

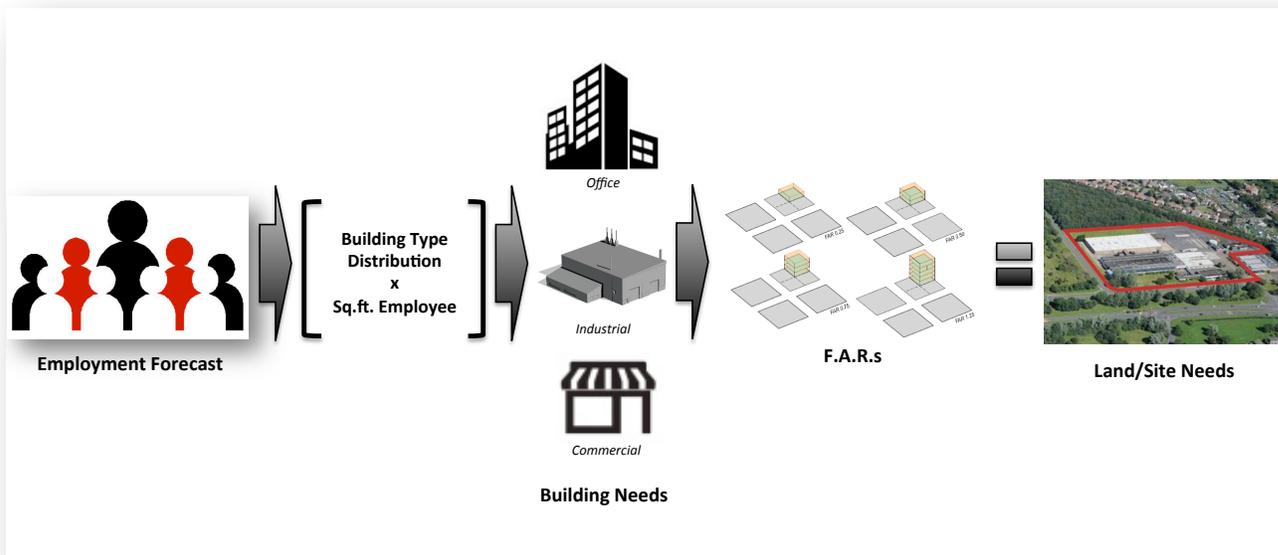
CLACKAMAS COUNTY EMPLOYMENT LAND FORECAST

The next analytical step in our analysis is to convert projections of employment into forecasts of land demand over the planning period. The generally accepted methodology for this conversion begins by allocating employment by sector across a distribution of building typologies those economic activities usually locate in. For example, insurance agents typically locate in traditional office space, usually along commercial corridors. However, a percentage of these firms locate in commercial retail space adjacent to retail anchors. Cross-tabulating this distribution provides an estimate of employment in each typology.

The ensuing step is to convert employment into space estimates using assumptions of the typical square footage exhibited within each typology. Adjusting for market clearing vacancy we arrive at an estimate of total space demand for each building type.

Finally, we can consider the physical characteristics of individual building types and the amount of land they typically require for development. The site utilization metric commonly used is referred to as a “floor area ratio” or F.A.R. For example, assume a 25,000 square foot general industrial building requires roughly two acre to accommodate its structure, setbacks, parking, and necessary yard/storage space. This building would have an F.A.R. of roughly 0.29.

EMPLOYMENT FORECAST TO LAND DEMAND METHODOLOGY



BASELINE LAND DEMAND ANALYSIS

Similar to how baseline employment forecasts followed assumptions in the Metro UGR, we maintain that trend here. Specifically, the UGR outlined assumptions for a distribution of employment by sector into six building typologies, provided general assumptions about sq. ft. per employee for these typologies, and indicated a series of F.A.R.s to complete the conversion process. An overview of how those assumptions were derived can be found in the Metro UGR. However, we note several limitations and caveats here:

- The baseline distribution matrix includes six typologies:
 - Traditional Office (commercial)
 - Institutional (commercial)
 - Flex/Business Park (industrial)
 - General Industrial (industrial)
 - Warehouse (industrial)
 - Retail (commercial)

These development typologies do not include broad diversity within individual sectors. In reality there is a considerable difference between many development forms within these categories.

- The designation of an entire typology into a single land class is limiting (commercial or industrial). In reality some of these typologies cross over land categories, particularly industries in institutional uses that locate on both commercial and industrial land.
- Square feet per employee assumptions reflect different rates for more urban (inner ring) and exurban (outer ring) locations. Our analysis did not evaluate discrepancies in geographic areas. Therefore, we calculated a weighted average based on gross employment distribution.
- Similarly, the UGR identified a different set of F.A.R.s for variances in geographic forms. For example, higher F.A.R. assumptions for Regional & Town Centers. However, the report does not provide background information on how these allocations were made. Again, we relied on a weighted average to consolidate into a single assumption by type.
- The UGR land demand analysis was for all land and employment across all sector types. The Clackamas County analysis is a non-retail study. As such, we have excluded the retail and accommodation & food service sectors from all land demand scenarios.

