

APPENDIX A

MACKENZIE TYPOLOGY ANALYSIS

MACKENZIE.

DESIGN DRIVEN | CLIENT FOCUSED

SITE DEVELOPMENT MATRIX

To

Clackamas County

For

Non-Retail Employment Land
Need Study

Submitted

December 4, 2014

Project Number

2140344.00



MACKENZIE
Since 1960

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ATTACHMENTS

Clackamas County Industrial Development Matrix

I. INTRODUCTION AND PROJECT DESCRIPTION

Description of Project

For this project, Mackenzie developed estimates for building coverage and basic site utility and transportation infrastructure requirements for the 11 identified target industry typologies outlined below, as provided by Johnson Economics.

11 IDENTIFIED TARGET INDUSTRY TYPOLOGIES FOR CLACKAMAS COUNTY		
Manufacturing	Logistics/Distribution	Services
Food Manufacturing and Processing	Wholesale	Traditional offices (Finance & Business Support)
Fabricated Metals	Distribution Center	Creative Office
Specialized Machinery		Medical Office
Computers, Electronics, and Electronic components		Research and Development
General Manufacturing		

This product is based on a scenario for a 3-acre site user, a 5-acre site user, and a 10-acre site user in each of the 11 industry typologies, with the exception of 20-acre + site users for the logistics/distribution based clusters. The result of this analysis is a matrix with each of the infrastructure categories and building coverage for each of the 3 different acreage scenarios for each industry cluster (Attachment 1). These user needs were established through case studies of existing users of a similar size in the Portland metropolitan region, or based on project knowledge of Mackenzie designers.

The matrix was designed to reflect two categories of land characteristics that affect the location of economic activity. The first category is general location factors that are desired by users or investors in choosing a location for employment/industrial uses. The second category is location factors that are specific to particular industry types. Both of these sets of location factors should be considered when determining the potential economic productivity of land under consideration for urban employment areas. General land characteristics that are key location factors for economic activity include:

- Access to major transportation routes for distribution of product
- Proximity to public utilities (e.g., sanitary sewer and water)
- Proximity to private utilities (e.g., electrical, gas, telecommunications)
- Transportation access for labor force

There are also industry-specific characteristics that are key to the 11 target industries. The target industries for a particular urban area are determined by the local community and reflected in the June 2012 Economic Landscape Final Report prepared for Clackamas County. It is necessary to analyze the community's target industries to understand their unique location factors and to consider these as part of determining the appropriateness of new urban areas for these industries.

II. METHODOLOGY

This section describes how the values in the Clackamas County Industrial Development Matrix were derived.

General Requirements

For a site to be considered for development with one of the target industries, a number of conditions must be met. These factors have been included in the matrix (see Attachment 1).

- The use is permitted outright;
- the site is located in the urban growth boundary (UGB) or equivalent;
- the site is outside the flood plain; and
- the site does not contain contaminants, wetlands, protected species, cultural resources, or has mitigation plan(s) that can be implemented to support the proposed use.

Physical Site Characteristics

The physical site characteristics include the maximum slope for a site to be competitive for a target industry plus building coverage ratios that are typical of the industry.

Competitive slope

The competitive slope listed in the matrix identifies slope that is reasonably mitigated through grading activities to support development for the target land use. While some sites with higher slopes could certainly be developed with the target industries, the associated higher earthwork costs may make the sites less competitive. Generally speaking, manufacturing and distribution uses need competitive slopes of 5% or less, while service industries may be able to build on competitive slopes of up to 15%.

Building Coverage

Building coverage represents the fraction of the site area that is covered by a building footprint. Site topography, physical dimensions, easements, and encumbrances on specific sites will affect potential coverage for all uses. The building coverage ranges in the matrix reflect typical ratios for the target industries. Multiple considerations affect how sites develop and the corresponding building coverage:

- Industrial sites that are rectangular will generally accommodate rectangular buildings more easily than irregular site shapes, allowing higher building coverage.
- Circulation, parking, and truck maneuvering represent a greater portion of smaller sites, reducing building coverage. Larger sites can accommodate higher parking ratios, and also provide more flexibility for site layout so higher building coverage may be achievable.
- Manufacturing uses typically include larger employee counts than other industrial occupancies (e.g., distribution) so additional parking is necessary, limiting building coverage.
- Manufacturing of weather-sensitive products (e.g., fabricated metals) may require more product to be stored indoors, increasing building coverage. Where products are less weather-sensitive, outdoor storage may be employed to reduce building coverage and construction costs.

- Logistics/distribution uses generally require limited vehicle parking, allowing greater building coverage of the site. By contrast, service-based users require greater parking ratios than other industrial uses, leading to lower building coverage.

