to command a certain level of rent and quality of construction.

Defining market districts is an inexact science that requires judgment. First, map current assessor data to identify areas with "high" or "low" sources of value to date. Improvement value per square foot of lot size demonstrates the relative amount of investments in an area, indicative of how the market has valued the area. (Divide improvement value by square feet of lot).

Study value patterns. In some cases, this measure results in relatively clear patterns of investment (see E**xhibit A-2** and notes for Tacoma example) in others it does not (see **Exhibit 3** for Puyallup on **page 11**). Study physical boundaries that define an area such as highways, natural boundaries, or clusters of prominent land uses. Examine past development patterns. Delineate districts based on these methods. Create a GIS shapefile of market districts. Using GIS, define a market district classification for each parcel within the study area.

USER TIPS AND NOTES FOR DEFINING MARKET DISTRICTS

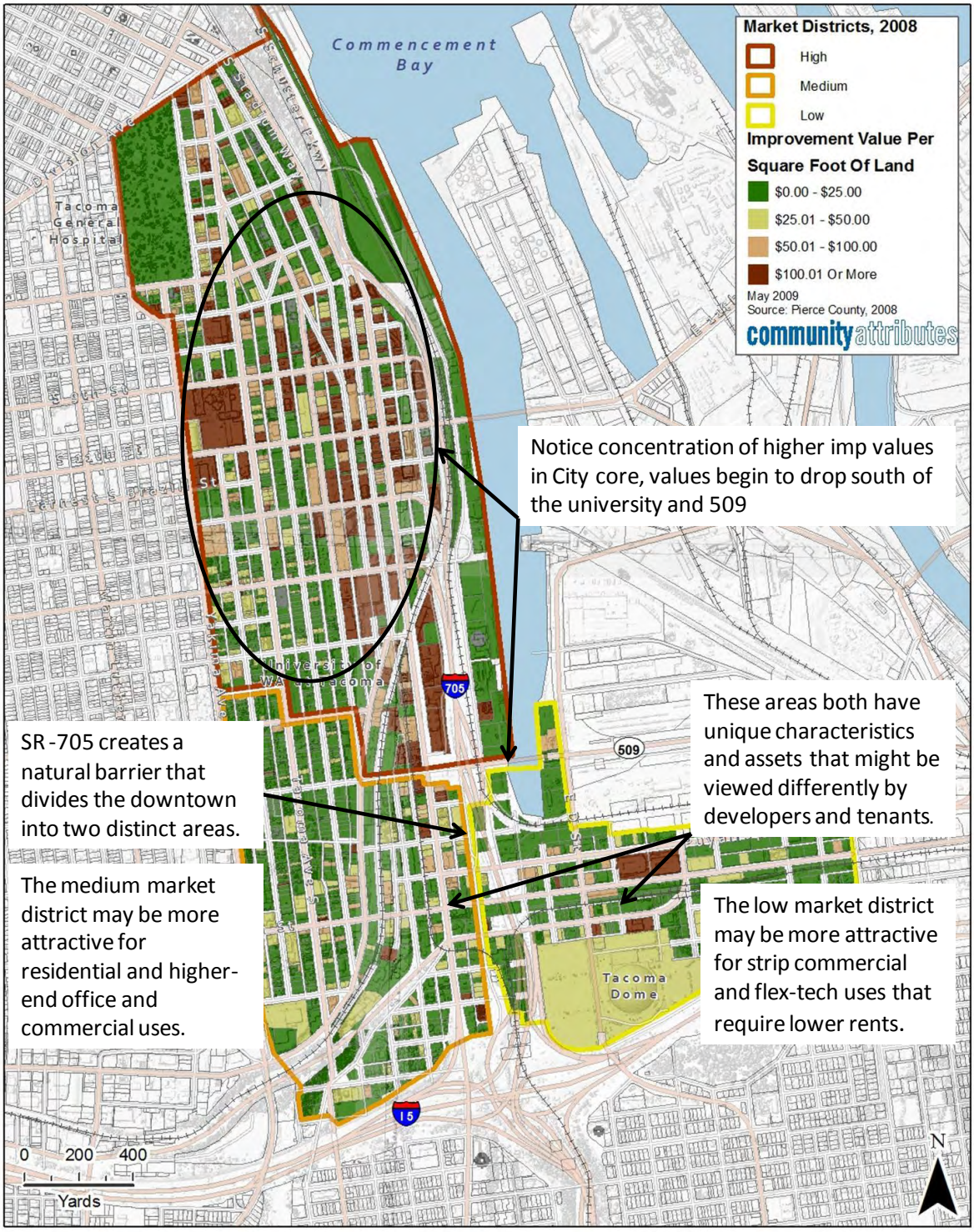
- Establish a small review committee of local stakeholders to review and confirm market districts. Members of the review committee should have knowledge of past and present market conditions and development patterns.

- Market districts can be adjusted or specific parcels can be flagged for unique circumstances.

- In small areas (such was the case in Puyallup) market conditions will not vary significantly from one district to the next. In these cases, classify an area as a single market district, or delineate market districts to match zoning districts.

- Variation in inputs and assumptions should be minimized when defining market assumptions for small geographic areas that share similar characteristics.

Exhibit A-2. Defining Market Districts in the Tacoma Study Area using Imp Value/SF of Lot



Step 4. Create Input and Assumption Tables

Outcomes of the LVP analysis are only as good as the assumptions that go in to the analysis. Analysts will likely have to adjust inputs and assumptions before finalizing LVP calculations. Defining inputs and assumptions is an important task that affects growth capacity calculations. Use sensitivity analysis to examine how variations in inputs and assumptions impact identification of redevelopable lands and growth capacity estimates.

Define Market Inputs and Assumptions

Create one market input table for each land uses analyzed. Begin by constructing the framework for market input tables. **Exhibit A-3** below identifies each market input used in the LVP analysis. Sources of data are provided with web links to data providers. References and user tips link to other parts of the report where the analyst can find additional information. Additional details on assumptions and inputs used in this analysis are provided after **Exhibit A-3**.

Exhibit A-3
Market Data Input and Assumptions

MARKET INPUTS	Directions and Key Questions	Source of Data, Reference & User Tips
Building Construction Cost (4a)	• Define building cost per square foot for each land use analyzed within each market district. • Choose the appropriate data input based on the two steps below; adjust as needed. See **Appendix C** for data. • First, define commercial or residential building types most likely to be built in each market district (i.e. office, retail or strip for commercial; attached or detached for residential) • Second, define construction quality for building type. Ask, will construction quality for each land use be "high" or "low" quality based on market district assumptions and previous development?	Go to Step 4a. Define Assumptions, Building Costs. Source: Rider Levett Bucknall (RLB) http://www.rlb.com/ • Evaluate assumptions for building type and construction quality against current building patterns, new developments and recent permit activity in market districts. • Review construction cost assumptions with local developers. • For-sale and for-rent multi-family can be modeled simultaneously.
Parking Construction Cost (4b)	• Define parking cost per square foot within each market district. • Choose the appropriate data input from **Appendix C** based on the two steps below; adjust as needed. • First, define parking construction types most likely to be built in each market district (i.e. above or below ground, surface)? • Second, define construction quality for parking. • Above ground low-end parking structures for urban centers for all land uses. A slight premium in Tacoma's high market district is assumed.	Go to Step 4b. Define Assumptions, Parking Costs. Source: Rider Levett Bucknall (RLB) http://www.rlb.com/ • Examine parking structures for new developments in market districts to ground truth assumptions. • Analysts may choose to reduce parking costs to replicate surface parking or increase costs to replicate underground parking.

MARKET INPUTS	Directions and Key Questions	Source of Data, Reference & User Tips
Demolition Costs (4c)	• Define a consistent redevelopment cost (as a percentage of existing value at the site) for all land uses in all market districts. • Use pro forma analysis of successful redevelopment projects to help calibrate this input (see **Appendix B**) • Redevelopment costs 10% of improvement value	Go to Step 4c. Define Assumptions, Demolition Costs See **Appendix B** for pro forma analysis
Soft Costs (4d)	• Soft costs include architectural fees, permit review and other costs that developers incur during the development process. • 33% of hard construction costs; a common industry standard.	Go to Step 4d. Define Assumptions, Soft Costs See **Appendix B** for pro forma analysis
Entrepreneurial Return (4e)	• The analysis assumes that developers will require a 10% return on their investment. • Entrepreneurial return will vary by investor and by project and is subject to many intangible factors such as developer credit, capital sources, lending practices, etc.	Go to Step 4e. Define Assumptions, Entrepreneurial Return See **Appendix B** for pro forma analysis
Building Rent (4f)	• Define building rents per square foot for each land use analyzed within each market district. • Choose the appropriate data input from **Appendix D** based on building type and construction quality assumptions defined for building costs in step 4a. • Use pro forma analysis of successful redevelopment projects to help calibrate these inputs (see **Appendix B**) • Adjust rental prices to account for a "rental premium" associated with new development.	Go to Step 4f. Define Assumptions, Building Rents. Source: www.realestatereport.org www.cbre.com ; www.grubb-ellis.com ; www.gvakm.com • Analyst judgment is required to define building rents. • LVP outcomes are highly sensitive to rental price assumptions, therefore we recommend using sensitivity analysis, to test adjustments to rent assumptions.

