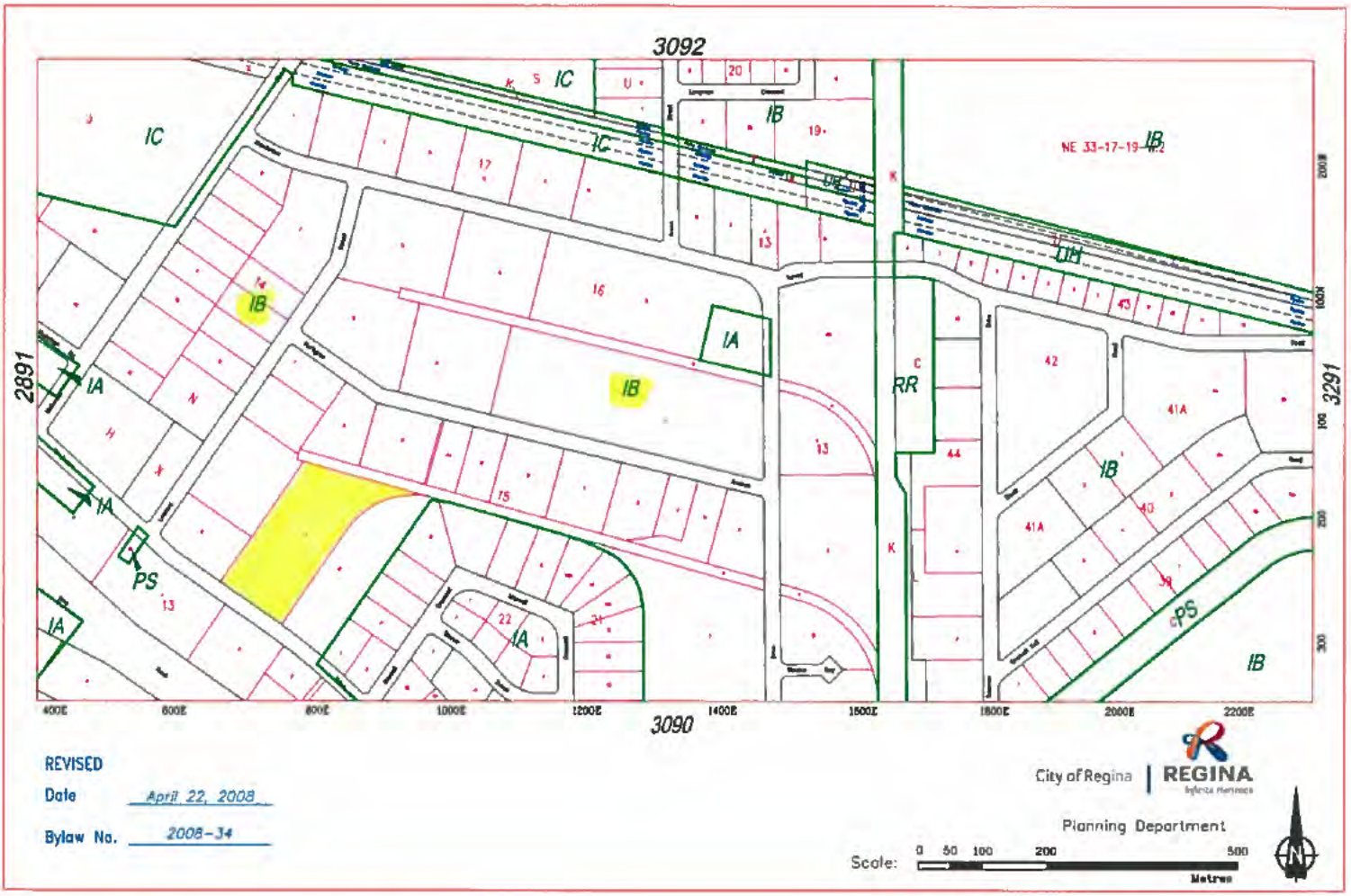
Appendix K

19. ZONING MAPS

PART 19A

UNDERLYING ZONING MAPS

The land use zone classifications established in Chapter 3 and their boundaries within the City are shown on the series of maps in this Chapter. [1992/9250]



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ZONING MAP 3091

Return to Key Map

5. USE AND DEVELOPMENT REGULATIONS

PART 5A

PURPOSE OF CHAPTER

(1) The purpose of this Chapter is to indicate which land uses:

(a) may locate in a land use zone as a matter of right;

(b) may locate in a land use zone at the discretion of Council; and

(c) are prohibited in each land use zone.

(2) The Chapter will also identify the development standards under which the permitted and discretionary uses may be developed.

(3) The intent is to bring all regulations relating to the uses that are allowed on properties and the level of intensity at which the uses may be developed, in one Chapter for quick and easy reference. [1992/9250]

PART 5B

USE REGULATIONS

5B.1 LAND USE TABLES

All uses of land or development of land in every land use zone must be made in accordance with the table of land uses in this Part. [1992/9250]

5B.2 INTERPRETION OF LAND USE TABLES

Tables 5.1, 5.2, 5.3 and 5.4 list land uses that are permitted by right, permitted at Council's discretion and prohibited in the:

(a) residential;

(b) commercial;

(c) industrial;

(d) special; and

(e) overlay zones. [1992/9250]

2.1 PERMITTED USES

Land uses permitted by right are marked by "P" at the intersection of the column and row, and require compliance with:

(a) the general development regulations of Chapter 4;

(b) the applicable development standards specified in this Chapter;

(c) the general requirements of the specific land use zone in which they are located, as specified in either Chapter 6, 7, 8 or 9; and

(d) any additional requirements imposed by:

(i) applicable overlay zone as described in Chapter 10;

(ii) Zoning Maps; or

(iii) additional requirements applicable to the use as specified in Chapters 11 to 18. [1992/9250]

2.2 DISCRETIONARY USES

(1) Land uses that are permitted at the discretion of Council are marked "D" at the intersection of the column and row, and may be developed subject to:

(a) all requirements applicable to land uses permitted by right mentioned in Section 2.1; and

(b) any additional requirements imposed by Council as part of the discretionary use review process.

(2) Each application for a discretionary use is considered as a unique case and shall not be regarded as a precedent for similar requests. [1992/9250]

2.3 PROHIBITED USES

(1) Blank space is used in the tables to designate land uses that are prohibited in the land use zones.

(2) Where a land use for which a blank space is shown existed in the land use zone prior to the coming into force of this Bylaw, that use may be continued as a legal non-conforming use, pursuant to Chapter 13 of this Bylaw. [1992/9250]

5B.3 LAND USE CLASSIFICATION

3.1 PURPOSE

The Classification of permitted and discretionary uses in land use zones in this Bylaw has been tied to the land use definitions provided in Chapter 2 of this Bylaw or the classifications of economic activities used in the *United States Standard Industrial Classification (SIC) Manual, 1987*. The classification of permitted and discretionary uses is intended to:

(a) ensure that incompatible land uses are properly separated; and

(b) facilitate the location of new land uses not specifically mentioned in this Bylaw. [1992/9250; 1999/10110]

3.2 AMENDMENTS TO CLASSIFICATION

Amendments may be made to the classification and definition of permitted and discretionary land uses in this Bylaw to reflect changes to the SIC Manual. [1992/9250]

3.3 COPY OF SIC MANUAL

A copy of the SIC Manual shall be made available for public use in the office of the Development Officer. [1992/9250]

3.4 OBLIGATION OF APPLICANT

An applicant for a land use approval, whether or not specifically mentioned or defined in this Bylaw, shall provide such information as is deemed necessary by the Development Officer in order to classify the land use. [1999/10110]

3.5 DEVELOPMENT OFFICER'S DETERMINATION IS FINAL

The determination of the Development Officer as to the proper classification of any land use shall be final subject only to appeal to the Development Appeals Board, as provided in Chapter 18 of this Bylaw. Land use definitions provided in Chapter 2 of this Bylaw shall prevail over SIC codes. The SIC codes shall be used to assist the Development Officer in interpreting land use where a specific land use definition is not provided in Chapter 2. [1992/9250; 1999/10110; 1999/10113]

3.6 TITLES AND CODES TO BE ASSIGNED

(1) Permitted and discretionary uses shall be assigned SIC code numbers. Where appropriate, code titles may also be used. The code title used may be either major group title, group title, or industry title.

(2) Code numbers used may be either major group number (two digit), group number (three digit), or industry (activity) number (four digit).

(3) Where a two digit code number is listed as a permitted or discretionary use in a zone, any code number beginning with the same first two or three digits shall be a permitted or discretionary use in the zone.

(4) Code "999" is used to represent an activity which is:

(a) not classified in the SIC manual;

(b) unique to the City; or

(c) defined in this Bylaw to reflect conditions in the City. [1992/9250]

5B.4 DETERMINING LAND USE FROM TABLES

In order to determine the use allowed for a specific site, the following approach may be followed:

(a) identify the land use zone in which the parcel is located from the Zoning Maps;

(b) if the parcel is zoned:

(i) residential, refer to Table 5.1;

(ii) commercial, refer to Table 5.2;

(iii) industrial, refer to Table 5.3;

(iv) special, refer to Table 5.4;

(v) overlay, refer to the Table for the appropriate underlying zone mentioned in clauses (i) to (iv). [1992/9250; 1993/9488; 1996/9776]

TABLE 5.1: TABLE OF LAND USES - RESIDENTIAL ZONES [2011-61]												
LAND USE TYPE	SIC CODE	LAND USE ZONE[1]										
		R1	R1A	R2	R3	R4	R4A	R5	R6	R7	R8	TAR
KEY: P=Permitted Use; D=Discretionary Use; Blank Space=Prohibited Use												
RESIDENTIAL												
Apartment	999								D			D
Apartment, Low Rise	999						D		P			D
Apartment, High Rise [1999/10110]	999								D			D
Apartment, Seniors Assisted Living – Low Rise [2005-34; 2011-8]	999						D	D	P			D
Apartment, Seniors Assisted Living – High Rise [2005-34]	999								D			D
Dwelling Unit	999											D[9]
Dwelling Unit, Converted	999					D	D					P
Dwelling Unit, Detached	999	P	P	P	P	P	P	D	D		P[8]	P
Dwelling Unit, Duplex	999			P	P	P	P	P	D		D	P
Dwelling Unit, Fourplex	999						D	P	P			P
Dwelling Unit, Mobile Home	999									P		
Dwelling Unit, Planned Group[10]	999	D	D	D	D	D	D	D	D		D	D
Dwelling Unit, Semi-Detached	999			P	P	P	P	P	D		D	P
Dwelling Unit, Townhouse	999					D	D	P	P			P
Dwelling Unit, Triplex	999						D	P	P			P
Mobile Home Park	999									D		
Residential Homestay[12] [2013-74]	999	D	D	D	D	D	D	D	D	D	D	P
Secondary Suite [2001-91]	999	P	P	P	P	P	P	P	P		P	P
		R1	R1A	R2	R3	R4	R4A	R5	R6	R7	R8	TAR

TABLE 5.1: TABLE OF LAND USES - RESIDENTIAL ZONES [2011-61]												
LAND USE TYPE	SIC CODE	LAND USE ZONE[1]										
		R1	R1A	R2	R3	R4	R4A	R5	R6	R7	R8	TAR
KEY: P=Permitted Use; D=Discretionary Use; Blank Space=Prohibited Use												
SERVICES [2003-1; 2003-2]												
Art Gallery	841											
Bed and Breakfast Homestay[10] [2005-88]	702	D	D	D	D	D	D	D	D	D	D	P
Day Care Centre, Adult[11] [1995/9736]	999	D	D	D	D	D	D	D	D	D	D	P
Day Care Centre, Child[11] [1995/9736]	835	D	D	D	D	D	D	D	D	D	D	P
Home -Based Business[14] [2006-14]	999	P	P	P	P	P	P	P	P	P	P	P
Individual and Family Social Service Home[7] [2003-1]	999					D	D		D			P
Labour Union Hall	999											
Library	823											P
Nursery School[11] [2003-1]	999	D	D	D	D	D	D	D	D	D	D	P
Religious Institution[13][2013-64]	866	D	D	D	D	D	D	D	D	D	D	D
School, Private	821, 824 and 829											D
Supportive Living Home[7]	805, 836	P	P	P	P	P	P	P	P	P	P	P
FINANCE AND REAL ESTATE												
Financial Institution	60											
Office	999											
CULTURE AND RECREATION												
Community Garden [2006-63]	999	P	P	P	P	P	P	P	P	P	P	P
Public Use[3] [2003-1]	999	P	P	P	P	P	P	P	P	P	P	P
		R1	R1A	R2	R3	R4	R4A	R5	R6	R7	R8	TAR

TABLE 5.1: TABLE OF LAND USES - RESIDENTIAL ZONES [2011-61]												
LAND USE TYPE	**SIC CODE**	**LAND USE ZONE[1]**										
		R1	**R1A**	**R2**	**R3**	**R4**	**R4A**	**R5**	**R6**	**R7**	**R8**	**TAR**
KEY: P=Permitted Use; D=Discretionary Use; Blank Space=Prohibited Use												
RETAIL TRADE												
Confectionery Store	544											D
House-Form Commercial	999											D
Licensed Dining Room	5812											
Licensed Restaurant	5812											
Mixed-Use Building	999											
Personal Service	999											
Repair Service	999											
Restaurant	5812											
Retail Use	54, 591, 5992-4											
		R1	**R1A**	**R2**	**R3**	**R4**	**R4A**	**R5**	**R6**	**R7**	**R8**	**TAR**

Notes:

1 Land use zone abbreviations are explained in Part 3B, Chapter 3.
2 Refer to the regulations in Subpart 6D.2, Chapter 6.
4 Deleted.
5 Deleted.
6 Deleted.
7 Refer to the regulations in Subpart 4C.2. [2003-1]
8 Includes zero lot line dwelling units.
9 Dwelling units in the same building as a permitted or discretionary use in the zone.
10 Refer to the regulations in Subpart 6D.1.
11 Refer to the regulations in Subpart 4C.1.
12 Refer to the regulations in Subpart 6D.5.
13 Deleted [2006-14].
14 Refer to the regulations in Subpart 6D.3.
15 Refer to the regulations in Subpart 9D.1 and development standards for the I-Institutional Zone in Table 5.9. [1997/9904]
16 Deleted [2005-34]
17 Deleted [2005-34]
18 Refer to the regulations in Subpart 6B.11. [1997/9904]

TABLE 5.2: TABLE OF LAND USES - COMMERCIAL ZONES [2003-6]												
LAND USE TYPE	SIC CODE	LAND USE ZONE*										
		NC	LC1	LC2	LC3	MS	MX	HC	MAC3	MAC	DSC	D
KEY: P=Permitted Use; D=Discretionary Use; Blank Space=Prohibited use												
RESIDENTIAL												
Apartment Dwelling Unit [2002-6]	999								D	D	P	P
Apartment, Low Rise [2002-6]	999					P	P		D	D	P	P
Apartment, High Rise [1999/10110; 2002-6]	+ 999					D			D	D	P	P
Apartment, Seniors Assisted Living – Low Rise [2005-34]	999					P	P		D	D	P	P
Apartment, Seniors Assisted Living – High Rise [2005-34]	999					D			D	D	P	P
Dwelling Unit [1999/10113; 2002-6]	999	P[3]	D[3]	D[3]	P[3]	D[3]	D[3]		D[3]	D[3]	P	P[3]
Dwelling Unit, Converted	999						P					
Dwelling Unit, Detached [1999/10113, 2012-67]	999	D	D		D		P			D		P[41]
Dwelling Unit, Duplex [2012-67]	999						P					P[41]
Dwelling Unit, Fourplex [2002-6, 2012-67]	999					P	D				P	P[41]
Dwelling Unit, Planned Group[36] [2002-6]	999					P	D				P	
Dwelling Unit, Semi-Detached [2012-67]	999						P					P[41]
Dwelling Unit, Townhouse [2002-6, 2012-67]	999					P	P				P	P[41]
Dwelling Unit, Triplex [2002-6, 2012-67]	999					P	D				P	P[41]
Home-Based Business[24] [1995/9736; 1997/9904; 2002-6; 2006-14]	999	P	P	P	P	P	P		P	P	P	P
Residential Homestay[25] [2013-74]	999	D	D		D		P			D		P
Secondary Suite [2001-91]	999	P	P		P		P			P		
AGRICULTURE												
Animal Hospital	074		P	P		P		P	P	P	P	
Animal Shelter	0752							P				
		NC	LC1	LC2	LC3	MS	MX	HC	MAC3	MAC	DSC	D

TABLE 5.2: TABLE OF LAND USES - COMMERCIAL ZONES [2003-6]												
LAND USE TYPE	**SIC CODE**	**LAND USE ZONE***										
		NC	**LC1**	**LC2**	**LC3**	**MS**	**MX**	**HC**	**MAC3**	**MAC**	**DSC**	**D**
KEY: P=Permitted Use; D=Discretionary Use; Blank Space=Prohibited use												
FINANCE AND REAL ESTATE												
Financial Institution	60	P	P	P	P	P	P	P	P	P	P	P
Office, General [2012-45]	999	P[1] D[34]	P[1] D[8]	P[1] D[8]	P[12]	P[13] D[17]	P[40] D[40]	D	P[14] D[17]	P[40] D[40]	P[40] D[40]	P
MANUFACTURING [2003-1]												
Prefabricated Homes[19]	245							P				
Printing, Commercial [Bylaw 2008-40)	275									P	P	P
PUBLIC ADMINISTRATION												
Fire Station	9224					P				P		
Police Station	9221					P				P		
SERVICES [2003-1] [2003-6]												
Amusement Arcade	7993					D				D	P	P
Amusement Arcade, Licensed	7993									D	D	D
Amusement Park, Commercial	7996							D		D		
Automobile Rental and Leasing	751							P	D	P	P	P
Bed and Breakfast Homestay[27] [2005-88]	702						P					
Bingo Parlour	7999					D			D	D	P	D
Bowling Centre	793					D			D	D	P	P
Car Wash[32] [1995/9730; 1995/9753]	7542					D		P	D	D	P	
Club [2003-6]	999		P	P	P	P	P		P	P	P	P
Club, Licensed [2003-6]	999		D[7]	D[7]	D[5]	P[7] D[16]	D		P[7] D[16]	P	P	P
College, Community	8222											P
Community Centre [2003-2]	999	D	P	P	P	P	P		P	P	P	P
Day Care Centre, Adult[29] [1995/9736, 2014-44]	999	P	P	P	P	P	P		P	P	P	P
Day Care Centre, Child[29] [1995/9736, 2014-44]	835	P	P	P	P	P	P		P	P	P	P
		NC	**LC1**	**LC2**	**LC3**	**MS**	**MX**	**HC**	**MAC3**	**MAC**	**DSC**	**D**

TABLE 5.2: TABLE OF LAND USES - COMMERCIAL ZONES [2003-6]												
LAND USE TYPE	SIC CODE	LAND USE ZONE*										
		NC	LC1	LC2	LC3	MS	MX	HC	MAC3	MAC	DSC	D
KEY: P=Permitted Use; D=Discretionary Use; Blank Space=Prohibited use												
SERVICES (continued)												
Funeral Home	726								D	D		
Hotel	701							P	D	P		P
Hotel, Single Room Occupancy	702											P
Humanitarian Service Facility [2003-2]	999	D	P	P	P	P	P		P	P	P	P
Individual and Family Social Service Home[13] [1998/10054] [2003-1]	999				D	D	P		P	P		P
Labour Union Hall	999						D		D	D		P
Library	823		P	P	P	P	P		P	P	P	P
Medical Clinic [2013-64]	802 [2015-1]	P[2]	P[2]	P[2] D[6]	P[12] D[12]	P[14] D[17]	D	D	P[14] D[17]	P	P	P
Medical/Dental Laboratory	807							D	P	P		P
Motel	701							P	D	P		P
Nursery School[29] [2003-1]	999	D	P	P	D	P	P		P	P	P	P
Parking, Off-site Caveated [2012-67]	999		D	D						D	P	P[42]
Parking Lot, Paved [2012-67]	7521									D		
Personal Service [1996/9776]	999	P[1]	P[1]	P[1]	P[1]	P[1]	D		P	P	P	P
Pool Hall	7999					D			D	D	P	P
Pool Hall, Licensed	7999					D			D	D	P	P
Public Self Storage Facility [1996/9821; 1998/10006]	999							D	D			D
Recreational Service Facility [2003-6]	999		P	P	P	P	P		P	P	P	P
Recreational Service Facility, Licensed [2003-6]	999		D[37]	D[37]	D[38]	P[37] D[39]	D		P[37] D[39]	P	P	P
Religious Institution[28] [2013-64]	866	D	P	P	P	P	D	D	P	P		P
Repair Service	999	P[1]	P[1]	P[1]	P[12]	P[1]	D		P	P	P	P
Repair Shop[35] [1996/9776]	753, 999							D	D	D		
School, Private	821, 824, 829						D					P
School, Vocational	824										P	P
Supportive Living Home[13] [2015-1]	805, 836					D	P			P[44]		
		NC	LC1	LC2	LC3	MS	MX	HC	MAC3	MAC	DSC	D