Workforce Size

Different target industries require various labor market sizes to provide an adequate pool of appropriately-skilled workers. The values included in the matrix are generally in line with the Business Oregon Industrial Development Competitiveness Matrix. The location of Clackamas County sites should be able to accommodate all of the target industries since they can draw on the labor pool of the entire Portland metropolitan region, and the target industries require workforce sizes of 60,000 or less.

Transportation Factors

As with the Business Oregon Industrial Development Competitiveness Matrix, the transportation assessments are based on the following definitions.

- ‘Required’ factors are seen as mandatory in a vast majority of cases, and have become industry standards.
- ‘Competitive’ factors significantly increase marketability, and are highly recommended by Business Oregon. These factors may also be linked to financing to enhance the potential reuse of the asset in case of default.
- ‘Preferred’ factors increase the feasibility of the subject property and its future reuse. Factors in other categories may prove more critical.

Trip Generation

The range of trip generation rates from the Business Oregon matrix was utilized for the same/similar land uses as the target industry in the matrix. Trip rates for medical offices were estimated using the range of rates presented in the ITE Trip Generation Manual, 9th Edition, based on an assumed 20% Floor Area Ratio (FAR). Traditional and Creative office trip rates were based on an assumed 35% FAR % and range or trips rates for general office in the Trip Generation Manual.

Transit Access for Labor Force

The importance of transit access for employees is assessed based on the likely skill level and pay range, with lower skilled/paid employees more likely to rely on transit. Further, creative office users are assumed more likely to utilize transit and require access to it. For medical offices, access to transit may be more important for customers.

Miles to Major Routes and Railroad Access

These values are based on the Business Oregon Matrix assessments for the same or similar uses. Such access is assumed to not be needed for office uses, as shipping needs are very low.

Utility Demands

The utility industry models are based on the Business Oregon matrix, using the model flow/power rates and site acreages listed in the matrix to develop a per-acre demand rate. All “Required/Competitive/Preferred/Not Required” factors are as defined by the Business Oregon matrix. It is important to note that utility demands can vary wildly within these industry clusters; specific sites need to be evaluated based on specific users.

Water/Sewer

The per-acre rate ranges from 500 GPDA to 10,000 GPDA, with typical ranges from 1,000 GPDA to 2,000 GPDA. This rate generally aligns with per-acre rates used for local sewer master plans for industrial zoning (1,000 to 1,500 GPDA).

The recommended Water and Sewer service main sizes are based on the associated Business Oregon matrix. Generally, water main lines serving industrial properties are no smaller than 6" to 8" lines; however, 4" lines do exist in some low-demand areas. Similarly, fire sprinkler and hydrant service lines are generally no smaller than 6" lines, regardless of the industrial/domestic water demand.

Electricity

The per-acre model rate ranges from 0.005 MWA to 0.10 MWA based on the Business Oregon models.

Natural Gas

The Business Oregon matrix does not list specific gas demand, but instead lists the gas service line size. The Clackamas County matrix assumes a similar gas line-to-acre ratio, assuming a minimum line size of 2" for transmission/distribution mains.

Telecommunications

The closest industry categories in the Business Oregon matrix was used as the basis for telecommunications requirements.

III. CONCLUSION

This report documents the basis on which thresholds were selected for each of the development criteria that affect the target industries for sites in Clackamas County. The information in the site matrix reflects industry standards, and the experience of Mackenzie designers in selecting, evaluating, and laying out industrial sites in the Portland region and throughout the state.