MARKET INPUTS	Directions and Key Questions	Source of Data, Reference & User Tips
Parking Rent (4g)	• Define parking rents per square foot for each land use analyzed within each market district. • Use pro forma analysis of successful redevelopment projects to help calibrate these inputs (see **Appendix B**) •	Go to Step 4g. Define Assumptions, Parking Rents. Source: http://www.dsaa.com/ for apartment parking rates. • Test different rental prices to determine the cost of one parking spot. • Call local parking providers, property managers to ground truth rent assumptions
Cap Rate (4h)	• Define a cap rate for all land uses in all market districts. • Use pro forma analysis of successful redevelopment projects to help calibrate this input (see **Appendix B**) • 6.000%. Reflects market averages in 2009.	Go to Step 4h. Define Assumptions, Cap Rate See **Appendix B** for pro forma analysis See **Appendix F** for definition of cap rate • Call real estate agents, local lenders to ground truth cap rate assumptions • LVP outcomes are highly sensitive to cap rate assumptions, by keeping cap rate assumptions consistent it helps ensure equitable analysis
Operating Expense (4i)	• Define a consistent operating expense for all land uses in all market districts. • Use pro forma analysis of successful redevelopment projects to help calibrate this input (see **Appendix B**) • 30% for building operation; 15% for parking operation (Reflects market averages in 2009)	Go to Step 4i. Define Assumptions, Operating Expenses See **Appendix B** for pro forma analysis See **Appendix F** for definition of operating expense • Reduce operating expenses to model the impacts of public incentives (i.e. property tax exemptions) on project feasibility

MARKET INPUTS	Directions and Key Questions	Source of Data, Reference & User Tips
Vacancy (4j)	• Define vacancy rates for each land use analyzed within each market district. • Choose the appropriate data input from **Appendix D** based on building types chosen in step 4a. • If multiple land use types assumed in a single market district, average and adjust vacancy rates data for each land use • Adjust average vacancy rate data downwards for new construction to replicate higher demand. • Define lower vacancy rates for high market districts to replicate desirability of location.	Go to Step 4j. Define Assumptions, Vacancy Rates Source: www.realestatereport.org www.cbre.com ; www.grubb-ellis.com ; www.gvakm.com • Adjust vacancy rates upward as a more conservative approach.
Building Efficiency (4k)	• Define a consistent building efficiency for all land uses in all market districts. • 90% for commercial uses and 85% for multi-family uses assumed.	Go to Step 4k. Define Assumptions, Building Efficiency • Decrease building efficiency to account for special zoning considerations that decrease buildable area.

USER TIPS AND NOTES FOR DEFINING MARKET INPUTS

STEP 4A. CONSTRUCTION COST ASSUMPTIONS

Reference **Appendix C** for construction costs. See also **Exhibits 5-12** beginning on **page 14.**

HIGH MARKET DISTRICTS:

Commercial

- Tacoma ($190/sf) - A mix of high-end prime and secondary office uses. This analysis assumes average cost between the range of high-end prime ($210/sf) and high-end secondary ($175/sf) office uses. Note, retail could still be considered, but construction costs would be more comparable to costs for office uses.

- Puyallup ($160/sf) – high-end secondary office and retail. This analysis assumes average cost between the range of high-end secondary office ($175/sf), high-end shopping center ($165/sf) and strip retail ($135/sf).

Multi-family Residential

- Tacoma ($200/sf) – Above average multi-family construction quality. There is a large range in multi-family construction costs exist in the Seattle MSA ($130 – $260/sf). This analysis assumes above average cost ($195 average cost between low and high end multi-family construction).

- Puyallup ($170/sf) – Slightly below average multi-family construction quality. Average cost within region is $195. Puyallup assumptions are slightly above Tacoma medium market district.

- Assumptions for construction costs were also calibrated by pro forma analysis of successful multi-family developments in the Tacoma and Puyallup areas.

MEDIUM MARKET DISTRICTS (DEFINED FOR TACOMA ONLY):

Commercial

- Tacoma ($155/sf) - High-end secondary office and retail. This analysis assumes average cost between the range of high-end secondary office ($175/sf), high-end shopping center ($165/sf) and strip retail ($135/sf). Costs in Tacoma medium market district are between those assumed for Puyallup high and low market districts. Assumptions align with commercial character of the market district.

Multi-Family Residential

- Tacoma ($160/sf) - Slightly below average multi-family construction quality within the region. Average cost within region is $195. Construction cost assumptions are slightly lower than Puyallup high market district, and the same as Puyallup low market district.

LOW MARKET DISTRICTS:

Commercial

- Tacoma ($110/sf) – Average construction quality for retail uses, high-end construction quality for warehouse and flex-tech. Assumptions align with existing and planned land uses in the Tacoma's low market district.

- Puyallup ($150/sf) – High-end retail and secondary office. Costs are slightly lower than high market district. Base data for assumed building types range from ($135/sf to $175/sf). Assumptions are similar to the medium market district assumptions in Tacoma.

Multi-family Residential

- Tacoma ($130/sf) - Multi-family construction costs in Tacoma represent low-end multi-family construction costs identified by RLB.

- Puyallup ($160/sf) - Slightly below average construction quality within the region. Average cost within region is $195. Construction cost assumptions are slightly lower than Puyallup high market district, and the same as Tacoma medium market district.

STEP 4B. PARKING COST

Reference **Appendix C** for construction costs. See also **Exhibits 5-12** beginning on **page 14.**

- Parking construction costs assume low-end above ground parking structures. ($75/sf). In Tacoma's high market districts, a cost premium is assumed for improved quality and aesthetics ($83/sf).

STEP 4C. DEMOLITION COSTS

Little information exists on demolition costs. Demolition costs are based on a number of unique factors such as building materials, contamination, etc. Demolition costs are assumed to be a constant 10% of existing improvement value, consistent with similar analyses used in California. Analysts may choose to adjust this assumption to account for unique site conditions.

STEP 4D. SOFT COSTS

Soft costs include architectural fees, permit review and other costs that developers incur during the development process. Soft costs are assumed a constant 33% of hard construction costs; a commonly held industry assumption.

STEP 4E. ENTREPRENEURIAL RETURN

The analysis assumes that developers will require a 10% return on their investment. 10% is added on top of the sum of hard costs, soft costs, and demolition costs. Entrepreneurial return will vary by investor and by project and is subject to many intangible factors such as developer credit, capital sources, lending practices and many others.

STEP 4F. BUILDING RENT

Reference **Appendix D** for rental data. See also **Exhibits 5-12** beginning on **page 14.**

HIGH MARKET DISTRICTS:

Commercial

- Tacoma ($30/sf) - A mix of high-end prime and secondary office uses. Data identifies average office rents in Tacoma CBD ranging between $22/sf and $23/sf (CBRE Richard Ellis and Real Estate Research Report). Pro forma analysis implies that rental rates in recent Tacoma projects were approximately $27 (see Poole's Corner and Rainer Pacific). Rental rates adjusted to $30/sf to account for rental premium of new construction in most desirable location.

- Puyallup ($28 /sf) - high-end secondary office and retail. Data identifies rental rates of approximately $25 for office (CBRE Richard Ellis and Real Estate Research Report) and $22 for retail (CBRE Richard Ellis). Rental rates adjusted to $28/sf to account for rental premium of new construction in high market district.

Multi-family Residential

- Tacoma ($26/sf) – Above average construction quality. Data shows average apartment rents ranging from $11 to $12 per square foot. Pro forma analysis demonstrates that rents for new units command $24/sf or more in Tacoma (Bella on Broadway, 505 Broadway, Mercato – note that 505 Broadway and Mercato are expressed in sale price/sf). Base data on rents are adjusted to $26/sf to account for rental premium of new construction in most desirable location.

- Puyallup ($22/sf) – Slightly below average construction quality. Data shows average apartment rents of $12.50 per square foot. Rental rates adjusted to

$22/sf to account for rental premium of new construction in most desirable location.

MEDIUM MARKET DISTRICTS (TACOMA ONLY):

Commercial

- Tacoma ($25/sf) - High-end secondary office and retail. Data identifies average office rents in Tacoma CBD ranging between $22/sf and $23/sf and retail rates of $20/sf (CBRE Richard Ellis and Real Estate Research Report). Pro forma analysis indicated that rents between $27 and $20 would be reasonable for this market district (See Poole's Corner and 38th and Pacific Shopping Center). Rental rates set at $25/sf to account for rental premium of new construction.

Multi-family Residential

- Tacoma ($20/sf) – Slightly below average construction quality within the region. Data shows average apartment rents ranging from $11 to $12 per square foot. Pro forma analysis (see 6th Ave Area Townhomes) indicated that rents of $20/sf to be reasonable. Base data adjusted to $20/sf to account for rental premium of new construction.

LOW MARKET DISTRICTS:

Commercial Land Uses

- Tacoma ($18/sf) – Average construction quality for retail uses, high-end construction quality for warehouse and flex-tech. Pro forma analysis (see 38th and Pacific Shopping Center and Johnsborogh Station) are representative examples of assumed development type and quality. Rents between $20 and $16/sf appear to support feasible redevelopment. Data identifies average office rents in Tacoma ranging between $22/sf and $23/sf and retail rates of $20/sf (CBRE Richard Ellis and Real Estate Research Report). Base data rates adjusted downward to accommodate inclusion of high-end warehousing and flex-tech uses that require lower rental rates.

- Puyallup ($26/sf) – Pro forma analysis (see Jerome Center Mixed Use, Rieder Medical and Puyallup Activity Center) supports assumed rental rates around $24, which closely aligns with other data sources ($24/sf to 22/sf). Rents assumed to be similar to Puyallup high market district and Tacoma medium market district. Base data adjusted to $26/sf to account for rental premium of new construction.

Multi-Family Land Uses

- Tacoma ($18/sf) – Low-end multi-family. Data shows average apartment rents ranging from $11 to $12 per square foot in Tacoma. Pro forma analysis (see 6th Ave Area Townhomes) indicated that rents of $20/sf to be

reasonable in more desireable locations. Base data adjusted to $18/sf to account for rental premium of new construction.

- Puyallup ($19/sf) - Slightly below average construction quality within the region. Rent assumptions are slightly lower than Puyallup high market district and Tacoma medium market district. Base data shows average apartment rents of $12.50 per square foot (Real estate Research Report). Rental rates adjusted to $19/sf to account for rental premium of new construction.

STEP 4G. PARKING RENT

Little formal data exists on parking rents. Pro forma analysis supports parking rate assumptions (see 505 Broadway). Calls to local parking service companies (Diamond Parking) and local real estate agents (GVA Kidder Mathews) cite similar monthly rates as those assumed for garage parking – averaging between $160 to $150 in Tacoma locations – which align with multi-family and commercial assumptions for Puyallup and Tacoma's medium and low market districts. A premium for new on-site parking is assumed for Tacoma's high market district.