As a result of these caveats, we cannot consider our baseline assumptions to be 100% reflective of UGR estimates, albeit the error is likely to be small.

Forecast Results:

- The baseline Scenario I forecast estimated 1,648 net-developable acres to accommodate forecasted economic growth. Additional acreage of up to 20% could be required if considerable extension or development of new infrastructure was required to deliver suitable land. Based on exhibited assumptions, the balance of need across commercial and industrial types is roughly equal.
- The model for baseline Scenario II projects slightly higher demand at 1,853 net-developable acres. The same caveat for potential gross acreage conversion applies. In this forecast the additional acreage is entirely concentrated across industrial uses, primarily the result of a more optimistic manufacturing outlook.

Figure 26: Baseline Land Demand Forecasts

SCENARIO I								
Industry	Base Year 2014	Est. 2035	NET-NEW EMPLOYMENT IN BUILDINGS					
			Office	Inst.	Flex/BP	Gen. Ind.	Warehouse	Retail
Construction	6,667	11,336	654	0	840	1,867	840	467
Manufacturing	13,902	13,942	3	0	10	24	3	0
Wholesale Trade	8,650	11,587	235	0	646	587	1,175	294
Retail Trade	15,065	19,447	219	44	263	0	526	3,330
T.W.U.	4,122	4,946	124	0	99	107	453	41
Information	1,333	1,850	129	0	129	206	0	52
Finance	4,665	5,105	317	4	22	4	4	88
Professional Services	7,404	10,758	2,415	34	168	34	34	671
Management	1,418	2,178	601	38	61	0	0	61
Admin & Waste	6,573	10,310	2,691	37	187	37	37	747
Education	7,672	10,551	864	1,526	144	29	29	288
Health & Social Assistance	16,588	24,782	2,458	4,342	164	0	0	1,229
Arts. Ent. Rec.	1,514	1,914	140	0	40	0	0	220
Other	4,238	6,211	1,421	20	99	20	20	395
Government	5,181	7,125	836	680	97	19	19	292
TOTAL:	104,993	142,040	13,105	6,726	2,968	2,935	3,140	8,174
<i>Average SF/Emp:</i>			328	555	826	690	1,580	478
Estimated Square Feet of Space*:			4,720,917	4,105,920	2,695,697	2,227,973	5,457,999	4,293,134
<i>Average FAR:</i>			0.35	0.49	0.29	0.29	0.29	0.31
TOTAL ACRES DEMANDED			309	193	214	176	433	322
Commercial:			825					
Industrial:			824					
TOTAL:			1,648					

**Includes 10% market clearing vacancy*

SCENARIO II								
Industry	Base Year 2014	Est. 2035	NET-NEW EMPLOYMENT IN BUILDINGS					
			Office	Inst.	Flex/BP	Gen. Ind.	Warehouse	Retail
Construction	6,667	11,578	687	0	884	1,964	884	491
Manufacturing	13,902	17,406	280	0	841	2,103	280	0
Wholesale Trade	8,650	10,864	177	0	487	443	885	221
Retail Trade	15,065	19,885	241	48	289	0	579	3,664
T.W.U.	4,122	5,353	185	0	148	160	677	62
Information	1,333	1,620	72	0	72	115	0	29
Finance	4,665	6,393	1,244	17	86	17	17	346
Professional Services	7,404	11,962	3,282	46	228	46	46	912
Management	1,418	1,903	383	24	39	0	0	39
Admin & Waste	6,573	10,116	2,551	35	177	35	35	709
Education	7,672	10,663	897	1,585	150	30	30	299
Health & Social Assistance	16,588	23,195	1,982	3,502	132	0	0	991
Arts. Ent. Rec.	1,514	2,015	175	0	50	0	0	275
Other	4,238	5,528	929	13	65	13	13	258
Government	5,181	6,185	432	352	50	10	10	151
TOTAL:	104,993	144,667	13,518	5,622	3,697	4,935	3,456	8,445
<i>Average SF/Emp:</i>			328	555	826	690	1,580	478
Estimated Square Feet of Space*:			4,869,781	3,432,238	3,358,307	3,745,929	6,007,208	4,435,904
<i>Average FAR:</i>			0.35	0.49	0.29	0.29	0.29	0.31
TOTAL ACRES DEMANDED			319	162	267	296	477	333
Commercial:			813					
Industrial:			1,040					
TOTAL:			1,853					

**Includes 10% market clearing vacancy*

ALTERNATIVE LAND DEMAND ANALYSIS

Our methodology for determining alternative land forecasts relies on the same conversion methodology. However, our analysis relies on a more detailed set of assumptions reflecting case studies and the market driven expertise of our consultant team. For this analysis Johnson Economics partnered with architectural and engineering Mackenzie to develop 11 building typology profiles based on the industry sectors we found most likely to exhibit employment growth.