TABLE 5.2: TABLE OF LAND USES - COMMERCIAL ZONES [2003-6]												
LAND USE TYPE	**SIC CODE**	**LAND USE ZONE***										
		NC	**LC1**	**LC2**	**LC3**	**MS**	**MX**	**HC**	**MAC3**	**MAC**	**DSC**	**D**
KEY: P=Permitted Use; D=Discretionary Use; Blank Space=Prohibited use												
SERVICES (continued)												
Tattoo Parlour [2001/10264]	999								P	P	P	P
Theatre [1997/9904; 2002-33]	7832					D			D	D	P	P
Theatre, Drive-In	7833							D				
TRANSPORTATION AND PUBLIC UTILITIES												
Ambulance Service [2008/37]	4119	D	D	D	D	P	D	D	D	P	D	D
Bus Terminal Operation [1996/9776]	417							D	D	D	D	P
Post Office	431					P				P		P
RETAIL TRADE [2003-6]												
Auction Room	5999											P
Automobile Sales and Service	551, 552							P	D	P	P	P
Bakery Shop [1995/9736; 1999/10110]]	5461	D	P	P	P	P			P	P	P	P
Convenience Store [2015-1]	999	P[45]	P[12]	P	D	P[12]	D[45]	D	P	P	P	P
Fast Food Outlet [1999/10110]	5812		D	D	D	D		P	P	P	P	P
Gas Bar [2014-81]	554		D	P		D		P	P D[43]	P	P	P
Grocery Store [1995/9736]	541		D	D	D	D			D	P	P	P
Home Improvement Centre	999					D		D	D	D	P	
House-Form Commercial	999						D					
Licensed Beverage Room	5812							P	P[7] D[16]	P		P
Licensed Cocktail Room [1995/9736]	5813		D	D	D	D		P	P[7] D[16]	P	P	P
Licensed Dining Room [1995/9736]	5812		D[7]	D[7]	D[8]	P[7] D[16]	D	P	P[7] D[16]	P	P	P
Licensed Restaurant [1995/9736]	5812		D[7]	D[7]	D[8]	P[7] D[16]	D	P	P[7] D[16]	P	P	P
Liquor Store	999		D	D		D		D	D	P	P	P
Mixed-Use Building [2013-64, 2014-44]	999	D	D	D	D	D	P		D	D	P	P
		NC	**LC1**	**LC2**	**LC3**	**MS**	**MX**	**HC**	**MAC3**	**MAC**	**DSC**	**D**

TABLE 5.2: TABLE OF LAND USES - COMMERCIAL ZONES [2003-6]												
LAND USE TYPE	SIC CODE	LAND USE ZONE*										
		NC	LC1	LC2	LC3	MS	MX	HC	MAC3	MAC	DSC	D
KEY: P=Permitted Use; D=Discretionary Use; Blank Space=Prohibited use												
RETAIL TRADE (continued)												
Mobile Home Sale[19]	527							P	D	P		
Night Club	5813							D	D	D	P	P
Recreation Vehicles[19]	556							P	D	P		
Restaurant [1995/9736]	5812	D_5	D_7	P_7	D_5	P_7 D_{16}	D	P	P_7 D_{16}	P	P	P
Restaurant, Drive-In[13]	5812							P		P		
Retail Use	54, 591, 5992-4	P^2	P^2 D^9	P^2	P^{12}	P^{15}	D	P^{14} D^{17}	P^{14} D^{17}	P^{20} D^{21}	P	P
Service Station[10]	554		D^{10}	P^{10}		D		P	P^{10}	P	P	P
Shopping Centre [2015-1]	999	P^{46} D^{47}	P^{46} D^{47}	P^{46} D^{47}	P^{46} D^{47}	P^{46} D^{47}	D	P^{46} D^{47}	P^{46} D^{47}	P^{46} D^{47}	D	P
Snack Shop, Mobile	5963									D		
WHOLESALE TRADE												
Farm Machinery and Equipment, Sale Rental	5083							D	D			
CULTURE AND RECREATION												
Art Gallery or Museum [2013-8; 2013-64]	841		P^2	P^2	P^{12}	P	P		P	P	P	P
Community Garden [2006-63]	999	P	P	P	P	P	P	P	P	P	P	P
Public Use[31] [2003-1]	999	P	P	P	P	P	P	P	P	P	P	P
Rink, Enclosed	999					D		D				
		NC	LC1	LC2	LC3	MS	MX	HC	MAC3	MAC	DSC	D

Notes:

* Land use zone abbreviations are explained in Chapter 3.

1 200m² or less in gross floor area. For office uses in the LC1, LC2, and NC zones, this limitation is on a single lot basis.
2 300m² or less in gross floor area. For retail uses in the LC1, LC2, and NC zones, this limitation is on a single lot basis.
3 Dwelling units in the same building as a permitted or discretionary use in the zone.
4 Deleted.
5 Maximum seating capacity of 50 persons.
6 Floor area greater than 300m².
7 Maximum seating capacity of 100.
8 Floor area greater than 200m² is at Council's discretion. For office uses in the LC1, LC2 zones, this limitation is on a single lot basis.
9 Floor area greater than 300m² is at Council's discretion. For retail uses in the LC1 zone, this limitation is on a single lot basis.
10 Maximum of 3 service bays.
11 Repealed. [2015-1]
12 150m² or less in gross floor area. Gross floor area greater than 150m² but less than 300m² is at Council's discretion. [2015-1]
13 Refer to the regulations in Subpart 6D.2.
14 500m² or less in gross floor area. For office uses in the MAC, MAC3 and MS zones, this limitation is on a single lot basis.
15 850m² or less in gross floor area on a single lot. Gross floor area greater than 850m² is at Council's discretion.

TABLE 5.2: TABLE OF LAND USES - COMMERCIAL ZONES [2003-6]												
LAND USE TYPE	SIC CODE	LAND USE ZONE*										
		NC	LC1	LC2	LC3	MS	MX	HC	MAC3	MAC	DSC	D
KEY: P=Permitted Use; D=Discretionary Use; Blank Space=Prohibited use												

TABLE 5.2: TABLE OF LAND USES - COMMERCIAL ZONES [2003-6]												
LAND USE TYPE	SIC CODE	LAND USE ZONE*										
		NC	LC1	LC2	LC3	MS	MX	HC	MAC3	MAC	DSC	D

Notes: (continued)

16 Capacity greater than 100 persons.
17 More than 500m² in gross floor area. For uses in the MAC, MAC3 and MS zones, this limitation is on a single lot basis. [1995/9736]
18 Repealed. [2003-6]
19 Includes display, sale, rental, service, and parts.
20 1000m² or less in gross floor area. For retail uses in the MAC zone, this limitation is on a single lot basis.
21 More than 1000m² in gross floor area. For retail uses in the MAC zone, this limitation is on a single lot basis. [1995/9736]
22 Repealed [2003-1]
23 1500m² or less in gross floor area.
24 Refer to the regulations in Subpart 6D.3
25 Refer to the regulations in Subpart 6D.5.
26 Deleted. [2006-14]
27 Refer to the regulations in Subpart 6D.1.
28 Refer to the regulations in Subpart 9D.1 and development standards for the I-Institutional zone in Table 5.9. [1997/9904]
29 Refer to the regulations in Subpart 4C.1.
30 Refer to the regulations in Subpart 7D.3. [1997/9904]
31 Refer to the regulations in Subpart 4C.2.
32 Refer to the regulations in Subpart 7D.1. [1997/9904]
33 Refer to the regulations in Subpart 7D.2. [1997/9904]
34 Gross floor area greater than 200m² but less than 300m² is at Council's discretion.
35 The storage of items to be repaired shall be indoors, or within an enclosed compound in accordance with the regulations under Subpart 4C.4. [1996/9776].
36 Refer to the regulations in Subpart 6B.11. [1997/9904]
37 Maximum seating capacity of 100 persons in the licensed portion of the facility. [2003-6]
38 Maximum seating capacity of 50 persons in the licensed portion of the facility. [2003-6]
39 Seating capacity of greater than 100 persons in the licensed portion of the facility. [2003-6]
40 Permitted use where the gross floor area is 1000m², or less, on a single lot basis, and discretionary use where there is a gross floor area of greater that 1000m². [2012-45]
41 Permitted use only on properties that front Angus Street and Osler Street in the D – Downtown zone.
42 Permitted in accordance with the requirements of subsection 7C.10.5(8) of this Bylaw.
43 Only where the site directly interfaces a residential property. [2014-81]
44 Permitted only if located in an existing building constructed and previously used a detached dwelling. [2015-1]
45 150m² or less in gross floor area. [2015-1]
46 If less than the maximum permitted floor area for Retail Use in the zone. [2015-1]
47 If greater than the maximum permitted floor area for Retail Use in the zone. [2015-1]

TABLE 5.3: TABLE OF LAND USES – INDUSTRIAL ZONES [2003-6]							
LAND USE TYPE	SIC CODE	LAND USE ZONE[1]					
		IA, IA1	IB, IB1	IC, IC1	IP	IT	WH
KEY: P=Permitted Use; D=Discretionary Use; Blank Space=Prohibited use							
RESIDENTIAL							
Dwelling Unit, In Reconstructed Building [1996/9776]	999	D[36]					D
Dwelling Unit, Detached	999	D					
Home-Based Business[1997/9904;2006-14][37]	999	P	P			P	P
Secondary Suite [2001-91]	999	P					
AGRICULTURE							
Animal Hospital	074	P			D	P	P
Animal Shelter	0752	P	P	P		P	
Agricultural Production [1996/9904]	01	P	P	P			
Feedlot, Livestock	021			P[13]			
Horticultural Specialities	018		P			P	
Poultry Hatchery	0254	P	P	P		P	
Vegetable, Production	016		P			P	
CONSTRUCTION							
Sheet Metal Work	1761		P	P			
Storage, Outdoor of Contractor or Builder's Equipment[25]	999	P	P	P		P	
FINANCIAL AND REAL ESTATE							
Financial Institution	60	D			P	P	
Office, General [2008-35, 2012-45]	999	D[30]					D
Office, Industry [2012-45]		P[41]			P[41]	P[41]	
MANUFACTURING [2003-1]							
Assembling, Parts	999	P	P	P		P	
Bakery	205	P	P	P			
Biscuit Plant	205	P	P	P			
Bottling and Canning	999	P	P				
Bottling and Canning, Soft Drinks and Carbonated Water	2086	P	P	P		P	
Brewery/Distillery	208	P	P	P			
		IA, IA1	IB, IB1	IC, IC1	IP	IT	WH

TABLE 5.3: TABLE OF LAND USES - INDUSTRIAL ZONES [2003-6]							
LAND USE TYPE	SIC CODE	LAND USE ZONE[1]					
		IA, IA1	IB, IB1	IC, IC1	IP	IT	WH
KEY: P=Permitted Use; D=Discretionary Use; Blank Space=Prohibited use							
MANUFACTURING (continued)							
Dyeing, Fur	3999	P[11]	P[11]	P[12]		P[11]	
Dyeing, Textiles and Wool	225, 226	P	P	P			
Machine Shop, Jobbing and Repair	3599	P	P	P		P	
Manufacture, Agriculture Chemical	287			D			
Manufacture, Chemical	28			D			
Manufacture, General[14]	20-27, 29-39	P[14]	P	P		P	
Manufacture, Ice	2097		D	D[17]			
Manufacture, Industrial Inorganic Chemical	281			D			
Manufacture and Processing, Dairy Products	202	P	P	P			
Meat Packing Plant	2011, 2015 [2000/10214]			D			
Mixing, General	999		D	D		D	
Mixing, Ink	999	P[5]	P[6]	P[6]		P	
Prefabricated Home[2]	245	P				P	
Printing, Commercial	27	P	P		D[20]	P	P
Processing, Food[18]	20		P	P			
Processing, Rock and Gravel[15]	999			P			
Publishing or Publishing and Printing, Newspaper	271	P				P	P
Sandblasting, Metal	3471		D	P		D	
Silvering, Mirror	999	D	D	D		D	
SERVICES [2003-6]							
Amusement Arcade	7993						D
Amusement Arcade, Licensed	7993						D
Automobile Rental and Leasing[26]	751	P	P			P	
Bingo Parlour	7999	D			D		P
Blacksmith Shop	7699		P	P			
Bowling Centre	793	D	D		D		D
Car Wash[27]	7542	P	P	P		P	
Cleaning, Carpet and Rug	721	P	P	P		P	
		IA, IA1	IB, IB1	IC, IC1	IP	IT	WH

TABLE 5.3: TABLE OF LAND USES - INDUSTRIAL ZONES [2003-6]							
LAND USE TYPE	SIC CODE	LAND USE ZONE[1]					
		IA, IA1	IB, IB1	IC, IC1	IP	IT	WH
KEY: P=Permitted Use; D=Discretionary Use; Blank Space=Prohibited use							
SERVICES (continued)							
Club [2003-6]	999	P	P		P	P	P
Club, Licensed [2003-6]	999	P	P		P	P	P
College, Community	8222						P
Community Centre [2003-2]	999	P	P		P	P	P
Crematory	7261	P	P	P			
Day Care Centre, Child[28] [1995/9736]	835	D	D	D	D[30]		D
Day Care Centre, Adult[28] [1995/9736]	999	D	D	D	D[30]		D
Dry Cleaning Plant	7216	D	D			D	D
Funeral Home	726	D					
Hotel	701				D		
Humanitarian Service Facility [2003-2]	999	P	P		P	P	P
Laboratory, Industrial	8731	D	D	D		D	D
Laboratory, Medical/Dental	807	P			D		P
Laundry Plant	721	P	P			P	P
Medical Clinic [2015-1]	801,802				D		
Motel	701				D		
Nursery School[28] [2003-1]	999	D	D	D	D[30]		D
Parking, Off-site Caveated	999	D	D			D	
Parking Lot, Paved [2002-2]	7521	D					
Personal Service [1995/9736]	72	P				P	P
Pool Hall	7999	D					P
Pool Hall, Licensed	7999	D					P
Public Self Storage Facility [1996/9821]	999	P	P	P	P	P	P
Recreational Service Facility [2003-6]	999	P	P		P	P	P
Recreational Service Facility, Licensed [2003-6]	999	P	P		P	P	P
Repair Service	999	P	P	P		P	P
Repair Shop [1994/9572]	75, 999	P	P	P	P[19]	P	P
School, Vocational	824	D	D		D	P	P
Sharpening & Repair, Knives, Saws, Tools	7699	P	P	P		P	
Tattoo Parlour [2001/10264]	999	P	P			P	P
Taxidermy Shop	7699	P	P	P		P	
Tire Retread Shop [1995/9736]	7534	P	P	P		P	
Truck Wash [2013-64]		P	P	P		P	
		IA, IA1	IB, IB1	IC, IC1	IP	IT	WH

TABLE 5.3: TABLE OF LAND USES - INDUSTRIAL ZONES [2003-6]							
LAND USE TYPE	SIC CODE	LAND USE ZONE[1]					
		IA, IA1	IB, IB1	IC, IC1	IP	IT	WH
KEY: P=Permitted Use; D=Discretionary Use; Blank Space=Prohibited use							
TRANSPORTATION AND PUBLIC UTILITIES							
Ambulance Service	4119	P					
Crating Services	4783		P	P		P	P
Railroad Transportation	40			D			
Storage, Natural Gas	4922			D			
Terminal, Truck and Freight	4231		P	P			
Warehousing[3]	4225	P	P	P	P[19]	P	P
Warehousing/Processing, Hazardous Materials/Wastes[29]	999	D[19]	D[19]	D[19]	D[19]	D[19]	D[19]
Warehousing, Refrigerated	4222	P	P	P		P	P
RETAIL TRADE							
Adult Arcade[35] [1995/9736]	999	D	D	D			
Adult Entertainment Establishment[35] [2014-8]	999	D	D	D			
Adult Motion Picture Theatre[35] [1995/9736]	999	D	D	D			
Adult Retail Outlet/Bookstore[35] [1995/9736]	999	D	D	D			
Auction Room	5999	D				D	D
Automobile Sales and Service[36] [2001/10264]	551, 552	P	P			P	
Convenience Store [2015-1]	999	P			D	P	
Gas Bar	554	P	P	P		P	
Home Improvement Centre	999	D			D		
Licensed Beverage Room	5812				D		
Licensed Cocktail Room	5813	D			D	D	D
Licensed Dining Room	5812	D			D	D	D
Licensed Restaurant	5812	D			D	D	D
Liquor Store	999					D	
Lumber Yard[25]	5211	P	P			P	
Massage Parlour[35] [1993/9559; 1995/9736]	999	D	D	D			
Mobile Home Sales[2,26]	527	P				P	
		IA, IA1	IB, IB1	IC, IC1	IP	IT	WH

TABLE 5.3: TABLE OF LAND USES - INDUSTRIAL ZONES [2003-6]							
LAND USE TYPE	SIC CODE	LAND USE ZONE[1]					
		IA, IA1	IB, IB1	IC, IC1	IP	IT	WH
KEY: P=Permitted Use; D=Discretionary Use; Blank Space=Prohibited use							
RETAIL TRADE (continued)							
Night Club	5813	D			D		D
Recreation Vehicles[26]	556	P				P	
Restaurant [2014-45]	5812	D	D		D	D	D
Restaurant, Drive-in[10]	5812	D					
Retail, General	999	P[3]	P[3]	P[3]	P[3]	P[3]	P[23] D[24]
Retail, Small Equipment and Supplies	999	P[4]	P[4]	P[18]		P[4]	
Service Station[31]	554, 5984 [1997/9904]	P	P	P		P	
WHOLESALE TRADE							
Farm and Large Machinery, Sale and Rental[26]	50	P	P	P			
Salvaging and Recycling (Junk Yard)[32]	5015, 5093		D	D			
Storage and Terminal, Petroleum	517			D			
Wholesale[3] [1995/9736]	999	P	P	P	P	P	P
CULTURE AND RECREATION							
Art Gallery or Museum [2013-8]	841						P
Community Garden [2006-63]	999	P	P	P	P	P	P
MISCELLANEOUS							
Public Use[33]	999	P	P	P	P	P	P
Rink, Enclosed	999	D					
		IA, IA1	IB, IB1	IC, IC1	IP	IT	WH

Notes:

1 Land use zone abbreviations are explained in Chapter 3.
2 Includes display, sale, rental, service, and parts.
3 Of any article or commodity for which the warehousing, storage, sale at retail or wholesale, fabrication, processing or manufacture is allowed in the zone.
4 Small equipment, supplies and materials for agriculture, mining, industry, business, transportation, building and other construction, except explosives.
5 On the same site as the industrial use, and for a watchman or caretaker and family whose duties are essential to the security of the industrial use.
6 Includes packaging.
7 Only inorganic pigments, nitrogen and oxygen are allowed.
8 Of any article, vehicle or commodity which is sold, stored, manufactured, packaged or assembled as a permitted use on the premise.
9 Of completely fabricated, processed or manufactured materials.
10 See "Automobile Repair".
11 Except tanning.
12 Includes tanning.
13 Except dairy and poultry.
14 Includes processing and storage of any goods, except nuclear processing or generating establishments.
15 Does not include mining.