STEP 4H. CAPITALIZATION RATE

The capitalization rate is the percentage of the initial investment that a developer wishes to re-capture each year on his/her investment. Cap rates demonstrate the "appetite for risk" within the real estate market where high cap rates, equate to high risk (need to re-capture money quickly, greater-uncertainty about rents, vacancy, etc.) and low rates equate to low risk (willing to re-coup money more slowly because of high demand for space, willingness to pay for rents). Cap rates vary depending on intangible factors such as developer credit and capital, lending practices, among others. Cap rates in this analysis are set at 6.000% to replicate current market conditions. LVP results are highly sensitive to small adjustments in cap rates, therefore keeping cap rates constant isolates this factor.

STEP 4I. OPERATING EXPENSE

Operating expenses or the cost of maintaining and operating the building, are held at a constant 30% of rental rates for buildings and 15% for parking. Dupre and Scott identify operating expenses of approximately 30% for apartment buildings in the Puget Sound region. The analyst has the flexibility to reduce operating expenses to account for certain redevelopment incentives (e.g. property tax abatements, developer agreements, etc) that would reduce annual expenses of operating a new property.

STEP 4J. VACANCY

Commercial

- In the second quarter of 2009, vacancy rates identified for office uses in downtown Tacoma range from 10% to 13% (7% for suburban Tacoma locations) and 3% for retail uses. Vacancy rates for warehousing uses in Tacoma are over 8%. For flex-tech uses, vacancy rates are over 15% region-

wide. In Puyallup, office vacancy ranges from 14.6% to 18.5% and over 9% for retail. Sources of vacancy rates include CBRE Richard Ellis, GVA Kidder Matthews, and the Puget Sound Real Estate Research Report.

- Tacoma - This analysis assumes baseline conditions of 10% commercial vacancy in Tacomas' low market district, the greatest level of vacancy in the study area. Tacoma's medium market district assumes an 8% commercial vacancy rate and the high market district assumes a 6% vacancy rate. Both high and medium market districts assume a blended vacancy rate between office and retail uses, with the high market district identified as the most desirable locations, therefore having less vacancy.

- Puyallup – This analysis assumes a 10% vacancy rate for both high and low market districts due to close proximity. The vacancy rate represents a blend of office and retail vacancy rates. Base data is adjusted downward to replicate higher demand for new office and retail space.

Multi-Family

- Multi-family vacancy rates identified for Pierce County average 6% in Quarter one of 2009. CBRE Richard Ellis identifies a 5% vacancy rate in Tacoma, Grubb and Ellis identifies 5.2% multi-family vacancy in downtown Tacoma. Vacancy rates for Puyallup range from 5.1% to 6.7%.

- Tacoma – 5% vacancy is assumed for the high market district, 6% for the medium market district, and 7% for the low market district. Vacancy rates are adjusted downward for less desirable market districts.

- Puyallup – a 6% vacancy rate is assumed for both high and low market districts. This vacancy represents the Pierce County average and is between the range of vacancy identified for Puyallup.

STEP 4K. BUILDING EFFICIENCY

Building efficiency, or the net leasable area, is assumed a constant 90% for commercial uses and 85% for multi-family uses. Areas in a building such as hallways and stairwells cannot be rented and therefore are excluded from building rent prices.

Define Zoning Inputs and Assumptions

Use local zoning ordinances to define zoning inputs shown in **Exhibit A-4**. Gather information for each zoning district found in the study area(s). Tacoma and Puyullap are used to illustrate important concepts for the analyst's benefit.

Define floor area ratio for each allowable land use (that is being analyzed) in each zoning district within the study area(s). Some zoning districts have an established FAR, others do not, but rather define lot coverage, maximum height or unit per acre requirements.

Define the percentage of buildable area (defined by multiplying FAR times lot size) in each zoning district that must be dedicated to parking. The remaining percentage of buildable area not dedicated to parking is designated as building area.

Use the following equation (customize the following equation based on zoning information available) to determine FAR and area allocations for parking and building requirements simultaneously (**Exhibit A-5, page 59**). The equation must be entirely set up first, in order to calculate the values in the blue cells. To see zoning calculations for all land uses and zoning districts in study areas see **Appendix E.**

Exhibit A-4
Zoning Data Input and Assumptions

ZONING INPUTS	Directions and Key Questions	Source of Data, Reference, User Tips
Floor Area Ratio	*If FAR is established:* • Identify applicable FAR for each zoning district in study area • Identify FAR for each prospective land use (for example Tacoma establishes a higher FAR for residential uses than it does for commercial uses in downtown zoning districts) and insert FAR into zoning input tables for each associated land use and zone *If FAR is not established:* • Identify zoning standards that determine building capacity such as height, max lot coverage, minimum lot size. Document different standards for different land uses if applicable. • Use equation in **Exhibit A-5** to estimate FAR for each zoning district. • Review FAR assumptions with municipal planners.	Source: Municipal Zoning Codes • Test multiple levels of FAR within each zoning district for each land use to identify a range of revelopable lands and growth capacity estimates. • Test multiple FARs if zoning codes provide incentives to increase building capacity (Tacoma zones DCC, DMU, DR, WR; Puyallup zone CBD) • Analysts will conduct multiple iterations of LVP calculations for each FAR established, for each land use. • Analysts may chose to replicate multiple levels of FAR to test feasibility of building at an FAR less than the max allowable FAR
% Buildable Area for Parking Construction	• If zoning requirements require parking, analysts must quantify the portion of the site that must be set aside for parking. • Identify zoning requirements for each land use within each zoning district. Collect information on the number of stalls required per square foot of land use or number of residential units. • Assume a standard parking stall size for calculations (shown in **Exhibit A-5**)	Source: Municipal Zoning Codes • If testing multiple land uses, then zoning codes will likely specify different parking requirements. • Conduct unique parking calculations for each land use
% Buildable Area for Building Construction (% area not dedicated to parking)	• Use the equation in **Exhibit A-5** to determine the percent of the site that can be used for building construction (not for parking). • Tailor the equation to the information available in the zoning code.	Source: Municipal Zoning Codes • Calculating parking requirements requires knowing how large the building could be on each respective site. Likewise, knowing how large the building can be requires knowing how much parking is required.

Exhibit A-5 demonstrates calculations used to determine an FAR, parking requirements and building requirements for a commercial use in Puyallup's CBD zoning district. Known information from the zoning code is shaded in gray and assumptions are shaded in green. Cells outlined in red, are the outputs of the analysis. Blue denote cells that require special calculations.

This calculation represents a tailored approach to Puyallup given the information available. Calculations are adjusted based on the information known. For this equation to work, analysts should set up the entire equation first (inputs and formulas) and then perform calculations highlighted in blue.

Exhibit A-5
Sample Zoning Input Calculations used in Puyallup Case Study for CBD Zoning District, Commercial Land Uses

Key	Input	Outcome	Equation
a	Height	36	Given
b	Lot coverage	90%	Given
c	Assumed lot size (sf)	40,000	Assumed
d	Story height	10	Assumed
e	Max buildable area (sf)	1,296,000	height (a) * lot coverage (b) * Lot size (c)
f	Max buildable footprint	129,600	Buildable area (e) / story height (d)
g	Bldg FAR	1.56	Enter ball park number
h	Bldg Area	62,210	Bldg FAR (g) * Lot Size (c)
i	Parking required (bldg sf per stall)	300	Given
j	Stalls required	207	Bldg area (h) * parking requirement (i)
k	Parking stall (sf)	325	Assumed or given
l	Parking Area	67,394	Stalls required (j) * assumed stall size (k)
m	Parking FAR	1.68	Parking area (l) / lot size (c)
n	Total Buildable Area	129,600	Parking area (l) + Building area (h)
o	Total FAR	3.24	Building FAR (g)+ Parking FAR (m)
p	Building allocation ratio	48%	Building FAR (g) / Total FAR (o)
q	Parking allocation ratio	52%	Parking FAR (m) / Total FAR (o)

Notes

1. Select "excel options" under file or windows icon. Under formulas check the box that says, "enable iterative calculations"

2. Select "what if analysis" (under the "Data" menu) and choose "goal seek."

3. "Set cell" to reference "total buildable area" (step n)

4. "To value" plug in value for max building footprint calculated in step f

5. "By changing cell" select cell reference corresponding to Bldg FAR in step g.

This automatically calculates Bldg FAR based on parking, height, and lot coverage inputs

These are the primary inputs used in the zoning assumption tables.

It may be beneficial to calculate FAR to guide the process of setting up this long equation. Analysts can alternatively calculate FAR using the following equation:
height*lot coverage /story height.

USER TIPS AND NOTES FOR DEFINING ZONING INPUTS

- It is very difficult to incorporate all nuances of zoning for every parcel and every possible development scenario in the LVP approach. Include the basic factors that have major influence on development (such as building capacity and parking requirements).

- If there are other zoning requirements that reduce building size on a site, be conservative with other inputs. There are various assumptions that can be adjusted such as parking stall size (increase this to account for larger setbacks, open space requirements, etc) or building efficiency (see step 4k). Analysts can adjust inputs at any point in the analysis.

- Test redevelopment feasibility for land uses at multiple levels of FAR. Some zoning districts, such as downtown zoning districts in Tacoma, establish incentive programs with various levels of bonus FAR. In this case, use the baseline FAR as the low starting point, and two other levels of FAR (as defined by maximum FAR allowances under incentive programs) to establish medium and high FARs. For districts with no FAR, establish a maximum FAR and then decreased FAR by 2/3 and 1/3 to create two other levels of lower FAR.

- When considering options for analyzing FAR, analysts should answer a key question*: Is it reasonable that the developer will always build to the maximum FAR?*

  This question has important implications to buildable lands calculations. Developers don't build to max FAR all the time, for every project. (This was a key finding in pro forma analysis). Develop a sensitivity matrix to quantify buildable lands (net units, population and jobs) and make policy judgments about target redevelopment and buildable lands.

Step 5. Sensitivity Inputs and Assumptions

Sensitivity analysis is used to test the "sensitivity" of assumptions and their impact on LVP outcomes. Sensitivity analysis helps test redevelopment feasibility under various scenarios that could represent changing market conditions or zoning amendments. Sensitivity analysis also supports integrity of the analysis, by demonstrating multiple scenarios were considered when identifying redevelopable parcels and defining growth capacity.

This section of the guidebook will discuss three key inputs that are used to conduct sensitivity analysis: rent, vacancy and FAR.