DEVELOPMENT CRITERIA	Manufacturing Based														
	1 Food Manufacturing and Processing			2 Fabricated Metals			3 Specialized Machinery			4 Computers, Electronics, Electronic Components			5 General Manufacturing Category		
	Small - 3 ac	Medium - 5 ac	Large - 10 ac	Small - 3 ac	Medium - 5 ac	Large - 10 ac	Small - 3 ac	Medium - 5 ac	Large - 10 ac	Small - 3 ac	Medium - 5 ac	Large - 10 ac	Small - 3 ac	Medium - 5 ac	Large - 10 ac
PERFORMANCE	5%	5%	5%	5%	5%	5%	7%	7%	7%	5%	5%	5%	5%	5%	5%
Building coverage:	28-30	28-30	30-32	32-37	35-39	37-40	30-34	32-36	34-38	27-30	28-32	30-35	28-32	30-34	32-36
Available workforce population in 50 mile radius	20,000	20,000	20,000	30,000	30,000	30,000	30,000	30,000	30,000	60,000	60,000	60,000	30,000	30,000	30,000
DEVELOPMENT CRITERIA															
TRIP GENERATION:	ADT/Acre	75-100	75-100	75-100	42-58	42-58	42-58	42-58	42-58	50-75	50-75	50-75	76-106	76-106	76-106
TRANSIT ACCESS FOR LABOR FORCE	Dependency	Competitive	Competitive	Competitive	Competitive	Competitive	preferred	preferred	preferred	preferred	preferred	preferred	preferred	preferred	preferred
MILES TO MAJOR ROUTES (INTERSTATE ROUTES FOR FREIGHT AND LABOR FORCE):	Miles	within 30	within 30	within 30	within 10	within 10	within 10	within 10	within 10	within 15	within 15	within 15	within 20	within 20	within 20
RAILROAD ACCESS:	Dependency	preferred	preferred	preferred	preferred	preferred	preferred	preferred	preferred	not required	not required	not required	preferred	preferred	preferred
UTILITIES															
WATER:	Minimum Line Size (Inches/Diameter)	6"	8"	10"	4"	6"	8"	10"	4"	6"	10"	4"	4"	4"	8"
	Minimum Fire Line Size (Inches/Diameter)	6"	8"	10"	6"	8"	8"	8"	6"	8"	10"	6"	6"	8"	8"
	High Pressure Water Demand Dependency	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Not Required	Not Required	Not Required
	Flow (GPD)	15,000	25,000	50,000	7,200	12,000	24,000	24,000	7,500	12,500	25,000	7,500	12,500	25,000	4,500
SEWER:	Minimum Service Line Size (Inches/Diameter)	6"	8"	10"	8"	8"	8"	8"	4"	6"	8"	4"	4"	4"	6"
	Flow (GPD)	15,000	25,000	50,000	7,200	12,000	24,000	24,000	7,500	12,500	25,000	7,500	12,500	25,000	4,500
NATURAL GAS:	Preferred Minimum Service Line Size (Inches/Diameter)	4"	4"	6"	4"	4"	4"	4"	2"	2"	2"	2"	2"	2"	4"
	On Site	Preferred	Preferred	Preferred	Competitive	Competitive	Competitive	Competitive	Competitive	Competitive	Competitive	Competitive	Competitive	Competitive	Competitive
ELECTRICITY:	Minimum Service Demand	0.05 MW	0.10 MW	0.15 MW	0.15 MW	0.20 MW	0.40 MW	0.40 MW	0.15 MW	0.20 MW	0.40 MW	0.05 MW	0.05 MW	0.10 MW	0.25 MW
	Close Proximity to Substation	Not Required	Not Required	Not Required	Competitive	Competitive	Competitive	Competitive	Competitive	Competitive	Competitive	Preferred	Preferred	Preferred	Preferred
	Secondary System Dependency	Not Required	Not Required	Not Required	Required	Required	Required	Required	Required	Required	Required	Required	Required	Required	Required
TELECOMMUNICATIONS:	Major Communications Dependency	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred
	Route Diversity	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required
	Fiber Optic Dependency	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Required	Required	Required	Preferred	Preferred	Preferred
GENERAL REQUIREMENTS	Use is permitted outright, located in UGB or equivalent and outside flood plain, and site (NCDA) does not contain contaminants, wetlands, protected species, or cultural resources or has mitigation plan(s) that can be implemented in 180 days or less.														

Abbreviations:
AC = Acres
ADT = Average Daily Trips
GPD = Gallons per day
MW = Megawatts
NA = Not applicable
NCDA = Net contiguous developable acres

Notes:
Utility demands can vary widely within these industry clusters. Specific sites need to be evaluated based on specific users.