TABLE 5.3: TABLE OF LAND USES - INDUSTRIAL ZONES [2003-6]							
LAND USE TYPE	SIC CODE	LAND USE ZONE[1]					
		IA, IA1	IB, IB1	IC, IC1	IP	IT	WH
KEY: P=Permitted Use; D=Discretionary Use; Blank Space=Prohibited use							

Notes: (continued)

16 Small equipment, supplies and materials for agriculture, mining, industry, business, transportation, building and other construction including explosives.
17 Storage also permitted.
18 Except SIC Industry Number 2011 and all those uses under Industry Number 2015 that involve the handling and slaughtering of live animals.
19 Indoor only.
20 In the same building as a permitted or discretionary use.
21 Less than 500m^2 in gross floor area.
22 Except SIC industry groups 261-262 and 301, as well as major groups 29 and 33-39.
23 1000m^2 or less in gross floor area. [1995/9736]
24 More than 1000m^2 in gross floor area. [1995/9736]
25 Refer to the regulations in Subpart 4C.4.
26 Refer to the regulations in Subpart 4C.3
27 Refer to the regulations in Subpart 7D.1. [1997/9904]
28 Refer to the regulations in Subpart 4C.1.
29 Refer to the regulations in Subpart 8D.2.
30 Refer to the regulations in Subpart 7D.2. [1997/9904]
31 Refer to the regulations in Subpart 7D.3. [1997/9904]
32 Refer to the regulations in Subpart 8D.1.
33 Refer to the regulations in Subpart 4C.2.
34 Except all uses noted in footnote 22 and SIC codes 2011, 2015, 207, 2091, 2092, 241, 242 and 28.
35 Refer to the regulations in Subpart 8D.3. [1995/9736]
36 This use may be accommodated only in the IA1 Zone. [1996/9776]
37 Refer to the regulations in Subpart 6D.3. [1997/9904]
38 Deleted. [2006-14]
39 Permitted use where there is a gross floor area (GFA) of up to 500m2 on a single lot basis, and discretionary use where there is a GFA of greater than 500m2. [2008-14]
40 Discretionary use where located in the Warehouse District, in accordance with the policies of the Official Community Plan. [2012-45]
41 Permitted use where the gross floor area is 1000m^2, or less, on a single lot basis. [2012-45]

TABLE 5.4: TABLE OF LAND USES - SPECIAL ZONES [2003-6]									
LAND USE TYPE	SIC CODE	LAND USE ZONE[1]							
		AIR	FW	I	PS	PUD	RR	UH	WC
KEY: P=Permitted Use; D=Discretionary Use; Blank Space=Prohibited use									
RESIDENTIAL									
Apartment, Seniors Assisted Living – Low Rise [2005-34]	999			D					
Apartment, Seniors Assisted Living – High Rise [2005-34]	999			D					
Detached Dwelling	999			D[2]		P		D[5]	
Detached Dwelling, Zero Lot Line	999					P			
Secondary Suite [2001-91]	999			P		P		P	
AGRICULTURAL									
Agricultural Production [1997/9904]	01		P					P	
Horticultural Specialties [1996/9776]	018		D					D	
Vegetable Production [1996/9776]	016		D					D	
PUBLIC ADMINISTRATION									
Fire Station	9224			P					
Police Station	9221			P					
SERVICES [2003-1; 2003-2; 2003-32]									
Amusement Park, Commercial	7996							D	
Aquarium, Indoor	8422			D					
Auditorium or Amphitheatre	999			D					
Bed and Breakfast Homestay [1995/9736][12]	702					D			
Campground	7033							D	
Care Home, Special[4]	805			D					
Cemetery	7261			D	D				
College, Community	8222			P					
Community Centre	999			P	P				
Convent	8661			D					
Day Care Centre, Adult [1995/9736][8]	999			P	D	D			
Day Care Centre, Child [1995/9736][9]	835			P	D	D			
		AIR	FW	I	PS	PUD	RR	UH	WC

TABLE 5.4: TABLE OF LAND USES - SPECIAL ZONES [2003-6]									
LAND USE TYPE	SIC CODE	LAND USE ZONE[1]							
		AIR	FW	I	PS	PUD	RR	UH	WC
KEY: P=Permitted Use; D=Discretionary Use; Blank Space=Prohibited use									
SERVICES (continued)									
Exhibition Operation	7999				D				
Golf Course or Golf Driving Range	7992, 7997, 7999		D		P			D	
Home-Based Business[10] [2006-14]	999					P			
Hospital	806			P					
Humanitarian Service Facility [2003-2]	999			D	D				
Individual and Family Social Service Home [2003-1]	999			D					
Job Training and Vocational Rehabilitation	833			P					
Library	823			P	D[5]				
Medical Clinic	801,802 [2015-1]				D[5]				
Nursery School[9] [2003-1]	999			P	D	D			
Religious Institution[2013-64][8]	866			D	D			D	
Rink, Curling	999				D				
Rink, Ice Skating	7999		D[1]		P[3] D[4]				
School, Private	821, 824, 829			P					
School, Public	821, 824, 829			P					
School, Vocational	824			P					
Stadium (Professional Sports Clubs and Promoters)[13]	7941				P[14]				
Supportive Living Home[6]	805					P			
Theatre, Drive-in	7833							D	
University, College and Professional School	8221			P					
Zoological Garden	8422			D					
		AIR	FW	I	PS	PUD	RR	UH	WC

TABLE 5.4: TABLE OF LAND USES - SPECIAL ZONES [2003-6]									
LAND USE TYPE	SIC CODE	LAND USE ZONE[1]							
		AIR	FW	I	PS	PUD	RR	UH	WC
KEY: P=Permitted Use; D=Discretionary Use; Blank Space=Prohibited use									
TRANSPORTATION AND PUBLIC UTILITIES									
Ambulance Service	4119			D					
Licensed Restaurant	5812				D[5]				
Personal Service	999				D[5]				
Post Office	431			P					
Railroad Transportation	40						P		
Restaurant	5812				D[5]				
Truck and Freight Terminals [2009-24]	4231						P		
Warehousing	42						D		
CULTURE AND RECREATION									
Art Gallery or Museum	841			P	D[5]				
Community Garden [2006 - 63]	999	P	P	P	P	P	P	P	P
MISCELLANEOUS									
Park and Open Space [1999/10120; 2003-32]	999		D	P	P				
Public Use[11] [2003-1]	999		P	P	P	P	P	P	
		AIR	FW	I	PS	PUD	RR	UH	WC

Notes:

1 Land use zone abbreviations are explained in Chapter 3
2 Accessory to a permitted or discretionary use.
3 Outdoor.
4 Indoor.
5 Only in conjunction with municipally owned or operated recreational facility.
6 Refer to the regulations in Subpart 6D.2.
7 Deleted. [2006-14]
8 Refer to the regulations in Subpart 9D.1 and development standards for the I-Institutional zone in Table 5.9. [1997/9904]
9 Refer to the regulations in Subpart 4C.1.
10 Refer to the regulations in Subpart 6D.3.
11 Refer to the regulations in Subpart 4C.2.
12 Refer to the regulations in Subpart 6D.1. [1995/9736]
13 Refer to the regulations in Subpart 9D.2
14 Repealed. [2015-1]

PART 5C

DEVELOPMENT STANDARDS

5C.1 TABLE OF ZONE STANDARDS

1.1 APPLICATION

All uses of land or development of land in every land use zone shall conform to the development standards applicable to that zone or use provided in this Part. [1992/9250]

1.2 DWELLING UNITS

(1) Unless otherwise specified on the Zoning Maps, every dwelling unit in a residential zone must conform to the standards in Table 5.6 applicable to the land use zone in which it is located, respecting the:

(a) gross area of the lot;

(b) site frontage;

(c) coverage;

(d) floor area ratio;

(e) principal building setback from the front, rear and side property lines; and

(f) building height. [1999/10113]

(2) Unless otherwise specified, all standards in Table 5.6 are the minimum required standards. [1992/9250]

TABLE 5.6: DWELLING UNIT DEVELOPMENT STANDARDS [2011-61]

DEVELOPMENT STANDARD AND DWELLING TYPE	LAND USE ZONE										
	R1	R1A	R2	R3	R4	R4A	R5	R6	R8	R7	TAR
MINIMUM LOT AREA (m^2)											
Detached	325	250	325	250	250	250	250	325	325		250
Detached zero lot Corner lot Others	315 250	315 250	315 250	315 250	315 250	315 250	315 250	315 250	315 250		315 250
Semi-detached [1999/10113; 2001/10264; 2013-64, 2014-44] Semi-detached (front to back) [2014-44]			250[4] 210[4,7] 325	250 210[7]	250 210[7]	250 210[7]	250 210[7]	250 210[7]	250 210[7]	n/a	250 210[7]
Duplex	n/a	n/a	325	250	250	250	250	325	325		250
Fourplex			n/a	n/a	n/a	500	500	500	n/a		500
Triplex						500	500	500			500
Townhouse unit[4] [1999/10113]					120	120	120	120			120
Apartment[*]					n/a	500	500	500			250
Converted house[1]						250	n/a				250
Mobile home						n/a	n/a			400	n/a
MINIMUM LOT FRONTAGE (m)											
Detached	10.5	7.5	10.5	7.5	7.5	7.5	7.5	10.5	10.5		7.5
Detached zero lot Corner lot Others	10.5 9	10.5 9	10.5 9	10.5 9	10.5 9	10.5 9	10.5 9	10.5 9	10.5 9		10.5 9
Semi-detached [1999/10113; 2001/10264; 2013-64, 2014-44] Semi-detached (front to back) [2014-44]			7.5[4] 6.7[4,7] 10.5	7.5 6.7[7]	7.5 6.7[7]	7.5 6.7[7]	7.5 6.7[7]	7.5 6.7[7]	7.5 6.7[7]	n/a	7.5 6.7[7]
Duplex	n/a	n/a	10.5	7.5	7.5	7.5	7.5	10.5	10.5		7.5
Fourplex			n/a	n/a	N/a	15	15	15	n/a		15
Triplex						15	15	15			15
Townhouse unit[4] [1999/10113]					4	4	4	4			4
Apartment[*]					n/a	15	15	15			7.5
Converted house[1]						7.5	n/a				7.5
Mobile home						n/a	n/a			12	n/a
	R1	R1A	R2	R3	R4	R4A	R5	R6	R8	R7	TAR

TABLE 5.6: DWELLING UNIT DEVELOPMENT STANDARDS [2011-61]											
DEVELOPMENT STANDARD AND DWELLING TYPE	**LAND USE ZONE**										
	R1	**R1A**	**R2**	**R3**	**R4**	**R4A**	**R5**	**R6**	**R8**	**R7**	**TAR**
MINIMUM FRONT YARD SETBACK (m)											
Detached[8]	6	6	6	6	6	6	6	6	5.5	6	5
Detached zero lot	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Semi-detached[8] [2001/10264]	6									n/a	5
Duplex[8]											
Fourplex[8]											
Triplex[8]											
Townhouse unit[8]											
Apartment[+]											
Converted house[1]	6									n/a	5**
Mobile home	n/a									5	N/a
MINIMUM REAR YARD SETBACK (m) [1997/9904]											
Detached	5									n/a	5
Detached zero lot Corner lot Others											
Semi-detached [2001/10264]											
Duplex											
Fourplex											
Triplex											
Townhouse unit											
Apartment[+]	5										nil
Converted house[1]	5									n/a	5
Mobile home	n/a									4	n/a
	R1	**R1A**	**R2**	**R3**	**R4**	**R4A**	**R5**	**R6**	**R8**	**R7**	**TAR**

TABLE 5.6: DWELLING UNIT DEVELOPMENT STANDARDS [2011-61]

DEVELOPMENT STANDARD AND DWELLING TYPE	LAND USE ZONE										
	R1	R1A	R2	R3	R4	R4A	R5	R6	R8	R7	TAR
MINIMUM SIDE YARD SETBACK (m)											
Detached	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	n/a	1.2
Detached zero lot Corner Others	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]	1.8[2]		1.8[2]
Semi-detached [2001/10264]	n/a	n/a	1.2[5]	1.2[5]	1.2[5]	1.2[5]	1.2[5]	1.2[5]	1.2[5]		1.2[5]
Duplex			1.2	1.2	1.2	1.2	1.2	1.2	1.2		1.2
Fourplex	n/a				N/a	1.2	1.2	1.2	n/a	n/a	1.2
Triplex						1.2	1.2	1.2			1.2
Townhouse unit					1.2[3]	1.2[3]	1.2[3]	1.2[3]			1.2[3]
Apartment[+]	1/4 of the height of the proposed wall adjacent to the side lot line to a maximum of 6 metres.										Nil
Converted house[1]	N/a										1.2
Mobile home	n/a									*	n/a
MAXIMUM COVERAGE (%)											
Detached Detached zero lot Corner Others Semi-detached [2001/10264] Duplex Fourplex Triplex Townhouse unit	50%										
Apartment[+]	50%										65%
Converted house[1]	n/a										50%
Mobile home	n/a									50%	n/a
	R1	R1A	R2	R3	R4	R4A	R5	R6	R8	R7	TAR

TABLE 5.6: DWELLING UNIT DEVELOPMENT STANDARDS [2011-61]

DEVELOPMENT STANDARD AND DWELLING TYPE	LAND USE ZONE										
	R1	R1A	R2	R3	R4	R4A	R5	R6	R8	R7	TAR
MAXIMUM FLOOR AREA RATIO											
Detached Detached zero lot corner lot others Semi-detached [2001/10264]	0.75										
Duplex Fourplex Triplex Townhouse unit	0.85										
Apartment[+6]	3.00										**
Converted house[1] Mobile home	0.50										0.75
MAXIMUM BUILDING HEIGHT (m)											
	11	11	11	11	11	13	11	20[6]	11	nil	**
	R1	**R1A**	**R2**	**R3**	**R4**	**R4A**	**R5**	**R6**	**R8**	**R7**	**TAR**

Notes:

1 Includes rooming house in all zones, and house form commercial/residential building, library and private school in the TAR zone. [2003-2]
2 Total of both sides.
3 End units only.
4 Development standards shown are per unit, not per building. [1999/10113]
5 Where the 2 units are on separate lots, the total side yard requirement (total of both sides) for each lot is 1.2 metres. Where the 2 units are on the same lot, each side yard must be a minimum of 1.2 metres. [2001/10264]
6 Apartment buildings with a height of more than 13 metres are discretionary uses in the R6 zone. See Table 5.1. [2004-1]
7 Reduced lot area and lot frontages shall only apply to semi-detached dwelling units on lots with rear lane/alley access.
8 Reduced setbacks may be permitted in accordance with Subpart 6B.6 of Chapter 6.
N/A Not Applicable
* Refer to Subpart 6C.9 of Chapter 6.
** Refer to Subpart 6C.11 of Chapter 6.
+ In the TAR zone, includes low-rise and seniors assisted living apartments. [2005-34]

1.3 COMMERCIAL ZONES

(1) Unless otherwise specified on the Zoning Maps, every use of land or development in a commercial zone must conform to the standards in Table 5.7 applicable to that land use zone and the proposed use, respecting the:

(a) gross area of the lot;

(b) site frontage;

(c) coverage;

(d) floor area ratio;

(e) principal building setback from the front, rear and side property lines; and

(f) building height.

(2) Unless otherwise specified, all standards in Table 5.7 are the minimum required standards. [1992/9250]

TABLE 5.7: COMMERCIAL ZONE DEVELOPMENT STANDARDS

DEVELOPMENT STANDARD	LAND USE ZONE										
	D	DSC	HC	LC1	LC2	LC3	MAC	MAC3	MS	MX	NC
MINIMUM LOT AREA (m^2)		750	750	250	250	100	250	250	250	250 500[4]	250
MINIMUM FRONTAGE (m)		25	22.5	6	6	5	6	6	6	6 15[4]	6
MINIMUM FRONT YARD SETBACK (m)		7.5[5]	7.5	6	6	nil[3]	nil	7.5	nil	5	5
MINIMUM REAR YARD SETBACK (m) [1999/10113]		9[5]	9	nil	nil	nil	1/4 of the height of the adjacent wall to a maximum of 6 metres	1/4 of the height of the adjacent wall to a maximum of 6 metres	3[1]	1/4 of the height of the adjacent wall to a maximum of 6 metres	1/4 of the height of the adjacent wall to a maximum of 6 metres
MINIMUM SINGLE SIDE YARD SETBACK (m)	See Subpart 7C.10, Chapter 7	nil[5]	2.5	nil	nil	nil	nil	nil	nil[1]	nil	Nil
MINIMUM TOTAL SIDE YARD SETBACK (m)		nil[5]	7	nil	nil	nil	nil	nil	nil[1]	nil	Nil
MAXIMUM SITE COVERAGE (%)		65	50	65	65	100	90	65	65	65	65
MAXIMUM BUILDING HEIGHT (m) [2012-45]		13[5]	15	13	13	13	15[6]	15	15	15	11[2]
MAXIMUM FLOOR AREA RATIO		See Zoning Maps[1]	2.0	1.75	1.75	2.0	3.0	3.0	1.0	3.0	1.75
	D	DSC	HC	LC1	LC2	LC3	MAC	MAC3	MS	MX	NC

Notes:

1 See details in Subpart 7C.5, Chapter 7.
2 Repealed. [2003-1]
3 Additional setback standards are provided in Section 4.5, Subpart 7C.4, Chapter 7.
4 Mixed-use buildings only. [1995/9736]
5 Refer to 7C.9.5(11) for development standards for residential and mixed use buildings. [2002-6]
6 Where this zone applies to lands identified for mid-rise office buildings, in accordance with the office policies of the Official Community Plan, a maximum building height of up to 30m may be considered as a discretionary use. [2012-45]

1.4 INDUSTRIAL ZONES

(1) Unless otherwise specified on the Zoning Maps, every use of land or development in an industrial zone must conform to the standards in Table 5.8 applicable to that land use zone and the proposed use, respecting the:

(a) gross area of the lot;

(b) site frontage;

(c) coverage;

(d) floor area ratio;

(e) principal building setback from the front, rear and side property lines; and

(f) building height.

(2) Unless otherwise specified, all standards in Table 5.8 are the minimum required standards. [1992/9250]

TABLE 5.8: INDUSTRIAL ZONE DEVELOPMENT STANDARDS

DEVELOPMENT STANDARD	LAND USE ZONE					
	IT[11]	IC1, IC	IP	IA1, IA	IB1, IB	WH
MINIMUM LOT AREA (m^2)	500	750[3] 4000	2000	200[1] 500	500[2] 2000	500
MINIMUM FRONT YARD SETBACK (m)	7.5	7.5[3] 15	9	0[1] 7.5	0[2,11] 7.5	0
MINIMUM FRONTAGE (m)	15	25[3] 60	30	6[1] 15	15[2] 30	15
MINIMUM REAR YARD SETBACK (m) [1999/10113]	50% of the height of the adjacent wall			50% of the height of the adjacent wall[4]	50% of the height of the adjacent wall	25% of the height of the adjacent wall to a maximum of 6 metres
MINIMUM SINGLE SIDE YARD SETBACK (m)	Nil					
MINIMUM TOTAL SIDE YARD SETBACK (m)	20% of the average lot width to a maximum of 3 metres	20% of the average lot width to a maximum of 7.5 metres[5]	20% of the average lot width to a maximum of 7.5 metres	20% of the average lot width to a maximum of 7.5 metres[6]	20% of the average lot width to a maximum of 7.5 metres[7]	Nil
MAXIMUM SITE COVERAGE (%)	75	65[9]	50	50[10]	75	90
MAXIMUM BUILDING HEIGHT (m)	15					
MAXIMUM FLOOR AREA RATIO	2.0	2.0	1.5	1.5[8]	2.0	4.0
	IT[12]	IC1, IC	IP	IA1, IA	IB1, IB	WH

Notes:

1 Sites in (IA1) zones only.
2 Sites in (IB1) zones only. See also Subpart 8C.2, Chapter 8.
3 Sites in (IC1) zones only.
4 Except in (IA1) zones, where the minimum rear yard shall be 25% of the height of the adjacent wall. [1999/10113]
5 The maximum for sites in (IC1) zones shall be 3 metres.
6 Nil for (IA1) zones. [1994/9572]
7 The maximum for sites in (IB1) zones shall be 3 metres.
8 Except sites in (IA1) zones, where the maximum FAR is 3.0.
9 Except sites in (IC1) zones, where the maximum coverage is 75%.
10 Except sites in (IA1) zones, where the maximum coverage is 65%.
11 Exceptions for the Ross Industrial Subdivision and the Alliance Industrial Subdivision are provided in Section 2.5, Subpart 8C.2, Chapter 8.
12 Refer to Subpart 10C.7, Chapter 10, for development standards for portions of this zone lying within the Innismore Industrial Transitional Overlay Zone.