SENSITIVITY ANALYSIS OF RENT INCOMES

Construction costs and rent are two of the most influential inputs into the LVP calculations. This analysis holds construction costs constant and tests changes rental rates. Sensitivity analysis tests a 10% increase in rents in Tacoma and 10% and 15% increases in rents in Puyallup.

VACANCY

Sensitivity analysis tests increases vacancy rates by a factor of 10% in the Tacoma study area. For example, the 5% vacancy for multi-family land uses in the high market district was adjusted up to 5.5%.

SENSITIVITY ANALYSIS OF FLOOR AREA RATIO

Multiple levels of FAR were tested in Tacoma and Puyallup. Three levels of FAR were established in Tacoma (guided by zoning incentives) and two in Puyallup for the CBD zoning district. FAR is influential when determining redevelopment feasibility and is influential in translating LVP outcomes to measures of growth capacity.

Sensitivity analysis requires reiterative calculations to test each respective scenario. For example, in Tacoma, this analysis tests feasibility for two different land uses, at three levels of FAR (baseline, medium and high) and three scenarios (baseline, 10% increase in rent; increase in vacancy). In total 18 iterations of LVP calculations are made in Tacoma. In Puyallup, analysis requires six iterations of calculations (2 land uses, 3 levels of rent).

Step 6. Assemble Custom Data Set for LVP calculations

The last step in the first stage of the LVP method is to assemble a custom data set, from which LVP calculations will be based. Begin this step once the scope of the analysis has been defined, the appropriate data has been gathered and market, zoning and sensitivity inputs have been defined.

First, assemble base data collected in step 2. **Exhibit A-6** demonstrates the fields that should be present. All fields except the zoning district and market area are present in County Assessor's data. To incorporate zoning districts and market area fields, use GIS. Overlay zoning and market area shapefiles with the parcel file. Use the spatial join function or select by location feature to define applicable zoning districts and market areas for each parcel.

Exhibit A-6
Example of Base Data and Fields for Conducting LVP Calculations

PIN	2009040023
Group Account No	
Land Value	$ 162,200
Improvement Value	$ 449,800
Total Value	$ 612,000
Land Use	RESTAURANT
No. Bldgs	1
No. Residential Units	0
Building SF	6000
Lot Size (sf)	6,079
Zoning District	DCC
Market Area	High

Next, link input and assumption tables to the base data using zoning district and market area fields. Linking input tables to base data allows analysts to easily make adjustments inputs and update calculations automatically.

When analysts connect input data with base data, they have compiled all the necessary information to conduct LVP calculations in Stage 2 of the LVP methodology.

Stage One Review

By this stage in the analysis, analysts should have:

- Defined the scope of the analysis, including the study area, the existing land uses and parcels to be analyzed, and prospective land use types to analyze
- Gathered base data from various sources
- Defined market districts along with several key market and zoning inputs
- Decided on an approach to sensitivity analysis and defined inputs to use in sensitivity analysis
- Assembled all data in a database model to be used for LVP calculations.

Stage 2. Calculate Land Value Potential

Set up a model to conduct LVP calculations. The model can be set up in Microsoft Excel and linked to GIS or can be completely programmed within GIS. For this demonstration project an excel model was used, because it allows for greater flexibility in developmental stages of the LVP method.

The goal of LVP calculations is to determine the residual land value (i.e. the capital available to acquire a development site after accounting for anticipated developments costs, net operating incomes and returns on investment). Mathematically, residual land values are calculated as follows:

(1) Present value of net operating income anticipated on-site over time (for perpetuity)

(2) – Development and Demolition Costs (excluding site acquisition)

(3) – Expected or Required Return on Development (Profit required to take the risk of developing the site)

(4) = Resources (dollars) left to purchase site, or the residual land value

The outcome of the calculation results in a theoretical willingness-to-pay for the opportunity to develop and operate a commercial or residential project, given market conditions and profit requirements. If the residual land value (4) is greater than or equal to the anticipated asking price of the parcel from the seller (defined as total assessed value), then the parcel is considered feasible for redevelopment.

The following presents a single example of LVP calculations, testing redevelopment feasibility of a commercial use, in Tacoma's high market district, under baseline FAR and rental rate assumptions. (See **Exhibit 5 and 7** for inputs and assumptions) In illustrations, green cells highlight assumptions, gray cells highlight base data.

Calculate Present Value of Gross Income Generated By New Construction over Time

NOI for buildings and parking structures on the site (Exhibit A-7).

Determine total building area by multiplying the lot size by FAR. Next, determine the gross leasable area for buildings. Gross leasable area takes into consideration parking requirements (% of site required for parking, % of site available for building) and building efficiency[10].

Next, multiply gross leasable area by the assumed rental rate and occupancy (1-vacancy rate) to determine potential gross income. To calculate net operating

[10] Efficiency accounts for areas such as stairwells, mechanical equipment, have already been incorporated into stall size assumptions used to calculate parking requirements, therefore gross leasable area is calculated for building structures only.

income, multiple gross operating incomes by annual operating expenses (1-operating expenses, expressed as a % of gross income).

Sum building NOI and parking NOI to quantify the total net annual operating income for the site. Next, transform annual NOI into the present value of NOI by dividing NOI by the capitalization rate assumed (similar to an annual rate of return). In the example below, the present value of net operating incomes at the site is $3.84 million. This represents the "development value potential of the site," given assumed building types, market conditions and development capacity.

Exhibit A-7
Calculate Present Value of Gross Income Generated by New Construction over Time

1. Calculate Gross Leasable Area (GLA) for Building			
Lot Size		6,079	From Parcel Data
Baseline FAR (DCC Zone)		3	Linked from Zoning Input Tables
Buildable Area		18,238	Lot Size * FAR
% Buildable Area for Building		55%	Linked from Zoning Input Tables
Building Efficiency		90%	Linked from Market Input Tables
Building GLA		9,028	Buildable Area * % Buildable Area for Bldg * Efficiency
2. Calculate Net Operating Income (NOI) for Building			
Vacancy		6.00%	Linked from Market Input Tables
Assumed Building Rent ($/sf)	$	30.00	Linked from Market Input Tables
Gross Operating Income	$	254,584	GLA * (1-% Vacancy) * Rent
Operating Cost		30%	Linked from Market Input Tables
Building NOI		178,209	Gross Operating Income * (1-% Operating Costs)
3. Calculate Parking GLA and NOI			
% Buildable Area for Parking		45%	Linked from Zoning Input Tables
Parking GLA		8,207	Buildable Area * % Buildable Area for Parking
Vacancy		6.00%	Linked from Market Input Tables
Assumed Parking Rent ($/sf)	$	8.00	Linked from Market Input Tables
Operating Cost		15%	
Parking NOI	$	52,460	Parking GLA * (1-Vacancy) *Rent * (1-% Operating Cost)
4. Calculate Total Net Operating Income (NOI) for Site			
Building Space NOI	$	178,209	Step 2
Parking NOI	$	52,460	Step 3
Total NOI for Site	$	230,669	Building NOI + Parking NOI
5. Calculate Present Value of Net Operating Income (NOI) for Site			
Total NOI for Site	$	230,669	Step 4
Cap Rate		6.000%	Linked from Market Input Tables
Present Value of NOI for Site	**$**	**3,844,479**	Total NOI/Cap Rate

The cost of redevelopment at the site (Exhibit A-8). Sum hard costs, soft costs and demolition costs to calculate total construction costs.

- **Hard construction costs for building and parking structures.** Multiply buildable area by the percentage of buildable area dedicated for parking or allowed for building. Next multiply the buildable area for building and parking structures by their respective construction costs. Add building and parking construction costs to derive the total hard costs of construction.

- **Soft costs.** Soft costs are assumed in this model to be a constant percentage of hard costs for all developments. Multiply hard costs by soft cost assumptions to derive total soft costs for the development.

- **Demolition costs.** This analysis assumes that demolition costs are equal to 10% of existing improvement value (the value of existing buildings on the site).

Exhibit A-8
Calculate Development and Demolition Costs (excluding site acquisition)

6. Calculate Hard Construction Costs for Building			
Lot Size		6,079	From Parcel Data
Baseline FAR		3	Linked from Zoning Input Tables
Buildable Area		18,238	Lot Size * FAR
% Buildable Area for Building		55%	Linked from Zoning Input Tables
Assumed Bldg Cost	$	190	Linked from Market Input Tables
Building Cost	$	1,905,831	Buildable Area * % Buildable Area for Bldg * Bldg Cost
7. Calculate Hard Construction Costs for Parking			
Buildable Area		18,238	Lot Size * FAR
% Buildable Area for Parking		45%	Linked from Zoning Input Tables
Assumed Parking Cost	$	83	Linked from Market Input Tables
Parking Cost	$	681,175	Buildable Area * % Buildable Area for Parking * Parking Cost
8. Calculate Total Hard Construction Costs			
Building Cost	$	1,905,831	Step 6
Parking Cost	$	681,175	Step 7
Total Hard Costs	$	2,587,006	Building Cost + Parking Cost
9. Calculate Soft Costs			
Total Hard Costs	$	2,587,006	Step 8
Soft Costs as % of Hard Costs		33%	Linked from Market Input Tables
Soft Costs	$	853,712	Hard Costs * % Soft Cost
10. Calculate Demolition Costs			
Existing Improvement Value	$	449,800	From Parcel Data
Demolition Costs as % of Imp Value		10%	Linked from Market Input Tables
Demolition Costs	$	44,980	Improvement Value * % Demolition Costs
11. Total Construction Costs			
Hard Costs	$	2,587,006	Step 8
Soft Costs		853,712	Step 9
Demolition Costs	$	44,980	Step 10
Total Construction Costs	**$**	**3,485,699**	SUM(Hard Costs, Soft Costs, Demo Costs)

Developers expected return on development, or the profit required to take the risk of developing the site (Exhibit A-9). This analysis assumes that developers will require a return of 10% on their investment. Required return is expressed as a percentage of total costs. Multiply the total hard costs shown above (**Exhibit A-8**) by the percentage of required return.