Identification of Industry Typologies

Building upon our analysis of targeted industry clusters in Clackamas County and industries likely to exhibit measurable growth over the planning period, Johnson Economics teamed with Mackenzie to identify commercial and industrial development typologies across a range of industry types. Driven by a case study evaluation of businesses across the region, we began with the identification of 11 prototypical non-retail development typologies.

MANUFACTURING BASED

1. Food Manufacturing and Processing:

Examples: Frozen food packaging, commercial baking, brewing

2. Fabricated Metals:

Examples: Construction materials, transportation equipment components, machinery components, cutlery, medical tools

3. Specialized Machinery:

Examples: General industrial. Broad range includes food processing equipment, optics, pumps, industrial molds, etc.

4. Computers, Electronics, & Electronic Components

Examples: Tyco, Eaton, MSEI

5. General Manufacturing Category

Examples: More generalized uses we can lump other activities under, such as paper and printing, furniture, wood products, etc. More traditional industrial business park

LOGISTICS/DISTRIBUTION BASED

6. Wholesaling:

Examples: Commercial equipment, medical/dental, industrial machinery (Biotronik, Phillips, United Grocers, Coca Cola, etc)

7. Distribution Center:

Examples: Safeway, Rite-Aid

SERVICES BASED

8. Traditional Offices (Finance & Business Support)

Examples: Finance, law offices, real estate, etc.) Kruse Way

9. Creative Offices

Examples: Advertising, software development, architecture & engineering, graphic design

10. Medical Offices

Examples: Medical office campus, specialists, outpatient care

11. Research and Development

Examples: Laboratory space, flexible uses, science, electronics, or biology research.

Mackenzie then developed a matrix of site need requirements for small, medium, and large users across each typology, derived from their unique experience in the development community as further case study analysis. This analysis is included in Appendix A.

Building Typology Matrix

Similar to our employment forecast, Johnson Economics then researched the composition of businesses within each cluster by their most likely of our 11 building typologies. Repeating this process within every subsector for every cluster we developed a case study matrix typology distribution unique to Clackamas County development patterns.

Figure 27: Building Typology Matrix

Industry	Computer		Traditional Office	Metals Manufacturing	Machinery Manufacturing	Medical Office	Creative Office	Distribution	Flex/R&D	Food Manufacturing	General Industrial	General Manufacturing	Institutional	Retail
	Manufacturing	Wholesale												
Construction	0%	0%	2%	0%	0%	0%	0%	0%	36%	0%	61%	0%	0%	0%
Manufacturing	40%	0%	0%	31%	3%	0%	0%	5%	8%	6%	0%	6%	0%	0%
Wholesale Trade	0%	57%	0%	0%	0%	0%	0%	32%	11%	0%	0%	0%	0%	0%
T.W.U.	0%	0%	2%	0%	0%	0%	0%	69%	9%	0%	20%	0%	0%	0%
Information	0%	0%	42%	0%	0%	0%	23%	0%	30%	0%	4%	0%	0%	1%
Finance	0%	0%	85%	0%	0%	0%	10%	0%	0%	0%	0%	0%	0%	5%
Real Estate	0%	0%	74%	0%	0%	0%	0%	0%	6%	0%	0%	0%	0%	20%
Professional Services	0%	0%	48%	0%	0%	0%	23%	0%	26%	0%	3%	0%	0%	0%
Management	0%	0%	19%	0%	0%	0%	0%	0%	60%	0%	14%	0%	7%	0%
Admin & Waste	0%	0%	41%	0%	0%	0%	0%	0%	20%	0%	37%	0%	1%	0%
Education	0%	0%	42%	0%	0%	0%	0%	0%	5%	0%	0%	0%	40%	13%
Health & Social Assistance	0%	0%	6%	0%	0%	49%	0%	0%	0%	0%	0%	0%	45%	0%
Arts, Ent. Rec.	0%	0%	0%	0%	0%	0%	0%	0%	18%	0%	0%	0%	0%	82%
Other	0%	0%	15%	0%	0%	0%	0%	0%	8%	0%	21%	0%	0%	56%
Government	0%	0%	35%	0%	0%	0%	0%	0%	0%	0%	0%	0%	55%	10%

Square Feet Per Employee

This analysis also made assumptions about square feet per employee for each building typology. This is perhaps the most difficult metric to estimate, as changes in technology, productivity, market conditions, and broad variance across firms and subsectors create wide deltas within a given building type. Our approach was to lean on third-party resources, case study analysis using QCEW data and Metro’s RLIS GIS data, and Mackenzie’s expertise to develop range estimates for each building type. Third-party sources include baseline estimates from the Metro UGR, national estimates from the Energy Information Administration’s Commercial Building Energy Consumption Survey (CBECS), and estimate by employment sector from the Urban Land Institute.