1.5 SPECIAL ZONES

(1) Unless otherwise specified on the Zoning Maps, every use of land or development in a special zone must conform to the standards in Table 5.9 applicable to that land use zone and the proposed use, respecting the:

(a) gross area of the lot;

(b) site frontage;

(c) coverage;

(d) floor area ratio;

(e) principal building setback from the front, rear and side property lines; and

(f) building height.

(2) Unless otherwise specified, all standards in Table 5.9 are the minimum required standards. [1992/9250]

TABLE 5.9: SPECIAL ZONE DEVELOPMENT STANDARDS [1999/10113]

DEVELOPMENT STANDARD	LAND USE ZONE								
	AIR	DC	FW	I	PS	PUD[3]	RR	UH	WC
MINIMUM LOT AREA (m^2)	Consult with Transport Canada	See Chapter 9 Subpart 9C.3	500	500	500	250[1] 315[2]	2000	3500	Consult with the Wascana Centre Authority
MINIMUM FRONTAGE (m)			15	15	15	9[1] 10.5[2]	30	40	
MINIMUM FRONT YARD SETBACK (m)			7.5	7.5	7.5	5.5	7.5	7.5	
MINIMUM REAR YARD SETBACK (m)			25% of depth of lot	6	25% of depth of lot	5	50% of the height of the adjacent wall	25% of depth of lot	
MINIMUM SIDE YARD SETBACK (m)			3	3	3	See Chapter 9, Subpart 9C.7, Section 7.7	nil	3	
MINIMUM TOTAL SIDE YARD SETBACK (m)			6	6	6		25% of the average width of the lot to a maximum of 7.5	6	
MAXIMUM SITE COVERAGE (%)			75	75	75	50	75	17	
MAXIMUM BUILDING HEIGHT (m)			15	15	15	11	15	15	
MAXIMUM HEIGHT OF ACCESSORY BUILDING (m)			nil	nil	nil	4	nil	nil	
MAXIMUM FLOOR AREA RATIO			.75	1.5	.75	.75	2.0	.25	
	AIR	DC	FW	I	PS	PUD	RR	UH	WC

Notes:
1 Interior lot.
2 Corner lot.
3 Detached dwelling units only.

Appendix L

14. PARKING AND LOADING REGULATIONS

PART 14A

PURPOSE OF CHAPTER

(1) The purpose of this Chapter is to establish minimum off-street parking standards necessary for the parking needs of the various land uses allowed in this Bylaw.

(2) Minimum standards are provided for the loading and unloading of goods for various commercial and industrial uses. Also, mechanisms are provided to encourage the use of alternative modes of transportation.

(3) The intent is to:

(a) protect the capacity of the City's street system and avoid undue congestion of the streets; and

(b) lessen conflicts between pedestrians and vehicles. [1992/9250]

PART 14B

PARKING REGULATIONS FOR ALL LAND USES

14B.1 APPLICATION OF OFF-STREET PARKING REQUIREMENTS

1.1 NEW, ALTERED OR CHANGED USES

The requirements of this Chapter apply to every development, whether:

(a) a new building or structure;

(b) an alteration or enlargement of an existing structure or building; or

(c) a change in use of an existing building or structure. [1992/9250]

1.2 COUNTING RULES - SINGLE AND MULTIPLE USES

(1) The parking requirements for a single lot or building containing more than one use shall be the total of the parking requirements for each use on the lot or in the building.

(2) No parking space provided to meet the requirements for one building or use shall be counted as part of the spaces required for another building or use, except as detailed in Subpart 14B.6 or 14B.7. [1992/9250]

1.3 COMPLIANCE WITH REGULATIONS - OWNER'S OBLIGATION

As long as a use exists on a property, and the use is required to provide parking spaces by this Bylaw, it shall be the continuing obligation of the owner and occupant of the property on which the use is situated to provide the parking spaces. [1992/9250]

1.4 TANDEM PARKING

Unless otherwise specified in this Bylaw, no parking spaces shall be provided as tandem parking. [2003-1]

1.5 MUNICIPAL HERITAGE PROPERTY AND PROVINCIAL HERITAGE PROPERTY[2013-64]

(1) Notwithstanding any other parking requirements contained within the *Regina Zoning Bylaw, 9250*, development of designated Municipal Heritage Property and Provincial Heritage Property shall not be required to provide parking and loading facilities in accordance with the provisions of Chapter 14.

(2) Where required, the number of parking spaces existing upon Municipal Heritage Property and Provincial Heritage Property, at the time of such heritage designation, shall be maintained with any development approved after such date.

14B.2 DETERMINATION OF STATUS

2.1 UNSPECIFIED REQUIREMENTS

(1) Where the parking requirements of any use allowed by this Bylaw is not specified, the Development Officer shall:

(a) establish an interim standard to allow the developer to proceed with his project; and

(b) recommend an amendment to this Bylaw to incorporate the interim standard.

(2) In establishing the interim standard, the Development Officer shall be guided by the standards for similar uses in the City. [1992/9250]

2.2 FRACTIONAL SPACES

If in determining the number of required parking spaces a fractional space is arrived at:

(a) any fraction up to and including one-half shall be disregarded; and

(b) fractions over one-half shall be deemed to be equivalent to one space. [1992/9250]

14B.3 REGULATIONS FOR NON-RESIDENTIAL PARKING

All surface parking lots and parking garages associated with non-residential uses shall be developed in accordance with the provisions of this Subpart. [1992/9250]

3.1 LOCATION

(1) Subject to subsections (2) and (3), all parking spaces shall be located:

(a) on the same building site as the uses they serve; or

(b) subject to the registration of a caveat as described in section 3.14, on a separate lot in a zone which allows caveated parking.

(2) The lot dedicated to off-site caveated parking in accordance with clause (1)(b), shall be located:

(a) in the D - Downtown Zone, no further than 150 metres from the lot for which it is being provided; and

(b) in all other zones, no further than 30 metres from the lot for which it is provided.

(3) Subsections (1) and (2) do not apply to parking provided in connection with the payment-in-lieu of parking described in section 3.15. [1992/9250; 1993/9488]

3.2 APPROACH RAMP LOCATION

(1) The location of vehicular approach ramps or driveways at the street line shall be no closer than 10 metres from the point of intersection of the two curbs at a street intersection. [2015-1]

(2) Where:

(a) the approach ramp will provide access to a parkade that will be part of a new building or part of an addition to an existing building; and

(b) there will be a grade difference from the parkade to the street or alley;

the ramp shall provide a flat area of not less than 5.5 metres and with a maximum slope of 2% for vehicles to stop before they proceed to enter the street or alley (refer to Figure 14.1A). [1992/9250; 2005-34]

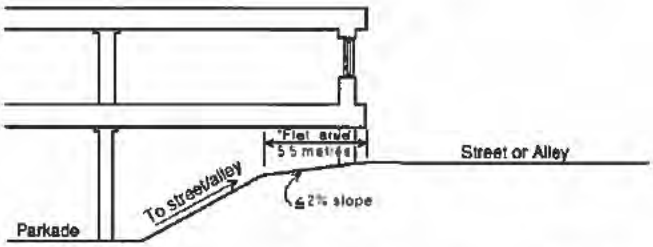


Figure 14.1A: Ramp Design Illustration [2005-34]

3.3 FRONT YARD PARKING [2003-1]

(1) Parking in the required front yard shall be prohibited in:

(a) all zones in the Transitional Area;

(b) the LC3 zone; and

(c) the IP zone. [1992/9250]

(2) For the purposes of this section, "Transitional Area" means the area shown in Figure 14.1.AA.

Figure 14.1AA: Transitional Area Boundaries [2003-1]

3.4 PAVING, DRAINAGE AND VISIBILITY [2003-32]

(1) The parking area shall be suitably paved with a satisfactory hard surface material, a minimum of 50 millimetres of asphaltic concrete, or some other appropriate material to the satisfaction of the Development Officer.

(2) Each parking space in the parking area shall be clearly demarcated.

(3) The parking area shall have visible boundaries.

(4) All storm water drainage shall be collected by means of an internal storm sewer system and connected to the public storm sewer system at locations acceptable to the City. [1992/9250; 2003-1; 2011-64; 2014-44]

(5) Subsections (1), (2) and (4) do not apply to parking areas associated with:

(a) park and open space uses; or

(b) athletic fields

that do not have a building on the site. However, the parking areas associated with these uses must be designed to meet the standards in Table 14.1.

(6) Structures such as concessions, timekeeper's booths, batting cages and equipment storage facilities which are used on a seasonal basis are not considered to be buildings for the purposes of subsection (5).

(7) All storm water drainage associated with the uses described in subsection (5) must be approved by the City. [2011-64; 2014-44]

3.5 STALL AND DRIVEWAY DIMENSIONS

(1) Table 14.1 offers a number of minimum parking stall and driveway dimensions that can be selected depending on the use which the spaces are designed to serve.

(2) Spaces and aisle dimensions may be designed to a specific standard or a mix of different arrangements, as illustrated in Figure 14.1.

(3) Notwithstanding Table 14.1, where 90-degree parking spaces are provided adjacent to an alley measuring 6.096 metres or less, the length of the parking spaces shall be a minimum of 7.5 metres, in order to ensure compliance with the requirements of section 3.8 to provide adequate manoeuvring space. [1992/9250; 1995/9736]

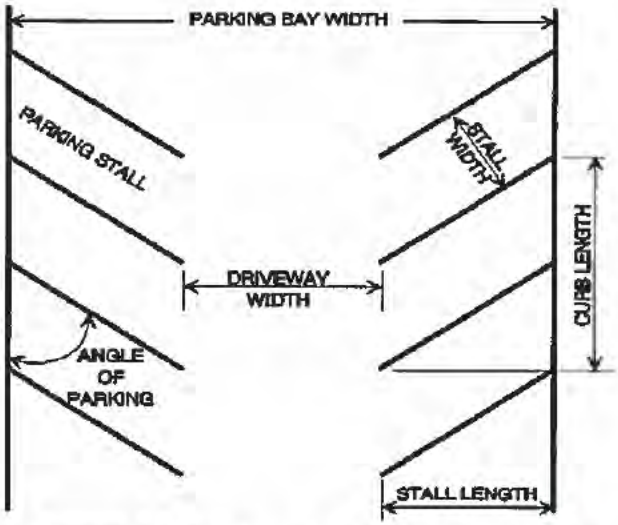


Figure 14.1: Illustration of Parking Area

TABLE 14.1: PARKING AREA STANDARDS [2002-2]					
ANGLE OF PARKING (IN DEGREES)		**MINIMUM REQUIRED STALL WIDTH (IN METRES)**	**MINIMUM REQUIRED CURB LENGTH PER CAR (IN METRES)**	**MINIMUM REQUIRED STALL LENGTH (IN METRES)**	**MINIMUM REQUIRED DRIVEWAY WIDTH (IN METRES)**
0	Option 1	2.5	6.5	2.5	4.0
30	Option 1	2.5	13.95	5.17	4.0
	Option 2	2.73	14.32	5.11	4.0
45	Option 1	2.5	9.55	6.01	4.0
	Option 2	2.73	9.68	5.82	4.0
60	Option 1	2.5	6.61	6.45	5.5
	Option 2	2.73	6.69	6.13	5.5
90	Option 1	2.5	2.5	6.0	7.5
	Option 2	2.73	2.73	5.5	7.5
Compact Space					
30	Sole Option	2.29	12.25	4.43	2.8
45		2.29	8.31	5.08	3.1
60		2.29	5.75	5.39	5.3
90		2.29	2.29	4.9	7.0

3.6 PARKING AND ROAD RIGHTS-OF-WAY

All required parking spaces shall be located outside of existing and proposed road rights-of-way. Subject to Subpart 15B.4 of Chapter 15, property lines should have either a fence or curbs to prevent encroachment onto road rights-of-way or adjacent lots, and to delineate driveways in areas where rolled curb is present. [1992/9250]

3.7 PARKING AND LANDSCAPING

All parking spaces shall be located in such a manner that the required landscaping for the parking area, as specified in Chapter 15, can be provided. [1992/9250]

3.8 MANOEUVRING SPACE

All parking lots for:

(a) non-residential uses; and

(b) all uses on major thoroughfares

shall be designed so as to eliminate the need for backing and manoeuvring from, or onto roads, pedestrian walkways, in order to get out of spaces or leave the lot. [1992/9250]

3.9 HOUSE FORM COMMERCIAL

(1) Notwithstanding any other provision in this Bylaw, when an existing house form building is converted to a House-Form Commercial/Residential Building use, no parking shall be required for the new use above what was required for the building prior to the change of use.

(2) All parking stalls in existence on the lot prior to the change in use mentioned in subsection (1) shall be maintained. [1992/9250]

3.10 PARKING FOR PERSONS WITH DISABILITIES [2003-1]

(1) Notwithstanding any other provision in this Bylaw, in all zones a minimum of two percent of all required parking spaces shall be provided in the form of accessible parking spaces, with a minimum stall width of 3.9 metres and a minimum stall length of 5.5 metres. [2001/10264]

(2) Parking spaces for persons with disabilities shall be located as close as possible to a building entrance, and shall be clearly designated with signs indicating their purpose as accessible parking stalls. [1992/9250]

3.11 MOTORCYCLE PARKING

(1) Where at least 30 parking spaces are required by this Bylaw, motorcycle spaces may be provided in lieu of or in addition to automobile parking spaces in accordance with the standards specified in Table 14.2.

TABLE 14.2: MOTORCYCLE AND BICYCLE PARKING STANDARDS		
VEHICLE TYPE	**WIDTH (METRES)**	**DEPTH (METRES)**
Motorcycle	0.9144	3.048
Bicycle	0.6096	1.8288

(2) The parking spaces shall be clearly marked as reserved for motorcycles.

(3) Where motorcycle spaces are provided in lieu of automobile parking spaces, not more than 2% of the automobile parking spaces may be converted. [1992/9250]

3.12 BICYCLE PARKING

(1) Spaces for bicycles shall be provided in safe and convenient locations, in accordance with Tables 14.2 and 14.3.

(2) When any covered automobile parking is provided, all bicycle parking shall be covered.

(3) The parking spaces may be located in the rear 50% of any required front yard setback, but not in any vehicle parking space required by Subpart 14B.5.

(4) The parking spaces shall be clearly marked as reserved for bicycles. [1992/9250]

TABLE 14.3: REQUIRED BICYCLE PARKING SPACES		
TYPE OF USE	**NUMBER OF SPACES REQUIRED**	**PERFORMANCE STANDARDS**
Institution and Apartment Dwelling Units	5% of required vehicle spaces	♦ Visible from the use for which the spaces are provided. ♦ Located on the same lot as the principal use or within 20 metres of the lot.
Amusement Centre	20% of required vehicle spaces	♦ Visible from the use for which the spaces are provided. ♦ Located on the same lot as the principal use or within 20 metres of the lot.
Bowling Lane	10% of required vehicle spaces	
Child Care Centre	10% of required vehicle spaces	
Community Centre	20% of required vehicle spaces	
Convenience Store	20% of required vehicle spaces	
Library	30% of required vehicle spaces	
Recreation, Outdoor	20% of required vehicle spaces	
Shopping Centre	10% of required vehicle spaces	

3.13 COMPACT CARS

Up to 30% of the required parking spaces in any parking garage may be designed as Compact Space in accordance with Table 14.1. [1992/9250]

3.14 OFF-SITE CAVEATED PARKING

(1) Where off-site caveated parking is a discretionary use in a zone, the caveated parking area shall require the approval of City Council in accordance with the discretionary use process specified in Chapter 18 of this Bylaw.

(2) Where the off-site caveated parking is provided on a lot that is separate from the lot containing the building or structure for which it is provided, in accordance with subsection 14B.3.1, there shall be recorded in the office of the City Clerk, City of Regina, a registrable agreement between the:

(a) City;

(b) owner of the lot on which the parking is provided; and

(c) owner of the lot for which the parking is required.

(3) The agreement executed pursuant to subsection (2) shall bind on the owner mentioned in clause (2)(c) and his heirs and successors, and restrict the use of the lot for the purpose of off-street parking so long as the use for which the parking was provided exists.

(4) A caveat based on the agreement mentioned in subsection (2) shall be registered by the City against the lots mentioned in clauses (2)(b) and (c) in the Regina Land Titles Office. [1992/9250; 1993/9488]

3.15 PAYMENT-IN-LIEU OF PARKING

(1) Council may, at its discretion, waive all or part of the parking requirements in the:

(a) D - Downtown Zone in exchange for a payment-in-lieu of the waived spaces calculated on the basis of $7,000 per waived parking space (in 1992 dollars); or [2014-44]

(b) WH - Dewdney Avenue Warehouse Zone in exchange for a payment-in-lieu of the waived spaces calculated on the basis of $2,500 per waived parking space (in 1992 dollars). [2014-44]

3.16 REQUIRED REDUCTIONS

(1) The parking requirements for a building containing a mixed-use in which the gross floor area devoted to non-residential uses exceeds 5,000 square metres shall be reduced by 20% of the parking otherwise required to be provided for the non-residential uses.

(2) Notwithstanding any provision in this Chapter, when an existing building is reconstructed on Lots 11 to 20, Block 434, Plan Old 33, Regina Subdivision:

(a) no parking shall be required for the first 600 square metres of gross floor area of the building; and

(b) any parking shall only be required in accordance with the standards of this Chapter for the gross floor area in excess of 600 square metres.

(3) Notwithstanding any other provision in this Chapter, when an existing building is reconstructed in the WH - Dewdney Avenue Warehouse Zone, unless otherwise indicated, the most stringent parking requirements of this Chapter shall be reduced by 50%. [1992/9250]

14B.4 REGULATIONS FOR RESIDENTIAL PARKING

Where, in this Bylaw, parking facilities are required or provided for:

(a) a detached dwelling unit;

(b) a detached zero lot line dwelling unit;

(c) a semi-detached dwelling unit;

(d) a duplex dwelling unit;

(e) a triplex dwelling unit;

(f) a fourplex dwelling unit;

(g) a townhouse dwelling unit;

(h) an apartment dwelling unit;

(i) a rooming house;

(j) a converted dwelling;

(k) a supportive living home; or

(l) a secondary suite,

the provisions of this Subpart shall apply. [1992/9250; 2001-91; 2003-1]

4.1 LOCATION [2015-29]

(1) The parking area shall be provided on the same lot as the use it serves.

(2) Vehicles parked on site shall only be parked in approved parking spaces or on a legal driveway leading up to a garage, carport or legal parking pad located on site.

(3) Parking is not permitted on any required landscape area.

4.2 SPACE DIMENSIONS

The minimum parking stall and driveway sizes shall comply with Table 14.1. [1992/9250]

4.3 SURFACING AND MARKING [2003-1]

(1) The parking area for developments containing more than four dwelling units, and supportive living homes, shall be suitably paved and each parking space in the parking area shall be clearly demarcated.