Exhibit A-9
Expected Return on Development (Profit required to take the risk of developing the site)

12. Calculate Expected Return on Development			
Total Construction Costs	$	3,485,699	Step 11
Required Return as % of Total Costs		10%	Linked from Market Input Tables
Entrepreneurial Return Required	$	348,570	Required Return * Total Construction Costs

Residual land value, or the money left over to purchase the site. Subtract total construction costs and required return from the present value of net operating incomes on the site to determine the residual land value.

To determine if the site supports economically feasible redevelopment, compare the residual value to the site value (what would be the seller's asking price in a real transaction). In this case, site value is defined as the total assessed value (land value + improvement values). If the residual land value is greater than the site value, the parcel is redevelopable. If the site value is greater than the residual land value, the parcel is not redevelopable.

The residual land value is a theoretical "willingness-to-pay" for the opportunity to develop and operate a commercial or residential project at a site. In this example, the developer is willing to pay just over $10,000 to redevelop this site, given the value of construction (present value of NOI) minus the costs (construction costs and required return) at this site. In other words, the "land value potential" of this site is not great enough to justify the type of redevelopment modeled.

Exhibit A-10
Calculate Resources (dollars) Left to Purchase Site, or the Residual Land Value

13. Calculate Residual Land Value			
Present Value of NOI for Site	$	3,844,479	Step 5
Construction Costs	$	3,485,699	Step 11
Required Return on Investment	$	348,570	Step 12
Residual Land Value	**$**	**10,211**	Present NOI for Site - Const. Costs and Required Return
14. Determine Feasibility of Redevelopment			
Site Value	$	612,000	From Parcel Data
Residual Land Value	$	10,211	Step 13
Is Residual Land Value Greater than Site Value?		**NO**	If RLV > Site Value, Yes If RLV < Site Value, No
Is this site redevelopable?		**Not Redevelopable**	If RLV > Site Value, Redevelopable If RLV < Site Value, Not Redevelopable

Identify Redevelopable Parcels

Assumptions are required to define what is considered a redevelopable parcel if multiple prospective land uses are analyzed. In this analysis, a parcel is considered redevelopable if either commercial or multi-family land uses are determined feasible. This analysis assumes that if one use is feasible, then the right mix of the two uses would also be redevelopable.

Calculate Buildable Land Capacity on Redevelopable Parcels

In the last step in Phase 2, calculate the building area or "capacity" on all redevelopable parcels. This step supports calculations of households, persons and jobs that can be accommodated on redevelopable parcels.

For all redevelopable parcels, multiply the gross leasable area for the building (calculated in step one, **Exhibit A-7**) by the occupancy rate (1-vacancy). Note, inclusion of building occupancy, building efficiency, and parking requirements within calculations at this stage of the analysis, allows for ease of growth capacity calculations by zoning district in stage 3.

After estimating the capacity of all redevelopable parcels, analysts have compiled the necessary information to conduct preliminary calculations of households, population and jobs that can be accommodated on redevelopable parcels in Stage 3 of the LVP methodology.

Stage Two Review

By this stage in the analysis, analysts should have:

- Conducted LVP calculations for each parcel in the study area
- Identified all parcels that support economically feasible redevelopment
- Calculate capacity of redevelopable parcels by using assumed FAR and accounting for market conditions

Stage 3. Calculate Growth Capacity of Redevelopable Lands and Evaluate Outcomes

This portion of the guidebook presents one possible option for estimating the number of households, persons and jobs that can be accommodated on redevelopable lands. These are referred to as "growth capacity" calculations. *Note that the methodology presented here is different than methods used in past buildable lands reports. For this approach to be used for future buildable lands methods, further study and analysis is required.*

Step 1. Define Growth Capacity Inputs and Assumptions

The first step in determining the growth capacity of redevelopable lands is to establish assumptions that serve as inputs into the analysis. Inputs must be established for each zoning district. **Exhibits A-12 and A-13** presents assumptions for Tacoma and Puyallup respectively; methods for defining inputs follows.

Exhibit A-12
Assumptions Used to Calculate Growth Capacity of Redevelopable Lands in Downtown Tacoma

	Growth Capacity Assumptions			Allocation of Land by Use	
Zoning District	Avg Housing Unit Size (sf)	Persons/HH	Avg SF/Job	% Residential Mix	% Commercial Mix
C2	1,000	2.32	440	0%	100%
DCC	1,000	2.32	440	25%	75%
DMU	1,000	2.32	440	25%	75%
DR	1,000	2.32	440	65%	35%
M1	1,000	2.32	440	0%	100%
M2	1,000	2.32	440	0%	100%
R3	1,000	2.32	440	100%	0%
R4	1,000	2.32	440	100%	0%
S8	1,000	2.32	440	50%	50%
UCX-TD	1,000	2.32	440	25%	75%
WR	1,000	2.32	440	65%	35%

Source: 2007 Buildable Lands Report, Pierce County, p. 296 and 298 (Persons/HH, % Res/% Comm)
Source: Community Attributes (Avg HU Size Assumption, % FAR calculations)
Source: PSRC, Pierce County Assessor (Avg Job/SF)

Exhibit A-13
Assumptions Used to Calculate Growth Capacity of Redevelopable Lands in Downtown Puyallup

	Growth Capacity Assumptions			Allocation of Land by Use	
Zoning District	Avg Housing Unit Size (sf)	Persons/HH	Avg SF/Job	% Residential Mix	% Commercial Mix
CBD	1,000	2.38	490	50%	50%
CBD-Core	1,000	2.38	490	50%	50%

Source: 2007 Buildable Lands Report, Pierce County, p. 227 (Persons/HH, % Res/% Comm)
Source: Community Attributes (Avg Household Size Assumption, % FAR calculations)
Source: PSRC, Pierce County Assessor (Avg Job/SF)

AVERAGE HOUSING UNIT AREA

Average square feet (sf) per housing unit is assumed by the analyst. This analysis assumes an average 1,000 sf per household, in part to keep assumptions consistent with LVP calculations and also based on data research. Ground-truth assumptions by examining the average building square footage for condo developments in downtown areas (use assessor records) or the average unit size in comparable multi-family developments recently constructed.

For redevelopment feasibility determinations, the LVP method is not very sensitive to this assumption, since most calculations are made on a per-square-foot basis. Larger units generate proportionally larger revenues.

PERSONS PER HOUSEHOLD

Persons per household are necessary to correlate buildable land calculations to population growth trends. This study was asked to consider absorption, which relies on comparing the redevelopable land to population growth trends or forecasts. This study was not undertaken to address policy-based growth targets, but the application is an obvious extension of the analysis. Household population is therefore included in the documentation.

The average number of persons per household is estimated by dividing the total number of persons in occupied housing units by the number of occupied housing units. Persons per household assumptions used in this analysis were defined in the 2007 Buildable Lands Report for Tacoma and Puyallup respectively, which were collected from OFM estimates.

Note that person per household assumptions may be adjusted to better represent the demographics of urban centers (i.e. smaller persons per household to represent a greater concentration of singles, empty nesters). Sensitivity analysis can also be applied to this assumption.

AVERAGE SQUARE FOOT PER JOB

Jobs metrics are only necessary to correlate buildable land calculations to employment growth trends or targets. This study does address absorption, which relies on comparison of redevelopable lands to employment trends projections. The study was not undertaken to address policy-based growth targets, but the application is an obvious extension of the analysis. Jobs are therefore included in the documentation.

This input was defined using a four step process. First, 2008 covered employment for Tacoma and Puyallup was collected from the Puget Sound Regional Council (www.psrc.org). Note, that "covered employment" represents employees covered by the Washington State Employment Act, which accounts for 85% to 90% of total employment. Next, adjust covered employment to a measure of total employment. Define a conversion factor by taking the ratio of current employment to covered employment. This analysis used a ratio of 1.13 to estimate total jobs (Note, the 2007 buildable lands report applied the same factor, derived by PSRC based on their estimates of jobs not covered by state unemployment insurance). Next, query

assessor's data to quantify total commercial building space for each respective study area (use only commercial codes). Finally, divide total commercial square footage by total employment to arrive at the average square foot per job.

Average square foot per job metrics can be customized for areas of higher or lower employment density such as urban centers or industrial centers. Customized analysis of this metric was beyond the scope of this demonstration project, but may be further refined for formal implementation. For more information, see page 15 of the 2007 Pierce County Buildable Lands Report and Pierce County Buildable Lands Program, Employment Density Survey, 2006.

ALLOCATION OF BUILDABLE CAPACITY BY LAND USE

Define the "mix" of land uses expected on redevelopable lands. Mix assumptions used in this analysis were defined in the 2007 Pierce County Buildable Lands Report. This proposed method, requires defining a combined percentage of commercial and residential uses equal 100% to allocate net redevelopable land[11].

Step 2. Summarize LVP outcomes for analysis

After defining inputs and assumptions, the analyst will summarize and organize LVP data to support buildable lands calculations.

Organize data by zoning district to integrate unique zoning considerations (such as mixed use) into buildable lands estimates. The analyst should quantify the following 6 metrics for each zoning district:

- The total number of parcels
- The total number of redevelopable parcels
- Total land area
- Total redevelopable land area
- Total occupied, gross leasable area for buildings on redevelopable parcels (for each level of FAR, if multiple FARs are tested)
- Total existing building square footage on redevelopable parcels.

Create a sensitivity matrix to summarize and compare growth capacity for each scenario. Creating a sensitivity matrix supports transparent examination of LVP estimates, assists in evaluation and adjustments of inputs, and enables policy judgments when necessary.

[11] Where vertical mixed use is expected, the 2007 buildable lands report identifies 100% of both commercial and residential uses. In the case of Puyallup downtown districts, a 50-50 mix of residential and commercial is assumed.

Step 3. Calculate Growth Capacity of Redevelopable Lands

The following **Exhibits A-14** through **A-16** present a single example of growth capacity calculations in downtown Tacoma's DCC zoning district at baseline FAR and baseline rental inputs.

NET BUILDABLE CAPACITY ON REDEVELOPABLE LANDS

To determine growth capacity, first determine the net occupied gross leasable area of buildings on redevelopable parcels (**Exhibit A-19**). This requires quantifying the amount of new building capacity under current zoning and the amount of existing building space that would be demolished to make way for redevelopment.