F.A.R.s

Range F.A.R.s by building type for small, medium, and large users were provided by Mackenzie as a component of their site needs assessment deliverable.

Forecast Results:

- Forecasted growth in Alternative Scenario III projects roughly 2,188 net-developable acres would be required to accommodate employment growth in the region. This estimate includes roughly 1,373 acres of industrial land 816 acres of commercial land.
- Alternatively, Scenario IV projects a maximum of 2,728 acres of employment land through 2035. This estimate includes 1,726 acres of industrial land and 1,002 acres of commercial land. In both scenarios, commercial land predominately reflects growth in industries that utilize traditional, creative, & medical office space as well as institutional and office uses in retail space. Both scenarios also include the build-out of identified large-lot concept plans.

Figure 28: Alternative Land Demand Forecasts

SCENARIO III									
Building Typology	'14-'35 Growth	EMP/Sq. ft.		Est. Square Footage		Est. FAR			Mean Acres Demanded
		Low	High	Low	High	Low	Medium	High	
Computer Manufacturing	2,069	550	605	1,251,792	1,376,972	0.28	0.30	0.33	99
Wholesale	1,898	900	990	1,878,608	2,066,468	0.38	0.40	0.42	111
Traditional Office	7,010	425	468	3,277,026	3,604,729	0.28	0.28	0.30	269
Metals Manufacturing	1,576	700	770	1,213,558	1,334,914	0.33	0.37	0.39	80
Machinery Manufacturing	169	700	770	130,396	143,436	0.32	0.34	0.36	9
Medical Office	3,764	550	605	2,277,221	2,504,944	0.24	0.25	0.25	213
Creative Office	1,196	350	385	460,513	506,564	0.26	0.29	0.29	38
Distribution	1,996	1,850	2,035	4,062,056	4,468,262	0.26	0.27	0.29	352
Flex/R&D	5,228	825	908	4,744,108	5,218,519	0.28	0.28	0.30	389
Food Manufacturing	306	900	990	302,677	332,944	0.25	0.30	0.35	25
General Industrial	4,827	700	770	3,716,642	4,088,306	0.25	0.28	0.32	322
General Manufacturing	306	700	770	235,969	259,566	0.30	0.32	0.34	17
Institutional	5,469	550	605	3,308,978	3,639,876	0.40	0.44	0.50	181
Retail	1,904	475	523	994,644	1,094,109	0.25	0.30	0.33	83
TOTAL:	37,718			27,854,190	30,639,609				TOTAL ACRES: 2,188
									<i>Commercial: 816</i>
									<i>Industrial: 1,373</i>

SCENARIO IV									
Building Typology	'14-'35 Growth	EMP/Sq. ft.		Est. Square Footage		Est. FAR			Mean Acres Demanded
		Low	High	Low	High	Low	Medium	High	
Computer Manufacturing	2,865	550	605	1,733,275	1,906,603	0.28	0.30	0.33	137
Wholesale	2,332	900	990	2,308,346	2,539,180	0.38	0.40	0.42	136
Traditional Office	8,769	425	468	4,099,635	4,509,598	0.28	0.28	0.30	336
Metals Manufacturing	2,182	700	770	1,680,335	1,848,368	0.33	0.37	0.39	110
Machinery Manufacturing	234	700	770	180,551	198,606	0.32	0.34	0.36	13
Medical Office	4,506	550	605	2,726,003	2,998,604	0.24	0.25	0.25	255
Creative Office	1,536	350	385	591,245	650,369	0.26	0.29	0.29	49
Distribution	2,508	1,850	2,035	5,104,403	5,614,843	0.26	0.27	0.29	442
Flex/R&D	6,481	825	908	5,881,827	6,470,009	0.28	0.28	0.30	482
Food Manufacturing	423	900	990	419,097	461,006	0.25	0.30	0.35	35
General Industrial	5,823	700	770	4,483,958	4,932,354	0.25	0.28	0.32	388
General Manufacturing	424	700	770	326,731	359,404	0.30	0.32	0.34	24
Institutional	6,427	550	605	3,888,428	4,277,271	0.40	0.44	0.50	213
Retail	2,435	475	523	1,272,505	1,399,755	0.25	0.30	0.33	106
TOTAL:	46,947			34,696,337	38,165,971				TOTAL ACRES: 2,728
									<i>Commercial: 1,002</i>
									<i>Industrial: 1,726</i>