(2) Where the parking area for a development containing four or fewer dwelling units is accessed from a street, the parking area, including the driveway, shall have a durable, dust-free hard surface of asphalt, concrete, brick or other similar material excluding gravel or slag.

4.4 APPROACH RAMP [2015-1]

(1) The location of vehicular approach ramps or driveways at the street line shall not be closer than 10 metres from the point of intersection of the two curbs at a street intersection.

(2) Where:

(a) the approach ramp will provide access to a parkade that will be part of a new building or part of an addition to an existing building; and

(b) there will be a grade difference from the parkade to the street or alley;

the ramp shall provide a flat area of not less than 5.5 metres and with a maximum slope of 2% for vehicles to stop before they proceed to enter the street or alley (refer to Figure 14.1A).

4.5 FRONT YARD PARKING [2015-29]

(1) Front yard parking shall be permitted on a lot that:

(a) has an attached garage with access provided from the front yard; or

(b) has a detached garage, a carport or a parking pad located in the side or rear yard, with access provided from the front yard; or

(c) has no alley access and insufficient room to provide access from the front yard to the rear or side yards.

(2) Where a lot meets the criteria of clause (1), the number of spaces that may be located in the front yard is limited to the capacity of the garage, carport or parking pad, or two spaces, whichever is greater.

(3) Except for a Bed and Breakfast Homestay and Supportive Living Home, vehicles parked in tandem shall be considered to constitute one required parking space.

(4) Each parking space which is located entirely or in part in the front yard shall not exceed 22 square metres in area.

(5) Notwithstanding subsection (1):

(a) no parking shall be permitted in the front yard of an apartment building; and

(b) no parking of any class A or C motor home, any travel trailer, fifth wheel trailer, boat or any similar vehicle shall be permitted in the front yard from November 1 to April 1, inclusive.

4.6 PROHIBITED VEHICLES

No vehicle, business or otherwise, with a combined weight (vehicle and load carried by the vehicle) exceeding 4,500 kilograms, shall be parked on-site in a residential zone. Notwithstanding the above, recreational vehicles may be parked in a residential zone in compliance with Subpart 14B.4 – Regulations for Residential Parking. [2014-44]

4.7 NUMBER OF RECREATIONAL VEHICLES

Where recreational vehicle parking is provided for a detached dwelling unit in accordance with the regulations of this Bylaw, the number of recreational vehicles shall not exceed two. [2002-12]

Figure 14.1B Repealed [2004-1]

4.8 UNLICENSED VEHICLES

Every unlicensed vehicle shall be maintained in operable condition. Where not so maintained, the vehicle shall be deemed a junked vehicle pursuant to *The Regina Property Maintenance Bylaw* and any other applicable bylaws of the City of Regina. [2002-12; 2004-1]

4.9 DOWNTOWN PARKING

Where more than one parking space is provided for a dwelling unit located in the D – Downtown zone, the parking spaces may be provided as tandem parking. [2003-1]

14B.5 NUMBER OF MINIMUM REQUIRED PARKING SPACES

5.1 RESIDENTIAL USES

As specified in Table 14.4. [1992/9250; 1997/9918]

5.2 INSTITUTIONAL USES

As specified in Table 14.5. [1992/9250]

5.3 COMMERCIAL USES

As specified in Table 14.6. [1992/9250]

5.4 INDUSTRIAL USES

As specified in Table 14.7. [1992/9250]

TABLE 14.4: OFF-STREET PARKING REQUIREMENTS FOR RESIDENTIAL USES [2005-34]	
USE OF BUILDING OR LOT	**MINIMUM NUMBER OF PARKING SPACES**
Apartment Dwelling Units	
a) In R6 and MS Zones b) In D Zone c) All other zones	1.5 spaces per dwelling unit No requirement 1 space per dwelling unit
Bed and Breakfast Homestay [2005-88]	1 space in addition to the parking requirement for the dwelling [2005-88]
Detached, Semi-detached, Duplex, Triplex, Fourplex, Converted, Townhouse and Secondary Suite dwelling units [1994/9605; 2001-91]	1 space per dwelling unit
Dwelling Units in House Form Commercial Residential Buildings:	See Section 3.9 of Subpart 14B.3
Mobile Homes	1 space per mobile home
Portions of Buildings with residential uses	1 space per dwelling unit
Residential Homestay [2013-74]	0.5 space per guest room in addition to the parking requirements for the dwelling
Seniors Assisted Living Apartment Building [1997/9918; 2005-34]	
a) In D Zone	No requirement
b) All other zones	0.4 space per dwelling unit
Supportive Living Home	2 spaces per home; plus, 1 space per employee to a maximum of 2 additional parking spaces; plus 1 parking space per business vehicle. [1999/10110]

TABLE 14.5: OFF-STREET PARKING REQUIREMENTS FOR INSTITUTIONAL AND RECREATIONAL USES [2003-2; 2003-6; 2003-32]	
USE OF BUILDING OR LOT	**MINIMUM NUMBER OF PARKING SPACES**
Auditoriums – Public Assembly auditoriums including: Convention hall Exhibition hall Gymnasium Health, social, cultural or recreational hall Ice and hockey rink Club Athletic fields [2003-32] Labour union and lodge hall Other recreational or amusement places	1 space per 5 seating places for the public OR 1 space per 10 square metres of gross floor area used by patrons, whichever is greater
Bowling Alleys	3 spaces per alley
Business, Technical or Commercial Schools and Community Colleges	
a) D Zone b) All other zones	No requirement 1 space per 100 square metres of gross floor area
Community Centres	1 space per 20 square metres of gross floor area
Curling Rinks	8 spaces per sheet of ice
Day Care Centres	
a) D Zone b) All other zones	No requirement 1 space per centre
Elementary Schools	1 space per each teacher, employee or administrator
Fire Stations	1 space per employee on maximum work shift
Golf Courses	4 spaces per green, plus 50% of the requirements for the associated uses
Golf Driving Range	1.5 spaces per driving tee
High Schools	5 spaces per classroom plus 1 space per 10 square metres of assembly room floor area
Hospitals or other similar uses	1 space per 100 square metres of gross floor area
Humanitarian Service Facilities [2003-2]	1 space per 100 square metres of gross floor area

TABLE 14.5: OFF-STREET PARKING REQUIREMENTS FOR INSTITUTIONAL AND RECREATIONAL USES [2003-2; 2003-6]	
USE OF BUILDING OR LOT	**MINIMUM NUMBER OF PARKING SPACES**
Individual and Family Social Service Home	1 space per 6 beds plus 1 for each vehicle operated in connection with the home
Museums, Art Galleries, Libraries and other similar facilities	1 space per 50 square metres of gross floor area, but not less than 1 space per 20 square metres of the assembly room floor area of the largest assembly room within the building
Recreational Service Facilities [2014-44]	1 space per 20 square metres of gross floor area used by patrons
Religious Institutions [2013-64]	
a) D Zone b) All other zones	No requirement 1 space per 4 seating places
Special Care Homes	1 space per 6 beds
Sports Stadia	
a) Less than 10,000 seats b) over 10,000 seats	Same as auditorium standards in Table 14.5 No requirement
Universities and Colleges	1 space per 200 square metres of gross floor area

TABLE 14.6: OFF-STREET PARKING REQUIREMENTS FOR COMMERCIAL USES	
USE OF BUILDING OR LOT	**MINIMUM NUMBER OF PARKING SPACES**
Animal Hospitals or Animal Shelters	1 space per 100 square metres of gross floor area
Auctioneering Establishments	1 space per 3 seats
Bingo Halls	1 space per 3.1 seats, plus 10% of the total number of stalls if the site adjoins a residentially zoned property
Confectionery Stores	
a) D, TAR, NC, MX, and LC3 Zones	No requirement
b) All other zones	1 space per 20 square metres of gross floor area
Convenience Stores	
a) NC Zone	6 spaces for first 200 square metres of gross floor area plus 1 space per 25 square metres over 200 square metres in gross floor area
b) All other zones	1 space per 20 square metres in gross floor area
Drive-In Restaurants	1 space per 5 seats plus an additional 5 car stack-up per drive-in window
Drive-In Establishments not elsewhere classified	Required space prescribed for use plus 5 car stack-up per drive-in window plus additional regulations as per Subparts 7D.1 and 7D.2 [1994/9572; 1997/9904]
Funeral Homes	1 space per 4 persons
Gas Bars	No requirement
Hotels	
a) D Zone	1 space per 3 guest rooms
b) All other zones	1 space per guest room
Liquor Stores	1 space per 20 square metres of gross floor area
Medical Clinics [2013-64]	No requirements if less than 325 square metres. 325 square metres or greater, 1 space per 60 square metres of gross floor area.
Nightclubs	
a) D Zone	No requirement
b) All other zones	Same as auditorium standards in Table 14.5

TABLE 14.6: OFF-STREET PARKING REQUIREMENTS FOR COMMERCIAL USES	
USE OF BUILDING OR LOT	**MINIMUM NUMBER OF PARKING SPACES**
Offices, Banks, or Financial Institutions	
a) D and LC3 Zones	
i) less than 325 square metres of gross floor area	No requirement
ii) for that portion in excess of the first 325 square metres in gross floor area	1 space per 100 square metres of floor area
b) Lots 11-30, both inclusive in Blocks 403 and 411 and Lots 1-20 both inclusive gross in Blocks 404 and 412, Plan Old 33, Regina Subdivision	1 space per 100 square metres of floor area
c) Lots 11-20, both inclusive in Block 123; Lots 1-10, both inclusive in Block 139; and E.17' of Lot 21, all of Lots 2-29, both inclusive, and the S.20' of Lot 30, all in block 200; all of the above in Plan Old 33, Regina Subdivision	No requirement for existing buildings being constructed
d) All other zones	1 space per 60 square metres of gross floor area
Pool Halls, Amusement Arcades	
a) D Zone	No requirement
b) All other zones	1 space per 20 square metres of gross floor area
Public Self-Storage Facility [1996/9821]	1 space per 600 metres of gross floor area
Restaurants [2012-49]	
a) D Zone	No requirement
b) LC3 Zone	No requirement
c) All other zones	1 space per 5 seats
Bakery shops Fast Food Outlets [1994/9572] Grocery Stores Home Improvement Centres Personal Service Establishments Repair Shops Retail Stores	
a) D Zone	
i) less than 325 square metres of gross floor area	No requirement
ii) for that portion in excess of the first 325 square metres in the gross floor area	1 space per 50 square metres of gross floor area

TABLE 14.6: OFF-STREET PARKING REQUIREMENTS FOR COMMERCIAL USES	
USE OF BUILDING OR LOT	**MINIMUM NUMBER OF PARKING SPACES**
b) LC3 Zone	
i) less than 325 square metres of gross floor area	No requirement
ii) for that portion in excess of the first 325 square metres in the gross floor area	1 space per 50 square metres of gross floor area
c) Repealed. [2003-1]	
d) MX and TAR Zone	1 space per 50 square metres of gross floor area
e) WH-Zone and Lots 1-10, both inclusive, in Blocks 77 and 124; Lots 21-40, both inclusive, in Block 183; Lots 1-20, both inclusive, in Block 184; Lots 26-40, both inclusive, in Block 200, Plan Old 33, Regina Subdivision; and uses other than retail (for retail uses, see Table 14.6) on Lots 1-10, both inclusive, in Block 139, and Lots 11-20, both inclusive, in Block 123, Plan Old 33, Regina Subdivision	
i) For the first 1000 square metres in gross floor area	1 space per 50 square metres of gross floor area
ii) For that portion in excess of the first 1,000 square metres in gross floor area	1 space per 100 square metres of gross floor area
f) Retail stores on Lots 1-10, both inclusive, in Block 139, Plan Old 33, and Lots 11-20, both inclusive, in Block 123, Plan Old 33	
i) The main floor and the floor below grade in existing buildings	No requirement
ii) For entire new buildings and for floor other than the main floor and the floor below grade in existing buildings	i) For the first 1000 square metres in gross floor area, one space per 50 square metres of gross floor area ii) For that portion in excess of the first 1000 square metres in gross floor area, one space per 100 square metres of gross floor area
g) All other zones	1 space per 20 square metres of gross floor area
Theatres	
a) D Zone	No requirement
b) All other zones	1 space per 5 seating spaces
Automobile Repair Establishment	6 spaces for first two service bays plus 2 spaces for each additional service bay

TABLE 14.7: OFF-STREET PARKING REQUIREMENTS FOR INDUSTRIAL USES	
USE OF BUILDING OR LOT	MINIMUM NUMBER OF PARKING SPACES
Laundry or Dry Cleaning Plants and other similar industrial uses Manufacturing and Industrial Plants Repair, Rental Servicing Establishments Warehousing and Storage Buildings and Yards Wholesaling	1 space per 3 employees on maximum work shift but not less than 1 space per 150 square metres of gross area

14B.6 EXCEPTIONS TO REQUIRED PARKING - SHARED PARKING

Notwithstanding the requirements of Subpart 14B.5, shared parking shall apply to all zones in accordance with the requirements in this Subpart. [1992/9250]

6.1 General Provisions for Shared Parking

(1) Shared parking may be allowed between two or more uses to satisfy all or a portion of the minimum off-street parking requirements specified in Subpart 14B.5.

(2) Shared parking may be allowed between uses with different hours of operation.

(3) A use for which an application is being made for shared parking shall be located within 20 metres of the parking facility.

(4) A registrable agreement providing for the shared use of parking shall be executed between:

(a) the City;

(b) owner of the lot on which the parking is provided; and

(c) owner of the lots for which the shared parking is required.

(5) The agreement executed pursuant to subsection (4) shall bind on the owner mentioned in clause (4)(b) and his heirs and successors, and restrict the use of the lot for the purpose of parking so long as the uses for which the shared parking was provided exists. [2005-34]

(6) A caveat based on the agreement mentioned in subsection (4) shall be registered by the City against the lots mentioned in clauses (4)(b) and (c) in the Regina Land Titles Office.

(7) The shared parking privileges shall continue in effect only as long as the agreement, binding on all parties, remains in force.

(8) If the agreement is no longer in force, parking shall be provided as required in Subpart 14B.5. [1992/9250]

6.2 SPECIFIC REGULATIONS FOR SHARED PARKING

(1) Shared parking may be allowed between daytime and nighttime or Sunday uses under the conditions and exceptions provided in Table 14.7AA.

(2) For the purpose of this section, the following uses are deemed to be daytime uses:

(a) retail sales and service, except eating and drinking establishments, lodging and entertainment uses;

(b) wholesale, storage and distribution uses; and

(c) manufacturing uses.

(3) For the purpose of this section, the following uses are deemed to be night time or Sunday uses:

(a) auditorium;

(b) religious institutions;

(c) entertainment uses, including bowling alleys, theatres and dance halls; and

(d) eating and drinking establishments.

(4) The applicant shall show that there is no substantial conflict in the principal operating hours of the uses for which the sharing of parking is proposed. [1992/9250]

TABLE 14.7AA: SHARED PARKING ARRANGEMENTS -DIFFERENT OPERATING HOURS			
DAYTIME USE	**NIGHTTIME USE**	**CONDITIONS**	**EXCEPTIONS**
Any use specified in subsection 6.2(2)	Any use specified in subsection 6.2(3)	1. Up to 90% of the parking requirements for the daytime use may be supplied by the off-street parking provided by the nighttime or Sunday use. 2. Where the nighttime or Sunday use is a religious facility, up to 100% of the parking requirements for the daytime use may be supplied by the off-street parking provided by the religious facility.	None

14B.7 OTHER EXCEPTIONS TO REQUIRED PARKING

7.1 APPLICATION

(1) Notwithstanding the parking requirements of Subpart 14B.5, adjustments may be made by Council, at the request of an applicant, to those parking requirements on the basis of the rules specified in this Subpart.

(2) In order to prevent the development of on-street parking, an application may be made or approved for only one of the exceptions provided in sections 7.2 to 7.5 of this Subpart. [1992/9250]

7.2 PROXIMITY TO TRANSIT ROUTE

(1) A reduction of up to 20% in the minimum parking requirement may be allowed by Council for a new or expanding administrative or manufacturing building or complex which is:

(a) located in a commercial or industrial zone; and

(b) within 76.2 metres of any street with transit service headways of 20 minutes or less in each direction during morning or evening rush hour.

(2) The 76.2 metre distance mentioned in subsection (1) shall be the shortest distance measured from the nearest bus stop on the street to the property line of the lot containing the use, building or complex. [1992/9250; 1993/9488]

7.3 SUBSTITUTION OF ALTERNATIVE TRANSPORTATION - CARPOOL PROGRAM

(1) For a new or expanding administrative or manufacturing building or complex, which requires 40 or more parking spaces, the minimum parking requirement may be reduced by up to a maximum of 40% by the substitution of a carpool program that meets the following minimum requirements:

(a) an individual or department must be designated to manage the program;

(b) the program must provide an active matching service using manual or automated matching of addresses and providing employees with potential carpools (passive matching alone such as bulletin boards is not acceptable); and

(c) the carpool spaces on-site or off-site must be clearly identified for the sole use of the pool cars.

(2) For every carpool space provided and identified by the applicant, and certified by the Development Officer, the required parking shall be reduced by 2 spaces, to a maximum of 40% of the parking requirement (see sample carpool program in Table 14.7A). [1992/9250]

TABLE 14.7A: SAMPLE CARPOOL PROGRAM

REQUIRED PARKING	CARPOOL SPACE PROVIDED	REDUCTION IN PARKING REQUIREMENT	PARKING SPACE TO BE PROVIDED	% OF PARKING TO BE PROVIDED
40	1	2	38	95
	2	4	36	90
	3	6	34	85
	4	8	32	80
	5	10	30	75
	6	12	28	70
	7	14	26	65
	8	16	24	60

7.4 SUBSTITUTION OF ALTERNATIVE TRANSPORTATION - VANPOOL PROGRAM

(1) For a new or expanding administrative or manufacturing building or complex, which requires 40 or more parking spaces, the minimum parking requirement may be reduced by up to a maximum of 30% by the substitution of a vanpooling program that meets the following minimum requirements:

(a) an individual or department must be designated to manage the program; and

(b) the applicant must operate or hire vans, buses, or similar vehicles with seating capacity for at least six people to provide exclusive employee transportation to and from residential areas.

(2) For every vanpool and parking space provided by the applicant under subsection (1), and certified as such by the Development Officer, the parking requirement shall be reduced by six spaces to a maximum of 30% of the parking requirement (see sample Vanpool Program in Table 14-7B). [1992/9250]

TABLE 14.7B: SAMPLE VANPOOL PROGRAM

REQUIRED PARKING	VANPOOL SPACE PROVIDED	REDUCTION IN PARKING REQUIREMENT	PARKING SPACES TO BE PROVIDED	% OF PARKING TO BE PROVIDED
40	1	6	34	85
	2	12	28	70

7.5 SUBSTITUTION OF ALTERNATIVE TRANSPORTATION -TRANSIT PROGRAM

(1) For a new or expanding administrative or manufacturing building or complex that:

(a) requires 40 or more parking spaces; and

(b) is within 76.2 metres of a street served by the Regina Transit System

the minimum parking requirement may be reduced by 2.5 for every five transit passes to the Regina Transit System, with at least 50% cost reduction, provided to employees in a proposed structure or building for a minimum of five years, or the duration of the business establishment (see sample Transit Pass program in Table 14.7C).