Exhibit A-14
Determine Net Buildable Capacity on Redevelopable Parcels

Step	Input	Value	Source or Equation
1. Calculate Net Occupied GLA for Redevelopable Parcles			
	Net Occupied GLA on Redevelopable Parcels	99,074	
	Existing Bldg SF on Redevelopable Parcels	12,500	
	Net Building Capacity on Redevelopable Parcels	86,574	Net Occupied GLA - Existing Bldg SF

HOUSEHOLDS AND PERSONS

Next, quantify how many households and persons can be accommodated within that buildable space (**Exhibit A-15**).

Multiply the percent residential "mix" by net building capacity to identify capacity for residential uses. Next, determine the total number of occupied housing units (aka households) by dividing net building capacity for residential uses by the assumed average household unit size.

Multiple households by the average persons per household assumed to determine the number of persons.

Exhibit A-15
Calculate Number of Households and Persons

Step	Input	Value	Source or Equation
2. Calculate Number of Households			
	Net Bldg Capacity on Redevelopable Parcels	86,574	Step 1
	% Residential Mix	25%	Linked to Assumption Table
	Occupied GLA for Residential Use	21,643	Net Building Capacity * % Residential Mix
	Average Household Size	1,000	Linked to Assumption Table
	Total Number of Households	**22**	Occupied GLA for Res Use / Average HH Size
3. Calculate Number of Persons			
	Total Number of Households	22	Step 2
	Average Persons per Household	2.32	Linked to Assumption Table
	Total Number of Persons	**50**	Total Households * Persons per Household

JOBS

To calculate the number of jobs, begin my multiplying net occupied building capacity on redevelopable lands by the percent mix assumed for commercial uses.

Divide the buildable space for commercial uses by the assumed average square foot per job to determine the total number of jobs.

Exhibit A-16
Calculate Number of Jobs

Step	Input	Value	Source or Equation
4. Calculate Number of Jobs			
	Net Bldg Capacity on Redevelopable Parcels	86,574	Step 1
	% Commercial Mix	75%	Linked to Assumption Table
	Occupied GLA for Commercial Use	64,930	Net Building Capacity * % Commercial Mix
	Average SF per Job	440	Linked to Assumption Table
	Total Number of Jobs	148	Occupied GLA for Comm Use / Avg SF per Job

Preliminary Growth Capacity Estimates of Redevelopable Lands Identified using the Proposed LVP Methodology

The following Exhibits (**A-17** through **A-20**) present *preliminary* growth capacity estimates for Tacoma and Puyallup study areas in detail. These outcomes are for demonstration purposes only. Buildable lands estimates require a formal process of involvement and evaluation that is beyond the scope of this demonstration project.

Exhibit A-17 demonstrates redevelopable lands in downtown Tacoma under baseline rental rate assumptions for the three levels of FAR analyzed. Under baseline rental assumptions, preliminary estimates indicate that 13% of land in downtown Tacoma is potentially redevelopable. Redevelopable lands could accommodate approximately 10,600 to 24,700 people and 12,500 to 35,700 jobs.

Exhibit A-16 demonstrates redevelopable lands in downtown Tacoma with higher vacancy rates (by a factor of 10%). Preliminary estimates indicate that 11% to 14% of land is potentially redevelopable; accommodating between 10,000 to 23,400 people and 11,200 to 34,100 jobs.

Exhibit A-17 demonstrates redevelopable lands in downtown Tacoma assuming 10% increase in rental rates. Preliminary estimates indicate that 30% to 39% of land is potentially redevelopable; accommodating between 15,000 to 42,200 people and 18,400 to 62,400 jobs.

Exhibit A-18 demonstrates redevelopable lands in downtown Puyallup under baseline and sensitivity analysis conditions. Preliminary estimates resulted in no parcels supporting redevelopment given baseline inputs and assumptions. Assuming 10% increase in rents, 16% of land was found to be redevelopable, with the potential of accommodating 1,400 people and 1,200 jobs. Under the most optimistic scenario, redevelopable lands could potentially accommodate over 3,500 persons and nearly 3,000 jobs.

Exhibit A-17
Downtown Tacoma Redevelopable Lands, All Land Uses, Baseline Rental Rate Assumptions

		Baseline Rent Assumptions							
	Redevelopable Lands	**DCC**	**DMU**	**DR**	**M2**	**S8**	**UCX-TD**	**WR**	**Total**
FAR by Right (Baseline)	Redevelopable parcels	10	4	13	1	46	60	-	134
	Redevelopable Land Area	70,975	85,261	158,247	328,666	2,116,765	594,013	-	3,353,928
	% of Total Land that is Redevelopable	2%	3%	3%	28%	68%	18%	0%	13%
	Re-development Bldg Capacity SF	99,074	79,344	147,265	351,964	8,906,791	1,202,877	-	10,787,314
	Existing Building SF	12,500	1	-	-	606,508	64,269	-	683,278
	Net Re-developable Bldg SF	86,574	79,343	147,265	351,964	8,300,283	1,138,608	-	10,104,036
FAR w Design Guidelines (Medium)	Redevelopable parcels	7	6	21	-	48	77	-	159
	Redevelopable Land Area	58,481	89,125	241,151	-	2,229,742	818,116	-	3,436,615
	% of Total Land that is Redevelopable	2%	3%	5%	0%	72%	25%	0%	14%
	Re-development Bldg Capacity SF	163,267	165,879	448,831	-	14,992,928	3,313,370	-	19,084,275
	Existing Building SF	-	1	1	-	887,205	255,301	-	1,142,508
	Net Re-developable Bldg SF	163,267	165,878	448,830	-	14,105,723	3,058,069	-	17,941,767
FAR w Special Features (High)	Redevelopable parcels	-	4	14	2	49	82	-	151
	Redevelopable Land Area	-	85,261	173,637	459,878	2,263,186	860,093	-	3,842,055
	% of Total Land that is Redevelopable	0%	3%	4%	39%	73%	26%	0%	15%
	Re-development Bldg Capacity SF	-	238,031	484,759	2,615,510	19,024,099	5,225,064	-	27,587,464
	Existing Building SF	-	1	-	-	927,205	292,895	-	1,220,101
	Net Re-developable Bldg SF	-	238,030	484,759	2,615,510	18,096,894	4,932,169	-	26,367,363
	Existing Conditions								
	Total Parcels	561	316	803	17	157	104	272	2,373
	Total Land Area	3,572,133	3,113,828	4,686,011	1,172,046	3,090,309	3,288,887	3,068,910	25,338,760
	Total Built Space (sf)	7,768,624	2,897,659	3,367,684	2	1,590,682	1,458,801	2,188,448	19,867,450

Population, Households and Jobs Supported by Redevelopable Land Capacity

		Baseline Assumptions							
	Growth Capacity	**DCC**	**DMU**	**DR**	**M2**	**S8**	**UCX-TD**	**WR**	**Total**
FAR by Right (Baseline)	Households	22	20	96	-	4,150	285	-	4,572
	Persons	50	46	222	-	9,628	660	-	10,607
	Jobs	148	135	117	800	9,432	1,941	-	12,573
FAR Medium	Households	41	41	292	-	7,053	765	-	8,191
	Persons	95	96	677	-	16,363	1,774	-	19,004
	Jobs	278	283	357	-	16,029	5,213	-	22,160
FAR High	Households	-	60	315	-	9,048	1,233	-	10,656
	Persons	-	138	731	-	20,992	2,861	-	24,722
	Jobs	-	406	386	5,944	20,565	8,407	-	35,707

Note: C2, M1, R3 and R4 zoning districts did not contain any redevelopable parcels and are excluded from Exhibit A-17.

Exhibit A-18
Downtown Tacoma Redevelopable Lands, All Land Uses, Increase in Vacancy by a Factor of 10%

Downtown Tacoma Redevelopable Lands Potential

		Increase in Vacancy								
	Redevelopable Lands	**DCC**	**DMU**	**DR**	**M2**	**R4**	**S8**	**UCX-TD**	**WR**	**Total**
FAR by Right (Baseline)	Redevelopable parcels	7	4	11	-	-	46	50	-	118
	Redevelopable Land Area	58,481	85,261	146,704	-	-	2,116,765	422,920	-	2,830,131
	% of Total Land that is Redevelopable	2%	3%	3%	0%	0%	68%	13%	0%	11%
	Re-development Bldg Capacity SF	81,633	79,344	136,523	-	-	8,906,791	856,412	-	10,060,703
	Existing Building SF	-	1	-	-	-	606,508	6,763	-	613,272
	Net Re-developable Bldg SF	81,633	79,343	136,523	-	-	8,300,283	849,649	-	9,447,431
FAR w Design Guidelines (Medium)	Redevelopable parcels	-	4	14	-	-	46	69	0	133
	Redevelopable Land Area	-	85,261	173,637	-	-	2,116,765	744,331	-	3,119,994
	% of Total Land that is Redevelopable	0%	3%	4%	0%	0%	68%	23%	0%	12%
	Re-development Bldg Capacity SF	-	158,687	323,173	-	-	14,250,866	3,014,539	-	17,747,265
	Existing Building SF	-	1	-	-	-	606,508	192,751	-	799,260
	Net Re-developable Bldg SF	-	158,686	323,173	-	-	13,644,358	2,821,788	-	16,948,005
FAR w Special Features (High)	Redevelopable parcels	-	-	-	2	-	48	75	-	125
	Redevelopable Land Area	-	-	-	459,878	-	2,229,742	800,380	-	3,490,000
	% of Total Land that is Redevelopable	0%	0%	0%	39%	0%	72%	24%	0%	14%
	Re-development Bldg Capacity SF	-	-	-	2,615,510	-	18,741,160	4,862,307	-	26,218,977
	Existing Building SF	-	-	-	-	-	887,205	239,607	-	1,126,812
	Net Re-developable Bldg SF	-	-	-	2,615,510	-	17,853,955	4,622,700	-	25,092,165
	Existing Conditions									
	Total Parcels	561	316	803	17	80	157	104	272	2,373
	Total Land Area	3,572,133	3,113,828	4,686,011	1,172,046	684,245	3,090,309	3,288,887	3,068,910	25,338,760
	Total Built Space (sf)	7,768,624	2,897,659	3,367,684	2	72,943	1,590,682	1,458,801	2,188,448	19,867,450

Population, Households and Jobs Supported by Redevelopable Land Capacity

		Increase in Vacancy								
	Growth Capacity	**DCC**	**DMU**	**DR**	**M2**	**R4**	**S8**	**UCX-TD**	**WR**	**Total**
FAR by Right (Baseline)	Households	20	20	89	-	-	4,150	212	-	4,492
	Persons	47	46	206	-	-	9,628	493	-	10,420
	Jobs	139	135	109	-	-	9,432	1,448	-	11,263
FAR Medium	Households	-	40	210	-	-	6,822	705	-	7,777
	Persons	-	92	487	-	-	15,827	1,637	-	18,043
	Jobs	-	270	257	-	-	15,505	4,810	-	20,842
FAR High	Households	-	-	-	-	-	8,927	1,156	-	10,083
	Persons	-	-	-	-	-	20,711	2,681	-	23,392
	Jobs	-	-	-	5,944	-	20,289	7,880	-	34,113

Note: C2, M1, R3 and R4 zoning districts did not contain any redevelopable parcels and are excluded from Exhibit A-18.