DEVELOPMENT CRITERIA	6 Wholesale			7 Distribution Center		
	Small - 3 ac	Medium - 5 ac	Large - 20 + ac	Small - 3 ac	Medium - 5 ac	Large - 20 + ac
DEVELOPMENT CRITERIA						
PARCEL SIZE						
Competitive Slope:	5%	5%	5%	5%	5%	5%
Building coverage:	36-40	38-42	40-44	36-40	38-42	40-44
WORKSPACE						
Available workforce population in 50 mile radius	20,000	20,000	20,000	20,000	20,000	20,000
TRANSPORTATION						
TRIP GENERATION:	ADT/Acre	65-86	65-86	65-86	65-86	65-86
TRANSIT ACCESS FOR LABOR FORCE	Dependency	preferred	preferred	preferred	preferred	preferred
MILES TO MAJOR ROUTES						
INTERSTATE ROUTES FOR FREIGHT AND LABOR FORCE:	Miles	within 5 (only Interstate or equivalent)				
RAILROAD ACCESS:	Dependency	preferred	preferred	preferred	preferred	preferred
UTILITIES						
WATER:						
Minimum Line Size (Inches/Diameter)	6"	8"	10"	4"	4"	6"
Minimum Fire Line Size (Inches/Diameter)	6"	8"	10"	8"	10"	10"
High Pressure Water Demand Dependency	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required
Flow (GPD)	6,000	12,000	24,000	2,500	5,000	10,000
SEWER:						
Minimum Service Line Size (Inches/Diameter)	4"	6"	8"	4"	4"	6"
Flow (GPD)	6,000	12,000	24,000	2,500	5,000	10,000
NATURAL GAS:						
Preferred Minimum Service Line Size (Inches/Diameter)	2"	2"	2"	2"	2"	2"
On Site	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred
ELECTRICITY:						
Minimum Service Demand	0.10 MW	0.10 MW	0.20 MW	0.05 MW	0.05 MW	0.10 MW
Close Proximity to Substation	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required
Secondary System Dependency	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required
TELECOMMUNICATIONS:						
Major Communications Dependency	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred
Route Diversity	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required
Fiber Optic Dependency	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred
GENERAL REQUIREMENTS	Use is permitted outright, located in UGB or equivalent and outside flood plain, and site (NCDA) does not contain contaminants, wetlands, protected species, or cultural resources or has mitigation plan(s) that can be implemented in 180 days or less.					

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- NA = Not applicable
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Notes:

Utility demands can vary widely within these industry clusters. Specific sites need to be evaluated based on specific users.

DEVELOPMENT CRITERIA	Services Based											
	8 Traditional Offices (Financial/Business Support)			9 Creative Offices			10 Medical Offices			11 Research & Development		
	Small - 3 ac	Medium - 5 ac	Large - 10 ac	Small - 3 ac	Medium - 5 ac	Large - 10 ac	Small - 3 ac	Medium - 5 ac	Large - 10 ac	Small - 3 ac	Medium - 5 ac	Large - 10 ac
PERFORMANCE	Maximum Slope Percent	15% 24-28	15% 26-28	15% 24-28	15% 26-28	15% 28-30	15% 22-24	15% 22-25	15% 22-25	7% 24-28	7% 26-28	7% 28-30
WORKSPACE	Available workforce population in 50 mile radius	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	60,000	60,000	60,000
DEMOGRAPHICS												
TRANSPORTATION	ADT/Acre	120-165	120-165	120-165	120-165	120-165	234-417	234-417	234-417	50-75	50-75	50-75
TRANSIT ACCESS FOR LABOR FORCE	Dependency	Competitive	Competitive	Competitive	required	required	Competitive	Competitive	Competitive	preferred	preferred	preferred
MILES TO MAJOR ROUTES	Miles	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	within 10	within 10	within 10
UTILITIES												
RAILROAD ACCESS:	Dependency	not required	not required	not required	not required	not required	not required	not required	not required	not required	not required	not required
WATER:												
Minimum Line Size (Inches/Diameter)	4"	4"	8"	4"	4"	6"	4"	4"	6"	4"	6"	10"
Minimum Fire Line Size (Inches/Diameter)	6"	8"	8"	6"	6"	8"	6"	6"	8"	6"	8"	10"
SEWER:												
High Pressure Water Demand Dependency	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required	Preferred	Preferred	Preferred
Flow (GPD)	4,500	7,500	15,000	3,000	5,000	10,000	3,600	6,000	12,000	6,000	10,000	20,000
Minimum Service Line Size (Inches/Diameter)	4"	4"	6"	4"	4"	8"	4"	4"	8"	4"	8"	10"
NATURAL GAS:												
Preferred Minimum Service Line Size (Inches/Diameter)	2"	2"	4"	2"	2"	4"	2"	2"	2"	2"	2"	4"
ELECTRICITY:												
On Site Demand	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Competitive	Competitive	Competitive
Minimum Service Demand	0.15 MW	0.25 MW	0.50 MW	0.15 MW	0.25 MW	0.50 MW	0.15 MW	0.25 MW	0.50 MW	0.05 MW	0.05 MW	0.10 MW
Close Proximity to Substation	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred
Secondary System Dependency	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred	Preferred
TELECOMMUNICATIONS:												
Major Communications Dependency	Required	Required	Required	Required	Required	Required	Required	Required	Required	Required	Required	Required
Route Diversity Dependency	Required	Required	Required	Required	Required	Required	Required	Required	Required	Required	Required	Required
Fiber Optic Dependency	Required	Required	Required	Required	Required	Required	Required	Required	Required	Required	Required	Required
GENERAL REQUIREMENTS	Use is permitted outright, located in USB or equivalent and outside flood plain, and site (NCDA) does not contain contaminants, wetlands, protected species, or cultural resources or has mitigation plan(s) that can be implemented in 180 days or less.											

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