(2) The reduction in the required parking mentioned in subsection (1) shall not exceed 40%. [1992/9250]

TABLE 14.7C: SAMPLE TRANSIT PASS PROGRAM					
PARKING REQUIRED BY BYLAW	**MAXIMUM PARKING REDUCTION**	**DESIRED PARKING REDUCTION**	**TRANSIT PASSES REQUIRED FOR REDUCTION**	**TOTAL COST AT JULY 1991 PRICES ($)**	**ADJUSTED REQUIRED PARKING**
40	16	1	2	1,192.50	39
		2	4	2,385.00	38
		4	8	9,540.00	36
		5	10	11,925.00	35
		6	12	14,310.00	34
		7	14	16,695.00	33
		8	16	19,080.00	32
		9	18	21,465.00	31
		10	20	23,850.00	30
		11	22	26,235.00	29
40	16	12	24	28,620.00	28
		13	26	31,005.00	27
		14	28	33,390.00	26
		15	30	35,775.00	25
		16	32	38,160.00	24

7.6 ENFORCEMENT AND MONITORING OF EXCEPTIONS TO REQUIRED PARKING PROGRAMS

(1) Prior to the issuance of a certificate of occupancy for the use, building or complex for which a reduction in the required parking has been granted pursuant to section 7.2 to 7.5:

(a) the details of the alternative transportation program shall be spelled out in a memorandum of agreement between the City and the applicant which shall be filed in the same way as an off-site caveated parking agreement specified in section 3.14 of Subpart 14B.3; and

(b) the details shall be verified by the Development Officer. Such verification must include a review of copies of any contracts, lease agreements, purchase agreements, proof of purchase of transit passes, and any other relevant documentation.

(2) A memorandum of understanding filed pursuant to subsection (1) shall provide for an annual report to be submitted by the owner, subsequent owner or lessee of the building concerning:

(a) compliance with the agreement; and

(b) the status of the alternative transportation program, including but not limited to:

(i) the number of employees involved in the program; and

(ii) the percentage of participants to total work force involved in the program.

PART 14C

LOADING REGULATIONS FOR ALL LAND USES

14C.1 APPLICATION OF OFF-STREET LOADING REQUIREMENTS

1.1 NEW, ALTERED OR CHANGED USES

Vehicular loading and unloading spaces with access from a public roadway or alley shall be provided and maintained in accordance with the provisions of this Part by every commercial and industrial development, whether:

(a) a new building or structure;

(b) an alteration or enlargement of an existing structure or building; or

(c) a change in use of an existing building or structure. [1992/9250]

1.2 COMPLIANCE WITH REGULATIONS - OWNER'S OBLIGATION

As long as a use exists on a property, and the use is required to provide loading spaces by this Bylaw, it shall be the continuing obligation of the owner and occupant of the property on which the use is situated to provide the loading spaces. [1992/9250]

1.3 Where the use of the existing building is changed and the building is not enlarged or increased in capacity, but does not and cannot provide the required off-street loading spaces, the requirements of this section shall not apply, and no off-street loading space shall be required. [1993/9488]

14C.2 DETERMINATION OF STATUS

2.1 UNSPECIFIED REQUIREMENTS

(1) Where the loading requirements of any use allowed by this Bylaw are not specified, the Development Officer shall:

(a) establish an interim standard to allow the developer to proceed with his project; and

(b) recommend amendment to this Bylaw to incorporate the interim standard.

(2) In establishing the interim standard, the Development Officer shall be guided by the standards for similar uses in the City. [1992/9250]

2.2 FRACTIONAL SPACES

If, in determining the number of required loading spaces, a fractional space is arrived at:

(a) any fraction up to and including one-half shall be disregarded; and

(b) fractions over one-half shall be deemed to be equivalent to one space. [1992/9250]

14C.3 PERFORMANCE STANDARDS

3.1 Every off-street loading space and access thereto shall be hard surfaced if the access thereto is from a street or lane which is hard surfaced. Where hard surfacing is provided or required, it shall be constructed of concrete, asphalt or a similar durable, dust-free material. [1993/9488]

3.2 DIMENSIONS

(1) Where tractor-trailer deliveries are expected on a premise, loading berths shall be provided. The dimensions of the loading spaces shall conform with the requirements in Table 14.8, and shall, at the minimum, facilitate deliveries by a 50 foot wheel base (WB-50) truck design vehicle (see Figure 14.2).

(2) Where deliveries by vehicles other than tractor-trailers are expected on a premise, delivery spaces shall be provided. The dimensions of the delivery spaces shall conform with the requirements in Table 14.8 and shall, at the minimum, facilitate deliveries by trucks or pick-ups with two axles (see Figure 14.2). [1992/9250]

TABLE 14.8: REQUIRED LOADING BERTH DIMENSIONS						
DESIGN VEHICLE	**LENGTH IN METRES (L)**	**DOCK ANGLE (α)**	**CLEARANCE IN METRES (D)**	**BERTH WIDTH IN METRES (W)**	**APRON SPACE IN METRES (A)**	**TOTAL OFFSET IN METRES (T)**
Delivery Truck Space - Two Axles	5.67	90°	5.67	3.00	7.14	12.81
				3.65	6.35	12.02
				4.26	5.89	11.56
		60°	4.98	3.00	5.20	10.18
				3.65	4.52	9.50
				4.26	3.96	8.94
		45°	4.08	3.00	4.19	8.27
				3.65	3.62	7.70
				4.26	3.28	7.36
Loading Space - (WB-50) 50 Foot Wheel Base	16.76	90°	16.76	3.00	23.46	40.23
				3.65	21.94	38.70
				4.26	20.42	37.18
		60°	14.63	3.00	16.76	31.39
				3.65	15.54	30.17
				4.26	14.02	28.65
		45°	11.88	3.00	13.71	25.60
				3.65	12.19	24.07
				4.26	11.27	23.16

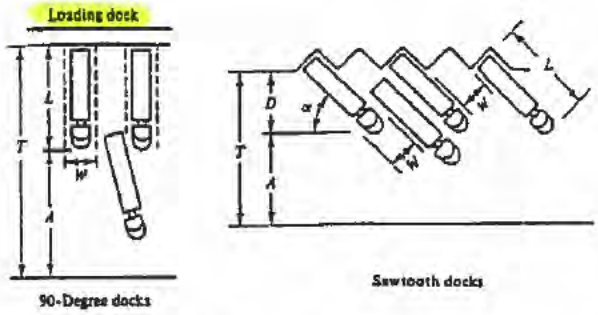


Figure 14.2: Loading Berth Dimensions

3.3 LOCATION

(1) Every loading facility shall be located on the same building site as the use it serves.

(2) All loading areas shall be reserved and clearly marked for loading purposes.

(3) Directional information to assist traffic flow shall be provided by either pavement marking or sign.

(4) All loading spaces shall be located so that vehicles using the spaces do not project into any public right-of-way or otherwise extend beyond the property boundaries.

(5) All loading spaces shall be located so that vehicles using the spaces would not be required to back to, or from, an adjacent street, sidewalks or other public right-of-way.

(6) No loading spaces shall be provided within a minimum front yard.

(7) No loading spaces shall be provided within the minimum side yard on a lot:

(a) within the IP - Prestige Industrial Service Zone; or

(b) within or abutting a Residential Zone.

(8) Loading spaces provided within the minimum side yard shall be open and uncovered. [1992/9250]

3.4 MANOEUVRING SPACE

(1) All loading spaces shall be provided with a manoeuvring area sufficient to allow vehicles to move in and out of the loading space.

(2) In order to allow the driver of a delivery vehicle to see along the truck when backing, the circulation pattern and loading position shall be designed for counter clockwise entry and for left-side backing manoeuvre (see Figure 14.2A). [1992/9250]

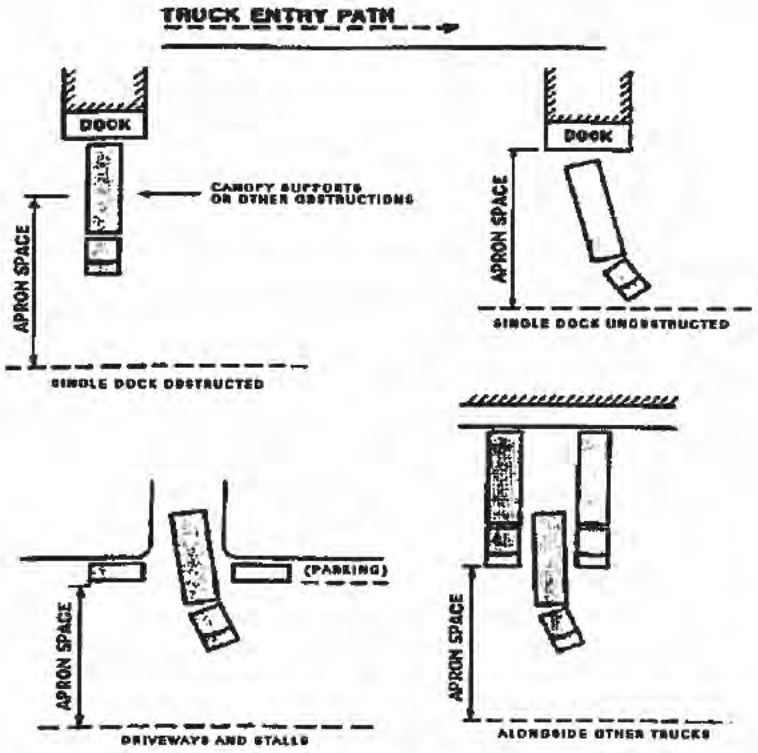


Figure 14.2A: Loading Berth Configurations and Approach

3.5 SEPARATION FROM PARKING SPACES

Loading spaces and manoeuvring areas shall be separated from required parking facilities. [1992/9250]

14C.4 MINIMUM REQUIRED LOADING SPACES

The required off-street loading spaces shall be as provided in Table 14.9. [1992/9250]

TABLE 14.9: REQUIRED LOADING SPACES			
LAND USE	**FLOOR AREA OF LAND USE (IN SQUARE METRES)**	**REQUIRED DELIVERY SPACE**	**REQUIRED LOADING SPACE**
Industrial Use, All Manufacturing Use, All Personal Service Establishments Repair Shops, Restaurants, Retail Store	100-800	1	0
	801-1,400	2	0
	1,401-2,500	0	2
	2,501-10,000	0	2♦
	More than 10,000	0	5♦
Assembly Place Club Hospital Nursing Home Office Building Public Utility School	100-1,400	1	0
	1,401-3,000	0	1
	3,001-6,000	1	1
	6,001-10,000	2	1
	10,001-15,000	3	1
	15,001-20,000	3	2
	More than 20,000	4	2
	More than 27,000*		

♦Plus 1 for each additional 2,500 square metres or a fraction of it.

• Plus 1 for each additional 4,000 square metres or a fraction of it.

*Council may at its discretion require additional loading space for buildings exceed 27000 square metres.

PART 14D

REGULATIONS FOR SPECIFIC LAND USES

14D.1 DAY CARE CENTRES/NURSERY SCHOOLS

1.1 PASSENGER DROP-OFF SPACE REQUIREMENTS [2005-34]

(1) On-site passenger drop-off spaces shall be provided where a day care centre or nursery school does not have an on-street parking capacity to serve as a drop-off area without impeding traffic flow.

(2) Parking spaces required pursuant to subpart 14B.5 shall not be used to satisfy the drop-off space requirements.

(3) Drop-off spaces shall comply with Table 14.1.

(4) All drop-off spaces shall be reserved and clearly marked for passenger drop-off purposes.

1.2 MINIMUM REQUIRED SPACES

The number of drop-off spaces provided pursuant to section 1.1 shall be in accordance with the Table 14.10. [1992/9250; 2005-34]

TABLE 14.10: DAY CARE CENTRE/NURSERY SCHOOL DROP-OFF SPACE REQUIREMENTS [2005-34]

MAXIMUM CAPACITY OF DAY CARE CENTRE/ NURSERY SCHOOL	NUMBER OF DROP-OFF SPACES REQUIRED
10 to 15 children	2
16 to 30 children	3
31 to 45 children	4
46 to 60 children	5
more than 60 children	2 further spaces for each increment of 15 children in excess of 60 [1999/10113]

Appendix M

with accepted appraisal theory, an advantage to AVMs is the objectivity and efficiency of the resulting value estimates. Of course, sound judgment is required in model development and an appraiser should review the values produced by the model.

2.2 Purpose and Use of AVMs

2.2.1 General

AVMs are used to provide estimates of market value for a variety of public and private sector purposes. AVM estimates reflect a given time period and should be calibrated to produce market values as of a specific date. Although past market trends can be projected over a short time horizon, the credibility of appraisal estimates increasingly suffers as the projection is lengthened.

AVMs have the advantage of objectivity and consistency, reduced cost, and faster delivery time. It is important, however, that the AVM follow sound statistical and mathematical modeling practices and be tested for accuracy and uniformity before application. Section 8 discusses the important area of model testing and quality assurance and section 9 focuses on reporting of results.

2.2.2 Analysis of Impaired Properties

Properties subject to significant defects or that are affected by atypical circumstances impairing market value, including superadequacy or functional obsolescence, cannot be accurately modeled with an AVM. An appraiser may choose to apply the AVM to the property, but the defect or unique circumstance should be noted and a special adjustment made to compensate for the defect or special circumstance.

2.3 Steps in AVM Development and Application

The remaining portion of this section outlines the steps to take in development of an AVM. The following sections of this standard provide clarification and details concerning these steps and their application to particular property types.

2.3.1 Property Identification

The first step in any appraisal problem is to identify the property to be appraised. In developed economies, identification is normally straightforward, as maps, ownership records, property addresses, and legal descriptions will identify the property and owner. The appraisal assignment will usually require identifying physical characteristics and property rights to be valued as of the appraisal date. When applying an AVM to a particular property, improvements and renovations made before this date should be included in the appraisal; those made subsequent to the appraisal date should not.

The bundle of rights to be appraised generally includes the fee simple interest or full bundle of rights inherent in ownership of property. Nevertheless, the market analyst should make clear what rights are assumed and any limitations to full use or restrictions to transfer of the property.

2.3.2 Assumptions

The AVM supporting documentation should state all assumptions, special limiting conditions, extraordinary assumptions, and hypothetical conditions. A key assumption in many AVM applications concerns the assumed use of the property. Most real estate databases contain the actual use of property as of the inspection date. In some property tax systems, current use is stipulated as the basis for valuation. However, comparable market sales reflect the concept of highest and best (most probable) use. Market analysts and users of AVMs need to be aware of these subtleties.

Another key assumption relates to whether or not the fee simple bundle of rights is being appraised. This is generally the case for residential properties, but many commercial appraisals are made to estimate only the leased fee or leasehold interest when there is an existing lease (or leases) on the property.

Government appraisal agencies are responsible for collecting and maintaining property databases, although they often contract with private vendors for this purpose. Commercial AVM providers generally use data maintained by a government agency or third party service. In all cases, it is imperative that AVM market analysts test the reliability of the data and clearly state assumptions concerning its accuracy. If data important to value estimation are missing or the statistical process has shown the data to be inconsistent or unreliable, the AVM provider has a responsibility to not provide a potentially misleading value estimate to the intended user.

2.3.3 Data Management and Quality Analysis

The reliability of any appraisal depends on accurate data. Appraisal data fall into two general categories: property data and market data. Property data relate to location, land characteristics, and building features. Market data include sales, income, and cost information. Asking prices and independent appraisals can sometimes be used to supplement sparse sales data.

Computerized statistical tools used to develop AVMs afford the opportunity to screen data for missing or out-of-range occurrences and inconsistencies; examples include homes with more than two fireplaces or a bi-level home with no listed lower level living area.

Geographic information systems (GIS) can also help in data reviews. GIS software is used to maintain computerized maps and provide geographic representations of property attributes and features. It can be used to

highlight properties with impossible, unlikely, or inconsistent data. For example, properties coded as being waterfront can be color-coded, displayed on a map, and reviewed for accuracy.

Only valid, open market sale and income data should be used in model development. (As mentioned, asking prices and independent appraisals can sometimes also be used to bolster sample sizes.)

Since the reliability of an AVM is dependent on the data from which it is generated, the integrity of the database should be monitored on a systematic and ongoing basis.

2.3.4 Model Specification

Model specification is the important process of determining the format (model structure) of the AVM. The market analyst must determine the type of model to be employed and specify the variables to be used in the model.

AVMs that employ property features, often characterized as "hedonic" models, can be categorized as additive, multiplicative, or hybrid models (see Section 3 on Specification of AVM Models). Market analysts must also determine the variables to be included in hedonic AVMs. These can represent property characteristics (e.g., square feet of living area and building age), location information, demographic data (e.g., income levels or school quality), or variables derived from property characteristics (e.g., the square root of lot size or living area multiplied by a quality index). The objective is always to include property features important in value determination and to capture actual market relationships. Skilled analysis is required to adequately specify an effective model structure.

Some models that are referred to as AVMs have only a time component; in other words, they merely track changes in property values over time. Where property characteristic information is unavailable or limited, these models can be used to trend a previous sale or value estimate to the target appraisal date.

2.3.5 Model Calibration

Calibration is the process of determining the coefficients in an AVM as well as which variables should be retained or deleted due to statistical insignificance. Several statistical tools can be used to calibrate AVM models (see Section 4 on Calibration Techniques). Proper use of these tools requires experience and training in statistical analysis and the software employed.

2.3.6 Model Testing and Quality Assurance

An AVM must be tested to ensure that it meets required accuracy standards before being deployed. This is accomplished through statistical diagnostics and a ratio study in which value estimates (e.g., estimated sale price or estimated rent) are compared to actual values (e.g., sale price or reported rent) for the same properties. GIS can be used to display color-coded ratios on maps and help spot groups of under- or over-valued properties. For more information, see Section 8 on Automated Valuation Model Testing and Quality Assurance. Before it is implemented, the AVM also should be tested on a holdout sample, which is a set of properties and their selling prices that were not used in the calibration process.

Properties with unusually large errors, termed "outliers," should be reviewed. It is likely that the sale price (or other value serving as the dependent variable in the model) is not representative, the data are partially incorrect, or the property exhibits atypical features that cannot be adequately accounted for in the model. Except where the data can be corrected, the property should be removed from the sample, and it and similar properties with similar features should not be valued by the AVM alone.

2.3.7 Model Application and Value Review

Once tested and validated, the AVM can be applied to estimate the value of other properties of the same type in the area or region where the model applies. These values should be reviewed for reasonableness and consistency with recent sales, either of the subject property itself or of similar properties in the same neighborhood or surrounding area, or where sales are not available, recent asking prices.

It is also good practice to systematically review the generated values for reasonableness and consistency with nearby properties in the same neighborhood. This affords the opportunity to ensure that the data are accurate, and to make individual adjustments to properties with unique features or that are subject to special influences, such as being located at a busy intersection or having a premium or obstructed view.

2.3.8 Stratification

Stratification is the process of grouping properties for modeling and analysis. Stratification begins with property type. Properties are delineated into generic use categories such as: single-family residential, condominium (if applicable), multi-family, commercial, and industrial. The number of property types will depend on the size and diversity of the geographic area being analyzed and the number of sales available within the proposed strata.

Residential properties in urban areas are generally stratified into "market areas." Market areas are broad, somewhat homogeneous geoeconomic areas that appeal to buyers in similar economic brackets. One AVM may be developed for each market area, or a regional model may be developed and individually calibrated for each market area. Location within the market area can be handled through neighborhood variables or other variables related to geographic location and desirability. Alternatively, a location value response surface analysis

The market analyst must be able to present the MRA results in an understandable and defensible format that appraisers and AVM clients can easily understand.

To avoid seriously violating assumption of linearity, additivity, and constant variance of the error term, the market analyst must consider the use of transforming variables or other calibration methods described in the standard. A multiplicative, nonlinear, or hybrid model structure is best for measuring interactive effects.

4.1.2 Diagnostic Measures of Goodness-of-Fit

Both the market analyst using regression and the user of AVM output must be aware of and understand how the various key statistical measures used in regression relate to the reliability of results. These statistics fall into two categories: overall measures that aid in the interpretation of model performance and individual variable measures that assist in the understanding of how well an individual variable performs in helping to estimate value, as well as keeping the standard error term to a minimum. Primary measures of goodness-of-fit for overall model performance are the coefficient of determination (R^2), standard error of the estimate (SEE), COV, and average percent error.