Exhibit A-19
Downtown Tacoma Redevelopable Lands, All Land Uses, 10% Increase in Rents

Downtown Tacoma Redevelopable Lands Potential

		10% Increase in Rents							
	Redevelopable Lands	**DCC**	**DMU**	**DR**	**M2**	**S8**	**UCX-TD**	**WR**	**Total**
FAR by Right (Baseline)	Redevelopable parcels	135	87	162	2	50	86	72	594
	Redevelopable Land Area	1,044,106	1,007,750	1,309,409	459,878	2,317,570	895,112	577,471	7,611,296
	% of Total Land that is Redevelopable	29%	32%	28%	39%	75%	27%	19%	30%
	Re-development Bldg Capacity SF	1,457,467	937,812	1,215,128	492,477	9,732,302	1,812,601	1,051,921	16,699,709
	Existing Building SF	325,201	101,468	398,940	-	968,439	321,301	28,424	2,143,773
	Net Re-developable Bldg SF	1,132,266	836,344	816,188	492,477	8,763,863	1,491,300	1,023,497	14,555,936
FAR w Design Guidelines (Medium)	Redevelopable parcels	191	117	316	2	50	97	72	845
	Redevelopable Land Area	1,520,299	1,256,393	2,409,309	459,878	2,317,570	1,010,909	577,471	9,551,829
	% of Total Land that is Redevelopable	43%	40%	51%	39%	75%	31%	19%	38%
	Re-development Bldg Capacity SF	4,244,372	2,334,499	4,467,871	910,075	15,571,683	4,094,181	1,051,921	32,674,602
	Existing Building SF	1,165,378	195,971	943,061	-	968,439	568,631	28,424	3,869,904
	Net Re-developable Bldg SF	3,078,994	2,138,528	3,524,810	910,075	14,603,244	3,525,550	1,023,497	28,804,698
FAR w Special Features (High)	Redevelopable parcels	226	123	326	2	50	99	47	873
	Redevelopable Land Area	1,797,631	1,303,122	2,564,875	459,878	2,317,570	1,068,951	438,508	9,950,535
	% of Total Land that is Redevelopable	50%	42%	55%	39%	75%	33%	14%	39%
	Re-development Bldg Capacity SF	10,037,252	3,634,997	7,140,631	2,615,510	19,464,604	6,493,875	1,198,180	50,585,050
	Existing Building SF	1,622,401	350,391	1,291,992	-	968,439	666,448	15,410	4,915,081
	Net Re-developable Bldg SF	8,414,851	3,284,606	5,848,639	2,615,510	18,496,165	5,827,427	1,182,770	45,669,969
	Existing Conditions								
	Total Parcels	561	316	803	17	157	104	272	2,373
	Total Land Area	3,572,133	3,113,828	4,686,011	1,172,046	3,090,309	3,288,887	3,068,910	25,338,760
	Total Built Space (sf)	7,768,624	2,897,659	3,367,684	2	1,590,682	1,458,801	2,188,448	19,867,450

Population, Households and Jobs Supported by Redevelopable Land Capacity

		10% Increase in Rents							
	Growth Capacity	**DCC**	**DMU**	**DR**	**M2**	**S8**	**UCX-TD**	**WR**	**Total**
FAR by Right (Baseline)	Households	283	209	531	-	4,382	373	665	6,443
	Persons	657	485	1,231	-	10,166	865	1,543	14,947
	Jobs	1,930	1,426	649	1,119	9,959	2,542	814	18,439
FAR Medium	Households	770	535	2,291	-	7,302	881	665	12,444
	Persons	1,786	1,240	5,315	-	16,940	2,045	1,543	28,870
	Jobs	5,248	3,645	2,804	2,068	16,595	6,009	814	37,184
FAR High	Households	2,104	821	3,802	-	9,248	1,457	769	18,200
	Persons	4,881	1,905	8,820	-	21,456	3,380	1,784	42,225
	Jobs	14,343	5,599	4,652	5,944	21,018	9,933	941	62,431

Note: C2, M1, R3 and R4 zoning districts did not contain any redevelopable parcels and are excluded from Exhibit A-19.

Exhibit A-20
Downtown Puyallup Redevelopable Lands, All Land Uses, Baseline and Sensitivity Assumptions

Downtown Puyallup Redevelopable Lands Potential

	Baseline Rent Assumptions		Baseline Assumptions	10% Increase in Rent		10% Increase in Rent	15% Increase in Rent		15% Increase in Rent
Redevelopable Lands	**CBD-Core**	**CBD**	**Total**	**CBD-Core**	**CBD**	**Total**	**CBD-Core**	**CBD**	**Total**
Redevelopable parcels	-	-	-	37	22	59	93	86	179
Redevelopable Land Area	-	-	-	360,722	247,873	608,595	855,749	910,844	1,766,593
% of Total Land that is Redevelopable	0%	0%	0%	25%	11%	16%	58%	40%	47%
Re-development Bldg Capacity SF	-	-	-	911,617	312,248	1,223,866	2,162,649	1,147,402	3,310,051
Existing Building SF	-	-	-	13,258	745	14,003	233,296	156,322	389,618
Net Re-developable Bldg SF	-	-	-	898,359	311,503	1,209,863	1,929,353	991,080	2,920,433
Existing Conditions									
Total Parcels	206	186	392	206	186	392	206	186	392
Total Land Area	1,467,958	2,305,414	3,773,372	1,467,958	2,305,414	3,773,372	1,467,958	2,305,414	3,773,372
Total Built Space (sf)	653,084	659,304	1,312,388	653,084	659,304	1,312,388	653,084	659,304	1,312,388

Population, Households and Jobs Supported by Redevelopable Land Capacity

			Baseline Assumptions			10% Increase in Rent			15% Increase in Rent
Growth Capacity	**CBD-Core**	**CBD**	**Total**	**CBD-Core**	**CBD**	**Total**	**CBD-Core**	**CBD**	**Total**
Households	-	-	-	449	156	605	965	496	1,460
Persons	-	-	-	1,069	371	1,440	2,296	1,179	3,475
Jobs	-	-	-	917	318	1,235	1,969	1,011	2,980

Step 4. Evaluate Results

Evaluate redevelopable lands and growth capacity outcomes by zoning district, existing land uses and specific parcels of interest.

EVALUATE GROWTH CAPACITY ESTIMATES BY ZONING DISTRICT.

For example, growth capacity estimates in downtown Tacoma's S-8 Thea Foss Waterway Zone District, produced larger growth capacity estimates than previously hypothesized by City staff. Further review of zoning and market inputs for this district would therefore be required.

EVALUATE IMPACTS OF EXCLUDING SPECIFIC TYPES OF EXISTING LAND USES FROM LVP CALCULATIONS.

For example, in the Tacoma study area, inclusion of large tracts of park land, railroad right of way, and other public uses skewed preliminary draft estimates of redevelopable lands and growth capacity targets. In subsequent analyses, these land uses were removed. In Puyallup however, inclusion of existing public land uses may be desirable. In recent years, several publicly owned lands in Puyallup (including the former city hall) were redeveloped.

EVALUATE SPECIFIC PARCELS

Some parcels have unique considerations that impact redevelopment feasibility. Parcel-by-parcel considerations often require special adjustments to LVP calculations. For example, the City of Tacoma's newly established an International Financial Services Area, which eliminates parking requirements in a section of downtown, is not captured in this analysis. Elimination of parking requirements would increase leasable area and improve the economic feasibility of redevelopment, likely resulting in more parcels being identified as redevelopable. Similarly, LIFT incentives (Local Infrastructure Financing Tool) in downtown Puyallup provide economic support for targeted redevelopment. Additional work on the LVP approach could account for economic incentives, assigning a change in development costs or revenues associated with each incentive.

Step 5. Revise Inputs and Calculations as Necessary

A formal process of City and County involvement and review is required to make these final determinations, which is beyond the scope of this demonstration study.

Stage Three Review

By this stage in the analysis, analysts should have:

- Constructed a sensitivity matrix that summarizes redevelopable land outcomes and growth capacity estimates
- Evaluated preliminary findings and identified potential adjustments to LVP assumptions and calculations

Stage 4. Forecast Redevelopment Absorption

One important component of buildable lands requirements is to estimate how much redevelopment will take place over a 20 year planning horizon. This portion of the guidebook presents two possible options for estimating the rate of redevelopment on redevelopable lands.

Absorption of redevelopment is illustrated using a scenario defined at the outset of the project. The scenario illustrated here examines redevelopment factors that yield a 10% or 15% redevelopment rate in downtown Tacoma over the next 15 years. Similar methods could be used to identify how much redevelopment would occur in a study area over a twenty year planning period.

The analysis presents two potential methods for estimating the rate and amount of redevelopment in Tacoma over the next 15 years. The first method uses historical assessor's records of new development to quantify an average development rate in downtown Tacoma from 2000 to 2008. The average development rate is applied to future years to estimate the amount of redevelopment that would take place if the current pace of downtown development continues in the future.

The second method uses City of Tacoma population allocations and employment targets published in Pierce County's 2007 Buildable Lands Report to serve as drivers of new development citywide. This method uses sensitivity analysis to establish possible scenarios. The method tests the rate and amount of redevelopment in downtown given a certain percentage of growth directed towards downtown.

Method One: Historical Development Trend Analysis

Begin by measuring new development by year in the study area. New development is defined using assessor's data and is based on the net square feet of development by year of construction. This analysis found that from 2000 to 2008, over 1.9 million s.f. of new development was constructed in downtown Tacoma accounting for nearly 27% of citywide new development (**Exhibit A-21**). Nearly 2,000 acres have been development citywide in Tacoma over this time period, with over 54 acres (2.4 million s.f.) of land in downtown.

Next, analysts calculate the average rate of development, and forecast development at this rate over a future planning horizon.

This analysis found that on average, 215,000 s.f. of new building development and 265,000 sf. in land development occurred annually in downtown Tacoma from 2000 to 2008. At this rate of development, over 3.23 million s.f. of new construction would be developed or re-developed in downtown Tacoma between 2009 to 2023. This translates to approximately 92 acres or 10.8% of land area being re-developed. The LVP analysis

identifies that approximately 13% to 15% of land area could support feasible redevelopment under current market conditions. If historical trends continue in the future, it is possible that downtown Tacoma could meet a redevelopment target of 10% to 15% within the next 15 years.

Exhibit A-21
Summary of New Development in Tacoma, Citywide and Downtown, 2000 – 2008

	New Development Citywide		New Development in Downtown Tacoma		
Year Built	New Building Development (SF)	Land Developed (sf)	New Building Development (sf)	Land Developed (sf)	% Bldg Development in Downtown
2000	967,295	22,332,332	41,938	44,533	4.3%
2001	1,236,881	6,296,894	909,525	510,226	73.5%
2002	1,050,704	11,331,678	295,785	272,234	28.2%
2003	693,145	10,303,661	282,161	884,309	40.7%
2004	1,184,460	12,355,336	31,436	442,440	2.7%
2005	765,535	11,885,036	194,110	97,460	25.4%
2006	532,653	7,691,098	-	13,526	0.0%
2007	625,617	4,171,694	25,411	6,749	4.1%
2008	176,824	606,943	155,200	114,075	87.8%
Total	7,233,114	86,974,673	1,935,566	2,385,553	26.8%
Annual Avg	803,679	9,663,853	215,063	265,061	26.8%

Source: Pierce County Assessor's, Community Attributes

DISCUSSION AND LIMITATIONS OF THE HISTORICAL DEVELOPMENT TREND METHOD.

Rates of development are cyclical and can vary dramatically based on exogenous market trends. Development rates varied in downtown from 2000 to 2008, which challenges the assumption that an average historical rate of development will continue consistently in the future. In the last three years, downtown Tacoma has averaged only 60,000 s.f. in new construction, however in 2008 it captured 88% of total development citywide, the most of any year from 2000 to 2008.

Second, building square footage from 2000 to 2008 was less than the square footage of land developed, indicating relatively low levels of density (average FAR of 0.8). Future downtown planning initiatives will likely advocate for greater levels of development density than estimated, resulting in less land consumed, and a lower rate of land redevelopment.

Method Two: Population and Employment Based Forecasts

The first step in method two is to calculate compounded annual growth rates for population and employment. This analysis used growth rates defined in the Pierce County 2007 Buildable Lands Report. In future buildable lands analyses, analysts would use OFM projections and a combination of additional methods to define citywide growth rates.

The Pierce County 2007 Buildable Lands Report projects that population in the City of Tacoma will increase by 1.55% annually and employment will increase by 1.75% from 2006 to 2022 (**Exhibit A-22**). In total, Tacoma is expected to accommodate 55,640 new persons and 25,683 new jobs from 2006 to 2022.

Exhibit A-22
City of Tacoma Population Allocations and Employment Targets, 2006 - 2022[12]

	2006	2022	CAGR	Net Change
Population	199,600	255,240	1.55%	55,640
Employment	111,409	147,092	1.75%	35,683

Source: Pierce County Buildable Lands Report, 2007

Next, analysts calculate new development, population and employment growth that occurred in past years.

From 2000 to 2008, over 7.2 million square feet of building space was constructed. Using historic data from PSRC and the Buildable Lands Report, population increased by nearly 12,300 and jobs (not including construction and resources) increased by nearly 4,900.

Historic population figures use OFM annual estimates for 2000 through 2006 and buildable lands growth rate projections to estimate 2007 and 2008 population. The analysis assumes that new development is built to accommodate new population and job growth from 2000 to 2008. A "development driver" divides the total building square footage of new development citywide from 2000 to 2008 by the sum of new persons and jobs citywide from 2000 to 2008. The driver value estimates 422 square feet of new construction will be built per person plus job (**Exhibit A-23**).

[12] 2006 population from OFM, 2006. 2006 employment represents total employment minus covered construction and resource jobs. See errata on p. 11 and p.284

Exhibit A-23
City of Tacoma Development, Population and Job Growth, 2000 - 2008[13]

New Building SF	2000 - 2008
Citywide (new bldg sf)	7,233,114
Downtown Tacoma (new bldg sf)	1,935,566
Population and Job Growth	
Population	12,274
Total Jobs - Const. Res	4,863
Development Driver	
New bldg SF citywide per new person+job (sf)	422

Using projected population and employment growth, this method estimates approximately 34.3 million square feet of new construction for the City of Tacoma from 2009 to 2022 (**Exhibit A-24**). The LVP method estimates development capacity on re-developable lands under baseline conditions range from 10.1 million square feet (low or baseline FAR) to as much as 26 million square feet (high FAR). Potential redevelopment capacity exists in downtown to accommodate between 30% and 75% of future growth under baseline conditions depending on FAR assumptions. Under the most optimistic scenario (10% increase in rents and highest FAR) downtown Tacoma could accommodate all projected growth within an estimated 45.7 million square feet of redevelopment.

[13] A greater level of specificity could be integrated into this analysis to define a development driver for population and a development driver for jobs. This method represent one variation of the driver method.

Exhibit A-24
Forecasts of New Construction using the Population and Employment Allocation Drivers Method, 2000 – 202214

	Citywide			% of Citywide Development (sf) focused in Downtown		
Year Built	Total Development by Year (SF)	New Tacoma Population	New Tacoma Employment	25%	50%	75%
2000	967,295			41,938	41,938	41,938
2001	1,236,881	944	-347	909,525	909,525	909,525
2002	1,050,704	400	-994	295,785	295,785	295,785
2003	693,145	1,400	-294	282,161	282,161	282,161
2004	1,184,460	500	820	31,436	31,436	31,436
2005	765,535	1,300	1,096	194,110	194,110	194,110
2006	532,653	1,500	644	-	-	-
2007	625,617	3,091	1,952	25,411	25,411	25,411
2008	176,824	3,139	1,986	155,200	155,200	155,200
2009	2,198,543	3,188	2,021	549,636	1,099,272	1,648,907
2010	2,233,997	3,237	2,056	558,499	1,116,998	1,675,497
2011	2,270,294	3,287	2,092	567,574	1,135,147	1,702,721
2012	2,307,436	3,338	2,129	576,859	1,153,718	1,730,577
2013	2,345,000	3,390	2,166	586,250	1,172,500	1,758,750
2014	2,382,986	3,442	2,204	595,747	1,191,493	1,787,240
2015	2,421,816	3,496	2,242	605,454	1,210,908	1,816,362
2016	2,461,068	3,549	2,282	615,267	1,230,534	1,845,801
2017	2,501,587	3,605	2,322	625,397	1,250,793	1,876,190
2018	2,541,683	3,660	2,362	635,421	1,270,841	1,906,262
2019	2,583,890	3,718	2,404	645,972	1,291,945	1,937,917
2020	2,625,252	3,774	2,446	656,313	1,312,626	1,968,939
2021	2,668,303	3,833	2,489	667,076	1,334,151	2,001,227
2022	2,710,932	3,893	2,530	677,733	1,355,466	2,033,199
Total 2009 - 2022	**34,252,786**	**49,410**	**31,745**	**8,563,197**	**17,126,393**	**25,689,590**

Exhibit A-25 presents a sensitivity analysis which translates forecasts of newly constructed building square feet needed to accommodate growth targets (from Exhibit A-24) to re-developable land. The method assumes that a given percentage of growth is focused in downtown and built at an assumed development density (FAR). Exhibit A-25 shows aggregate totals of re-developable land from 2009 to 2025 and the percent of downtown land area that could be re-developed.

If 25% of new citywide development was focused in downtown at an average FAR 0.8 then redevelopment could occur on as much as 29% of land area from 2009 to 2025. This outcome is not supported by LVP calculations. Assuming 25% of growth is directed downtown, 12% of land could be re-developed under current market conditions at an FAR of 2.0 to all little as

[14] Data shaded in gray represents base data from Pierce County assessor's office.

2% of land being re-developed at an FAR of 12, a more likely scenario given LVP calculations.

Exhibit A-25
Downtown Tacoma Re-developable Land from 2009 – 2022 using the Population and Job Allocation Driver Method

	Percentage of Citywide New Building SF Directed Towards Downtown Tacoma					
	25%		50%		75%	
FAR	Re-developed Land (ac)	Downtown Area	Re-developed Land (ac)	Downtown Area	Re-developed Land (ac)	% of Downtown Area
0.8	242	29%	485	57%	727	86%
1.0	197	23%	393	47%	590	70%
2.0	98	12%	197	23%	295	35%
4.0	49	6%	98	12%	147	17%
6.0	33	4%	66	8%	98	12%
12.0	16	2%	33	4%	49	6%

DISCUSSION AND LIMITATIONS OF THE POPULATION AND EMPLOYMENT DRIVER METHOD.

The application of population and employment forecasts to projections of redevelopment absorption accounts for both historical trends in new development and draws important connections to buildable lands population allocations and job targets. The driver method could be adjusted for a greater level of specification that creates unique drivers for population and jobs respectively. Sensitivity analysis also allows for planners to understand a range of different scenarios, including levels of density needed to achieve redevelopment targets and the percentage of growth that should be focused in downtown areas. Historical development may also not accurately represent new development, due to consumer preference, land use types and a range of other issues. Baseline drivers that define a consistent square foot per job and square foot per housing unit would conform more closely to existing buildable lands methods and ensure a consistent approach across jurisdictions.