Goodness-of-fit measures for individual variables in a model are produced by most MRA software packages and include the coefficient of correlation (R), T-statistic, F-statistic, and beta coefficients. Each of these measures will provide information about an individual variable's linearity or importance of contribution toward improving predictive success, and relative importance, as variables are compared to each other.

(D'Agostino and Stephens 1986.)

When all the measures are used collectively, along with an understanding of data quality issues, those skilled in developing and using MRA can fully evaluate the credibility of the AVM estimates. Appraisers asked to review AVM results must understand the role that *goodness-of-fit* statistics play in evaluating AVM results. The application of AVM results to a single property may be better evaluated using historical market comparisons selected from a subset of data. Appraisers asked to review AVM results should review the Appraisal Standards Board's *USPAP* Standard and AO-18.

(Appraisal Foundation 2003, 46–56, 180–187; IAAO 1990; D'Agostino and Stephens 1986.)

4.1.3 MRA Software, Options and Techniques

MRA is the most widely used method for calibrating models. As such, the availability of MRA software provides users many choices. No one software package is deemed superior to another, as success using MRA is a combination of modeling skills and software familiarity. Variations of a selected MRA technique can be a decisive factor in selecting an MRA and statistical application package. Many MRA techniques have been adopted over the years to help regression take better advantage of its predictive powers. Stepwise, constrained, robust, ridge regression, and others are acceptable techniques used to improve predictive success. Many of the statistical software packages include variable selection routines that aid the market analyst in selection of significant variables.

4.1.4 MRA Strengths

1. Goodness-of-fit statistics—gives credence to the validity of results.
2. Software availability—many regression software products are available.
3. Widely-accepted calibration method.
4. Broad education network—MRA is taught at most colleges and universities around the world.
5. Credible values—in the hands of a skilled market analyst, MRA is proven to produce results that meet the test of model performance.

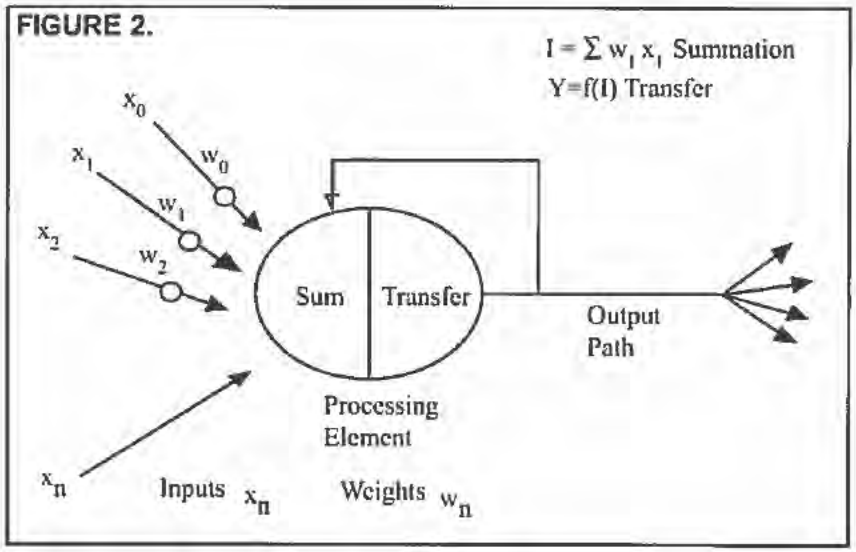
4.1.5 MRA Weaknesses

1. Requires a high level of statistical knowledge—market analysts must possess significant background in data analysis and statistical methods.
2. Predictive accuracy is restrained by assumptions.
3. Requires data sets that meet the test of sample size.
4. Interactive and nonlinear market trends are difficult to measure without transforming data.

4.2 Calibrating Using Adaptive Estimation Procedure (AEP)

Adaptive Estimation Procedure (AEP) is a calibration technique that was adapted to real estate value in the early 1980s. Also known as feedback, AEP is based on an engineering concept that relies on continual adjustment to coefficients as the calibration engine passes, or tracks, back and forth through the data until convergence, (minimum error is achieved) thus the feedback. For property valuation, the algorithm tracks the sale price as a moving target. It compares property characteristics as variables that measure the change in sale price, and calibrates a coefficient for each variable. The coefficients are used to estimate value that is then compared to sale price. A running tally is kept on the error term as the process continues. Figure 1 depicts the feedback loop.

AEP will make multiple passes through the sales file constantly adjusting coefficients before a final solution is reached. Success using AEP is dependent upon the



4.4 Time Series Analysis

Time series analyses are a family of techniques that can be used to measure the cyclical movements, random variations, seasonal variations, and secular trends observed over a period of time. In property valuation, these analyses can be used to develop a multiplier or index factor to update existing appraised values or to adjust sales prices for individual properties to the valuation date. Since values can change at different rates in different markets, separate factors should be tested for each property type and market area.

Four methods used to develop time trend factors in the appraisal and assessment industries are: (1) value per-unit analysis, (2) re-sales analysis, (3) sales/assessment ratio trend analysis, and (4) inclusion of time variables in sales comparison models. These methods are summarized below (for a more detailed explanation and discussion, see *Mass Appraisal of Real Property* (Gloudemans 1999, 263-270).

Value per-unit analyses track changes in sale price per unit (e.g., per square foot for residential properties or per unit for apartments) over time. The method is easily understood and lends itself well to graphical representation, as well as to statistical modeling to extract the average rate of change. A downside is that the method does not account for the myriad of other value influences, such as age and construction quality, that impact per-unit values.

Re-sales analysis uses repeat sales occurring over a given time period. Price changes between sales are converted to monthly rates and an average (or median) rate of change is extracted. As can be imagined, the larger the number of repeat sales, the more reliable the estimated rate of change. The method can overestimate rates of change if repeat sales reflect substantial improvements (or other alterations) made to the property since the first sale.

Sales/assessment ratio trend analysis involves tracking changes in the ratio of sales prices to existing assessments made as of a common base date. Increases in the ratios indicate inflation and vice versa. The ratio also provides the index factor required to convert assessed value to a full value estimate. Like value per-unit analysis, the method lends itself well to graphical and statistical analysis. An advantage of the method is that assessments account for most value determinants and thus can isolate time trends better than the value per-unit method. The method assumes that the assessments share a common basis, and its reliability depends partly on the accuracy or uniformity of the assessments.

Time variables can be included directly into AVM models to capture the rate of price change over the period of analysis. This is usually the most accurate of the various methods. However, model developers must be careful that time variables are properly specified so that coefficients developed from the model reflect the desired valuation date.

Once a time trend is established, it can be used to adjust values to any point within the sales period.

Trend factors can be extrapolated for a short period beyond the sales period, but this must be done with caution and grows increasingly unreliable as the time frame is lengthened. If more than several months are involved, the first three methods can be used to calibrate the trend (one would not ordinarily develop time adjustments through use of a modeling approach without recalibrating the entire AVM model).

(The Appraisal Institute 2002, 291.)

4.5 Tax Assessed Value Model

Tax assessed value models derive an estimate of value by examining values attributed to properties by the local taxing authorities. As a matter of local law and custom,

known as townhouses, row houses or zero-lot-lines, depending on geographic location throughout the world. All of these uses are residential in nature.

Valuing these various residential properties is somewhat similar to valuing detached single-family structures. All of the same principles apply and all can be modeled and valued using an AVM. In fact, because these properties exhibit a high degree of homogeneity compared to the detached single-family population, sales-based AVMs can produce values that are extremely reliable and accurate. The cost approach can also work well, in some cases, if adjusted to the market, but it is not appropriate for valuating condominium units because depreciated replacement cost will not properly reflect resale values. Data requirements for attached residences will not be the same as with detached residential properties. For example, floor level can be an important value determinant for condominiums, while lot size and yard improvements are irrelevant.

5.3 Two- to Four-Family Residential Property

Part of the residential housing market consists of structures built for the purpose of housing more than one family. Improvements designed to accommodate two, three, and four families within their own separate living areas are often referred to as small income-producing properties. A common theme among these property types is that the owner of the property may reside in one of the units. This concept, however, is not a requirement for classifying these structures in the market. Two-unit properties are more likely to be owner-occupied than four-unit properties. The concept to be recognized here is how such properties are treated in the marketplace, because that impacts their price and ultimately the value generated by any AVM. The ability to model the selling price of these small-income properties is reliant on what specific data is available, relating to number of units, age, condition, location and gross income. The motivation of buyers shifts when consideration is given to other property attributes that relate to producing rental income and not just owner occupancy. Direct market models, comparable sales models, and cost models are acceptable methods for valuing these small income-producing properties. With their income-producing potential, the income approach is also a model to be considered. With an adequate sample of gross income values for comparison to sale price, a model of GI * GIM will yield credible results where GI = Gross Income and GIM = Gross Income Multiplier (sale price/gross income). Some AVMs may even be set up to predict GI and the GIM. Each of these indicators can vary with size, age, location, style, and condition of a property.

5.4 Manufactured Housing

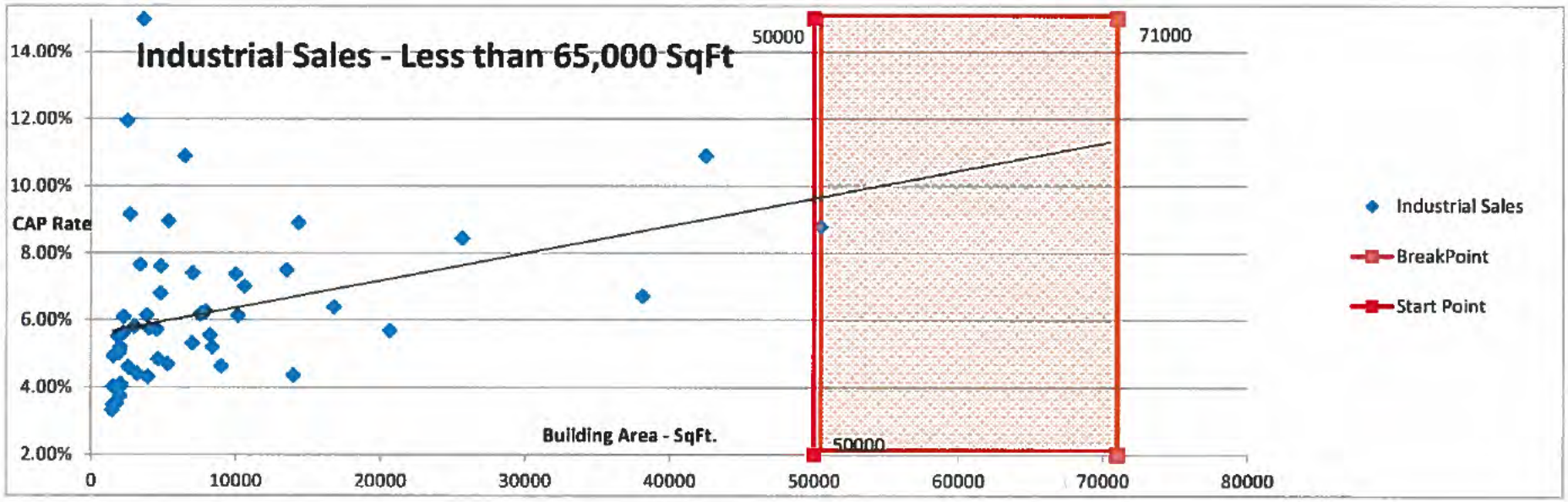
A manufactured home is a residential structure built in a factory. Construction standards for manufactured housing are controlled and monitored by the Department of Housing and Urban Development in the United States (HUD), and by the Canada Mortgage and Housing Corporation (CMHC) in Canada. While many manufactured homes are built with the same materials as site-built homes, the factory-controlled engineering process helps control cost and quality. The house can be financed as personal or real property on leased land, in a manufactured home community, or on a privately owned site. Buyers who desire to acquire land in conjunction with the home can finance the land and home together. Market conditions and trends will indicate how the manufactured homes compete in the market place. In some communities, zoning only allows manufactured homes in certain areas, confining the market area from which comparables can be derived. Once market conditions for a manufactured home are known, it can be modeled just like any other property type. Consistency is important when using an AVM for manufactured homes. Some manufactured homes are strictly treated in the market as mobile homes (i.e., personal property). An AVM developed to value manufactured homes as real property would give a false value in the case where the home was personal property, and vice versa. AVMs developed to value manufactured personal property homes cannot be used for homes classified as real property. Some manufactured homes compete in the market place with site-built homes. Where this is the case, it is possible that an AVM designed to value detached single-family structures will produce credible results, although the model should include a variable (or variables) to capture any differences between otherwise comparable manufactured and site-built homes.

5.5 Time Series Models for Residential Property

Indexed models relate to time-series analysis (see Section 4.4 on Time Series Analysis) as described earlier. Use of these models represents a common method of delivering quick automated value estimates. These models simply measure the average change in value over time and factor the value forward from a benchmark starting-place, such as the average value in a census block or market area. The accuracy of indexed models is inconsistent and less reliable than fully specified models. These models work best in areas of homogeneity where the range of value is close to the average value.

Indexing is a common method used to update cost tables to reflect current cost. As with market models, a benchmark in time is required as a starting point. Cost coefficients are then updated, using a single index factor representing the measurable change since the original cost coefficients were generated. One current method of indexing is to use an economic indicator such as the consumer price index (CPI). In the cost approach, indexed models have no way of adjusting values at the micro level for location and other market influences that impact value. Time adjustments may be developed from

Appendix N


Industrial Sales - Less than 65,000 SqFt
50000
71000
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14.00%
12.00%
10.00%
8.00%
6.00%
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CAP Rate
Building Area - SqFt.
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60000
70000
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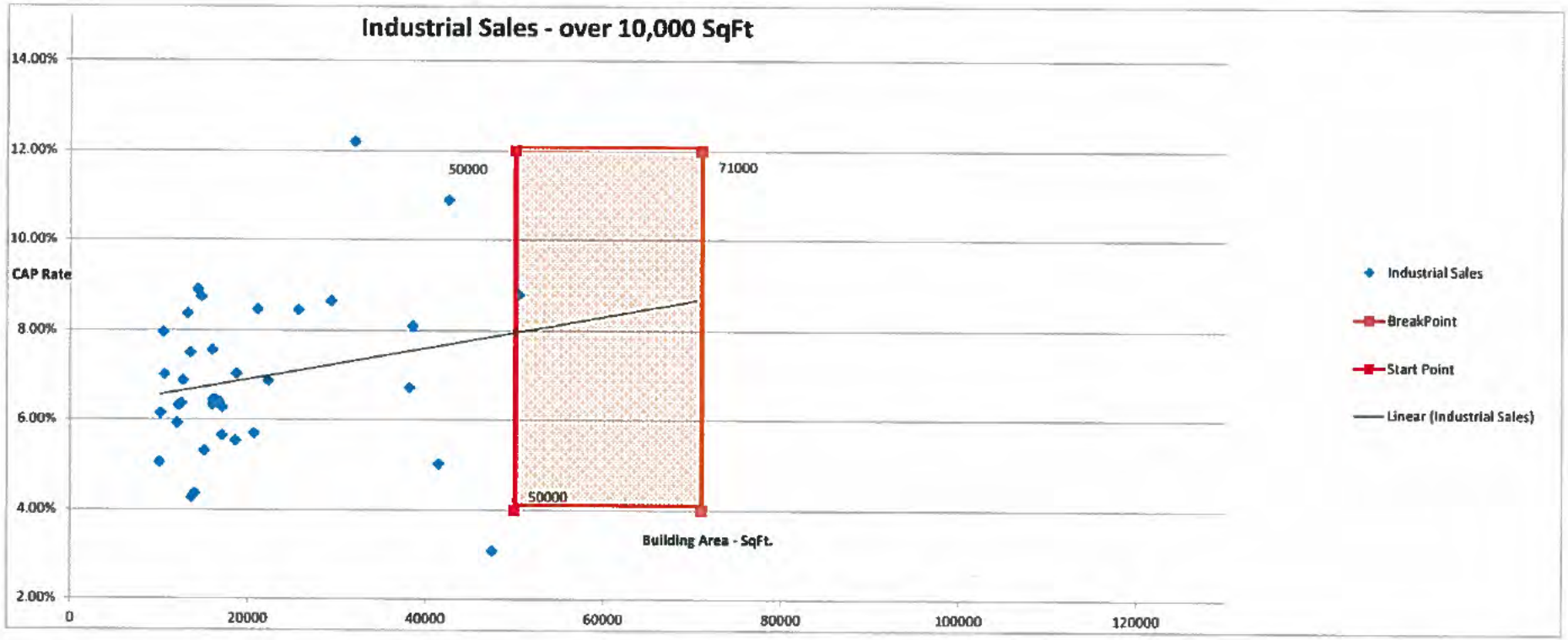
Industrial Sales
BreakPoint
Start Point

276

Appendix O


Industrial Sales - over 10,000 SqFt
14.00%
12.00%
10.00%
8.00%
6.00%
4.00%
2.00%
CAP Rate
0
20000
40000
60000
80000
100000
120000
Building Area - SqFt.
50000
71000
50000
Industrial Sales
BreakPoint
Start Point
Linear (Industrial Sales)

278

Appendix P

Exemption, Pseudo—Freedom from the property tax granted to property in recognition of the fact that it is taxed either directly or indirectly by other means; a reduction in the property tax base. Sometimes called "technical exemption." Note: For example, public utility property may be exempt from ad valorem property taxation but subject to a gross earnings tax in lieu thereof; corporation stock may be exempt in recognition of the taxation of the corporate assets.

Expense—A cost, or that portion of a cost, which, under accepted accounting procedures, is chargeable against income of the current year.

Expense Account—An accounting record maintained for recording particular expenses.

Expense Ratio—The ratio of expenses to gross income. A "typical" expense ratio is the relationship of normal expenses to effective gross income.

Expert Witness—One who is qualified to render expert testimony.

Exploratory Data Analysis—That part of concerned with reviewing the data set to isolate structures, uncover patterns, or reveal features that may improve the confirmatory analysis.

Exponent—A symbol usually written to the right and above an expression to indicate particular mathematical operations. For example, 6^2 means 6×6, or six squared. Fractional exponents indicate inverse operations; for example, an exponent of 1/2 signifies a square root. Exponents are also called powers. Valuation models make use of the following properties of exponents: A number raised to the exponent 0 is always 1.00; zero raised to any power is zero; any number raised to the power 1 is itself. Negative numbers cannot have exponents less than 1.

Expropriation—*See* **condemnation.**

External Diseconomies—Forces outside the activities of any single firm that cause resource prices to rise.

Statistics How To

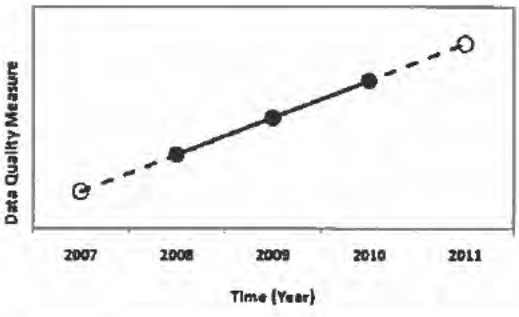
Statistics for the rest of us!

Extrapolation: What is it?

Statistics Definitions > Extrapolation

What is Extrapolation?

Extrapolation is a way to make guesses about the future or about some hypothetical situation based on data that you already know. Interpolation allows you to estimate *within* a data set; it's a tool to go beyond the data. It comes with a high degree of uncertainty. You're basically taking your "best guess" based on facts you already know.



The black line shows the data points. The dashed line shows a hypothetical extrapolation.

Real Life Uses

For example, you might look forward to your monthly paycheck and you assume that you're going to get it based on known data (the fact that you've got paid monthly, on-time for the last year). But what if your company goes bankrupt? Or the market crashes? Or the bank mistakenly freezes your bank account? In this particular case, extrapolation has a fair amount of certainty (you're probably going to get your paycheck), but that isn't always the case.

Use in Statistics

FitAll™ fitting solutions
for (multiple) linear, nonlinear & implicit functions Go to fitall.com

Extrapolation can mean several things in statistics, but they all involve assumption and conjecture (extrapolation is far from an exact science!):

1. The extension of a statistical method where you assume similar methods will be used.
2. The projection, extension, or expansion of your known experience into an area that you do not know or that you haven't experienced yet.
3. The use of equations to fit data to a curve. You then use the equation to make conjectures. This is known as curve fitting or regression, which can get quite complex, with the use of tools like the Correlation Coefficient.

Other Practical Uses

Extrapolation is used in many scientific fields, like in chemistry and engineering where extrapolation is often necessary. For example, if you know the current voltages of a particular system, you can extrapolate that data to predict how the system might respond to higher voltages.

Cautions with Use

In general, you should only extrapolate for small amounts of data. For example, you might be able to rely on a steady paycheck coming in for a few months or years, but it probably wouldn't be a good idea to assume that same company is going to be still paying you 20 years down the road!

Extrapolation: What is it? was last modified: March 23rd, 2017 by Andale

By Andale | November 2, 2013 | Definitions | 1 Comment |

← Empirical Rule: What is it? Degrees of Freedom: What are they? →

One thought on "Extrapolation: What is it?"

1. ye ji
June 19, 2014 at 1:50 am

Thank you for explaining the concept of extrapolation!! It helped me a lot

Leave a Reply

Your email address will not be published. Required fields are marked *

Comment

Name *

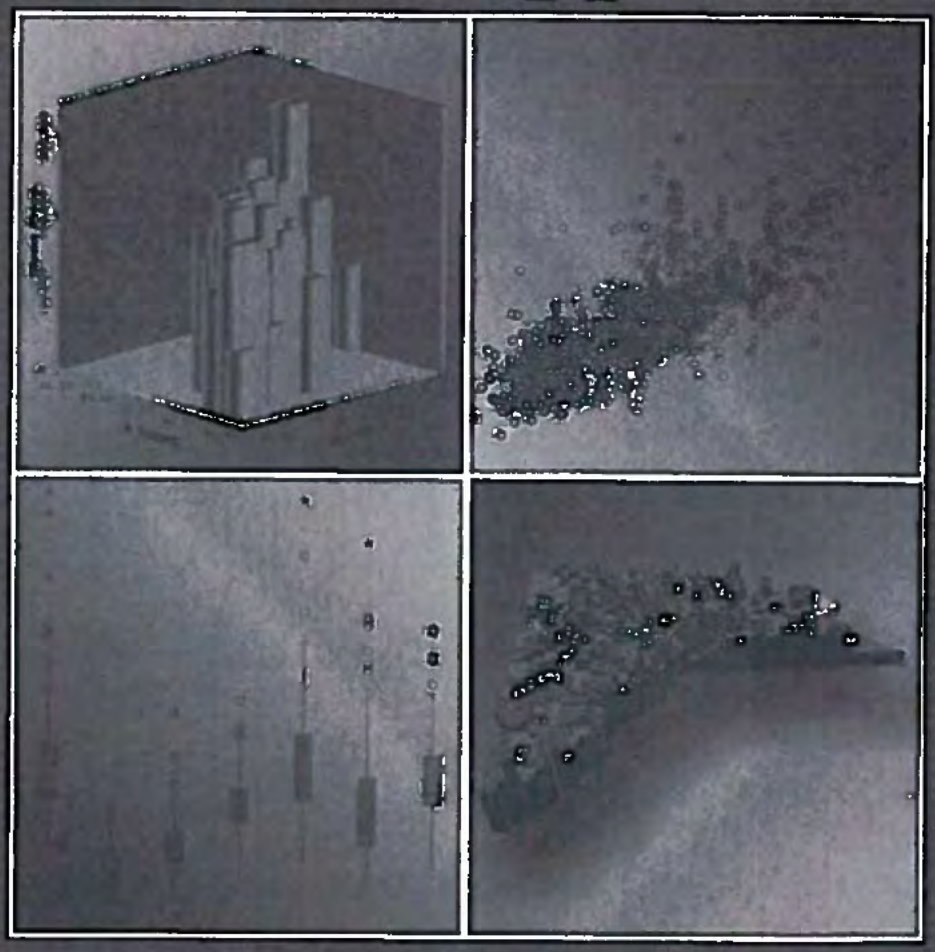
Email *

Website

Post Comment

Appendix Q

Fundamentals of Mass Appraisal



INTERNATIONAL ASSOCIATION OF ASSESSING OFFICERS

Fundamentals of Mass Appraisal

Robert Gloudemans
Richard Almy

International Association of Assessing Officers
Kansas City, Missouri

Spatial Data

Spatial data consist of maps, both hard copy and digital, that depict the location and geographic relationships among objects, namely, parcels and surrounding influences. These influences include political boundaries, market areas and neighborhoods, roads, rivers, lakes, greenbelts, mountains, and other relevant natural and man-made features. They can be displayed on maps and in geographic information systems (GIS). They can be turned on and off and represented by various colors or symbols. Maps that depict the size, degree, or relationship among objects in this matter are termed *thematic* maps.

Although spatial data are not used directly in modeling, they can be used to create variables used in modeling, for example, to determine the average elevation of parcels or to determine which properties abut or lie within a specified distance of a selected feature (e.g., lake, rivers, and major streets).

Market and property characteristics data maintained in traditional tabular format can be interfaced with spatial data and displayed thematically. For example, sales data can be linked to GIS data by parcel number and displayed in various colors depending on price. Estimated values and sales ratios can be similarly displayed.

Legal and Administrative Data

Legal and administrative data include legal description, property owner, billing address, assessment status, allowable exemptions, prior values, and appeals history. These data are not used in modeling but are needed to compute taxable values, notify property owners, and generate tax bills. How efficiently this information is maintained affects the cost and responsiveness of the assessment system.

Modern computer-assisted mass appraisal (CAMA) systems make data readily available to users, facilitate retrieval and integration of the data, and provide the public with convenient access to nonproprietary information.

Types of Variables

Independent variables used in model building represent or, more often, are based upon property characteristics. For modeling, it is helpful to categorize variables and the underlying data from which they were created as one of three types: (1) quantitative, (2) qualitative, or (3) binary. Different graphs and statistical analyses are appropriate for certain types of variables.

Quantitative

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modelers need to be
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fall as size increases a

During modelin
variables. For examp
ranges, as follows:

1 = 0–10 years
2 = 11–25 years
3 = 26–50 years
4 = more than

Qualitative

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property values.

Binary Vari

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Quantitative Variables

Quantitative data or variables, also known as *continuous*, are based on measurements or counts, for example, lot size, square feet of living area, or number of bathrooms. Quantitative data tend to be objective and verifiable and thus are well suited to statistical analyses. These data also are easily incorporated into models, although modelers need to be aware that value may not change in proportion to number of units. For example, the contribution of each additional square foot of living area may fall as size increases and a second fireplace may add less to value than a first fireplace.

During modeling, quantitative data sometimes are used to construct qualitative variables. For example, construction year could be converted to decades or to age ranges, as follows:

1 = 0–10 years
2 = 11–25 years
3 = 26–50 years
4 = more than 50 years.

Qualitative Variables

Qualitative data or variables, also termed *categorical* or *discrete*, represent property features or attributes that fall into predefined categories. Examples are construction grade, condition, building style, and type of heating or cooling. Data collectors normally assign codes for such features from a predefined list. Since qualitative data often are subjective, it is important that data collection manuals and training programs explain proper, consistent coding of such data.

Wherever possible, designers and users of CAMA systems should avoid creating and assigning vague or open-ended categories such as *other* or *to be determined*. These categories are exceedingly hard, if not impossible, to use in modeling, because they are unlikely to be bear any consistent, explainable relationship to property values.

Binary Variables

Binary variables represent the presence or absence of a specific feature, for example, waterfront location, corner lot, air conditioning, or swimming pool. In modeling, binary variables are usually coded 1 if present and 0 if not.

Binary variables provide an effective way for models to determine the contribution of property attributes to market value. They are often created from other variables; for example, a modeler could create a binary variable for brick exterior from exterior wall type (a qualitative variable).

The IAAO *Standard on Ratio Studies* (2010c) recommends the following standards for jurisdictions in which *current* market value is the legal basis of assessment. Individual jurisdictions may adopt tighter or alternative standards appropriate for their situation.

Appraisal Level

While the desired level of appraisal is 100 percent of market value, IAAO standards for measuring the level of appraisal allow a 10 percent variation. Based on the assumption that the law mandates appraisal at market value (before application of assessment ratios), this implies that the overall appraisal level should be between 0.90 and 1.10. The analyst can conclude that this standard has *not* been met when a 95 percent confidence interval (or other specified interval) about a chosen measure of central tendency fails to bracket either 0.90 or 1.10, or when a statistical test shows that the analyst can conclude with 95 percent confidence that the level of appraisal is not in this range.

The *window* of 10 percent about the market value standard provides a reasonable range in which measures of central tendency should fall in ad valorem mass appraisal. As long as this range is upheld and assessors are vigilant in reappraising property based on market value standards, property owners can use their appraisal as a reasonable indication of their property's true worth. Strict enforcement of a 100 percent standard is neither cost-effective nor practical. Such a policy could force assessors to make trivial annual adjustments in appraisals and encourage the loathsome and inequitable practice of sales chasing to achieve compliance. If strictly followed, such a policy would also force virtually half of properties to be appraised above market value, which tends to breed protracted and costly appeals and exacerbate inequities. The IAAO standard provides a reasonable, constructive, and cost-effective basis for ensuring that appraisals approximate market values. Of course, assessment officials can choose to enforce a more rigorous standard, such as 0.95 to 1.05, but a strict 100 percent standard is not recommended.

Appraisal Uniformity

As has been discussed, the three facets of appraisal uniformity are uniformity among strata, uniformity within a stratum, and value-related bias (regressivity and progressivity).

Uniformity among Strata

Each major stratum should be appraised within 5 percent of the overall level of appraisal for the jurisdiction. Thus, if the overall level is 0.900, each property class and area should be appraised between 0.855 and 0.945:

$0.900 - (0.05 \times 0.900) = 0.855;$

$0.900 + (0.05 \times 0.900) = 0.945.$

This aspect of appraisal performance is extremely important because it relates to systematic equity (or lack) thereof among major property groups.

Uniformity within a Stratum

IAAO recommends that the uniformity standard for a stratum vary with the type of property. This reflects differences in the difficulty of the appraisal task. IAAO recommends the following standards for the COD:

1. *Single-family residences.* CODs should generally be 15.0 or less and for newer and fairly homogeneous areas, 10.0 or less.
2. *Other residential property* (rural, seasonal, recreational, manufactured housing, 2- to 4-unit family housing). CODs generally should be 20.0 or less.
3. *Income-producing property.* CODs should be 20.0 or less, and in larger, urban jurisdictions, 15.0 or less.
4. *Vacant land and other property.* CODs should be 25 or less.
5. *Other real property and personal property.* Target CODs should reflect the nature of the properties, market conditions, and the availability of reliable market indicators.

While low CODs generally indicate good performance, note that the *Standard on Ratio Studies* (IAAO 2010c) regards a COD of 5.0 or less in any property category to be a possible indication of sales chasing or a nonrepresentative sample.

In general, low CODs are more difficult to achieve for heterogeneous property groups, very low- or high-value properties, and properties with older buildings or little market activity. Empirical work has shown that the ability to achieve good CODs is particularly affected by age of buildings. Difficult market conditions, in which prices are less rational and more difficult to predict, can also complicate achieving usual CODs. For example, while sales by financial institutions of previously repossessed property may constitute a significant portion of the market, use of such sales in ratio studies cannot be expected to produce CODs as good as when market conditions are more normal. Assessment officials may want to consider building such factors into performance measures or requirements.

For unique, very low-value or extremely high-value properties (outliers) and for transitional properties, even CODs of 20.0 may not be achievable. On the other hand, as indicated, CODs near zero are also not achievable and may indicate sales chasing.

Value-Related Bia

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Chapter 10
Evaluating the Reliability of Ratio Study Statistics

This chapter focuses on statistical tests applicable to ratio studies and the formal evaluation of assessment performance. Assessors usually do not need to go beyond the ratio study analyses and statistics presented in Chapter 5, "Ratio Studies in Mass Appraisal," and supplemental feedback on valuation accuracy obtained through field reviews, the continuous monitoring of price trends, and informal inquiries and appeals. However, ratio study findings, particularly those of assessment oversight agencies, often have substantial fiscal implications, such as the distribution of school aid or equalization grants or the need to issue reappraisal or equalization orders. In such cases accurate estimates of appraisal level and performance are paramount. This chapter describes techniques for evaluating the reliability of computed ratio study statistics and making appropriate decisions based on ratio studies. It also describes methods for evaluating performance on unsold properties.

Confidence Intervals

As stated in Chapter 5, "Ratio Studies in Mass Appraisal," ratio study statistics can provide misleading indications of the true level and uniformity of appraisals when samples are inadequate. Fortunately, there are several methods for evaluating the reliability of a statistic. One method is to compute confidence intervals; another is to conduct an appropriate test, as discussed in the section on "Hypothesis Testing," below.

A *confidence interval* is an estimate of the range of values in which a population parameter lies depending on the analyst's specified confidence level. As discussed below and as with point estimates generally (the realized values of statistics or estimators from the sample in question), confidence intervals depend on the confidence level (confidence coefficient) chosen and on the sampling process. The *confidence level* is an expression of the probability that interval does in fact contain the parameter. The most commonly used confidence levels are 90, 95, and 99 percent. The higher the confidence level, the broader the range of the confidence interval. A 95 percent

confidence level is well suited to most ratio study analyses, although ot
can also be appropriate depending on the application at hand. In t
confidence interval provides an indication of the margin of error in a ra

At any level of confidence, the width of the confidence interval is a fu
the sample size and the distribution of the ratios. Larger samples and l
sures of dispersion are associated with tighter confidence intervals, as illu
Table 5-4 in Chapter 5.

To understand the role of confidence intervals, it is important to recal
ference between *statistics* (such as the mean and standard deviation) and *pa*
Statistics are calculated from samples and serve as *point estimates* of corresp
population parameters. The true value of the parameters is unknown and r
estimated. Confidence intervals quantify the range in which the analyst co
clude that population parameters lie with a stated level of confidence.

Confidence intervals can be calculated about the mean, median, and w
mean ratios. The formulas assume that sales randomly represent the pop
of parcels. If sales are concentrated in areas in which appraisal levels are un
low or high or if sold and unsold properties are appraised differently, measu
central tendency and confidence intervals will not be representative.

Mean Confidence Interval

A confidence interval for the mean assumes a normal distribution. The formu

$$CI(\overline{A/S}) = \overline{A/S} \pm (t)(s) \div \sqrt{n},$$

where

$CI(\overline{A/S})$ = the abbreviation for the confidence interval about the mean,
t = the t-value corresponding to the desired confidence level and sample
(see Appendix A)
s = the standard deviation
n = the sample size.

Note that the t-value is based on *degrees of freedom*, which, in this case, is the samp
size less 1. Since confidence intervals are two-tailed, use the t-value correspondi
to a two-tailed test and the desired confidence level. For a 95 percent confiden
level and 60 degrees of freedom, the t-value is 2.00. For very large samples, th
t-value is 1.96 (equivalent to a z-value).

As an example, assume that a sample of 25 sales yields a mean sales ratio o
1.014 and a standard deviation of 0.132. The 95 percent confidence interval is

$$1.014 \pm (2.064 \times 0.132) \div \sqrt{25} = 1.014 \pm 0.054.$$

Thus, the lower confi
confidence limit is 1.01

Although not neces
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Thus, the lower confidence limit is 1.014 − 0.054, or 0.960, and the upper confidence limit is 1.014 + 0.054, or 1.068.

Although not necessary in ratio studies, the confidence interval can be adjusted to reflect the size of the sample relative to the population. The correction factor is

$$\sqrt{\frac{N-n}{N-1}}, \tag{2}$$

where

N = the size of the population

n = the sample size.

Assume there were 1,000 parcels in the population in the above example. The correction factor is

$$\sqrt{\frac{1000-25}{1000-1}} = \sqrt{\frac{975}{999}} = 0.988,$$

and the confidence interval could be refined as follows:

$$1.014 \pm (0.988 \times 0.054) = 1.014 \pm 0.053.$$

The adjusted confidence limits are 1.069 (1.014 − 0.053) = 0.961 and (1.014 + 0.053) = 1.067, respectively. The correction is minimal as long as samples are small relative to the population and can be ignored in most ratio studies.

Median Confidence Interval

Unlike the mean, the median confidence interval does not depend on the assumption of a normal distribution, nor is it as affected by outlier ratios. It is found by arraying the ratios and identifying the ranks of the ratios corresponding to the lower and upper confidence limits. The equation for the number of ratios (j) that the analyst must count up and down from the median to find the lower and upper confidence limits is

$$j = (1.96 \times \sqrt{n}) \div 2, \tag{3}$$

when n is odd, and

$$j = (1.96 \times \sqrt{n}) \div 2 + 0.5, \tag{4}$$

when n is even.

Consider the example of the 40 ratios in Table 10-1. The value of j is 6.70. Round this number to the next largest integer (7). Since the number of ratios is even, the lower confidence limit is found by counting *down* seven ratios beginning with the 20th-largest ratio (0.950) to obtain 0.890, and the upper limit is found

Appendix R

Google When to use a one-sample t-test

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The one-sample t-test is used only for tests of the sample mean. Thus, our hypothesis tests whether the average of our sample (M) suggests that our students come from a population with a know mean (m) or whether it comes from a different population.

One-Sample t-Test
www psychology emory edu cgi-bin cal/biwise/Tutorials/TOM/meanstests/tone htm

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One Sample T-Test - Statistics Solutions
www statisticssolutions com/manova-analysis-one-sample-t-test/ -
One sample t-test is a statistical procedure used to examine the mean difference between the sample and the known value of the population mean. In one sample t test, we know the population mean.

One-Sample t-Test
www psychology emory edu/cgi-bin/cal/biwise/Tutorials/TOM/meanstests/tone.htm -
The one sample t test is used only for tests of the sample mean. Thus, our hypothesis tests whether the average of our sample (M) suggests that our students come from a population with a know mean (m) or whether it comes from a different population.
One Sample Z · T-test for Dependent Means · T-test for Independent Means

One-Sample T-Test using SPSS Statistics - Laerd Statistics
https://statistics.laerd.com/spss-tutorials/one-sample-t-test-using-spss-statistics.php -
The one sample t test is used to determine whether a sample comes from a population with a specific mean. This "quick start" guide shows you how to carry out a one sample t test using SPSS Statistics, as well as interpret and report the results from this test. Fortunately, when

QMSS e-Lessons | One-Sample T-Test
cqmm.columbia.edu/projects/qmss/the_ttest/onesample_ttest.html -
To reiterate, the one-sample t-test compares the mean score of a sample to a ... the issues involved and demonstrate how to conduct a t-test using actual data.

Why should I use a 1-sample t-test? - Minitab
support.minitab.com/en-us/minitab/17/topic-library/basic-statistics-and-graphs/hypothesis-tests/tests-of-means/why-use-1-sample-t/ -
To perform this test, select Stat > Basic Statistics > 1 Sample t. Use the 1 sample t test to estimate the mean of a population and compare it to a target or reference value when you do not know the ... Alternative hypothesis. Choose one.

One Sample t-Test - YouTube

https://www.youtube.com/watch?v=VPdBDOL13Iw -
Aug 6, 2010 - Uploaded by statslectures
One Sample t Test ... which statistical test to be used when you know both sample as well as ... That is y we ...

One Sample t Test - SPSS Tutorials - LibGuides at Kent State University
libguides.library.kent.edu/SPSS/OneSampletTest -
4 days ago - The One Sample t Test determines whether the sample mean is ... data is significantly different than 86.5 inches using a one sample t test.

[PDF] One Sample T-test
faculty.umd.edu/psyc200/handouts/psyc200_0810.pdf -
Sample size can be small. The only difference between the z- and t-tests is that the t statistic estimates standard error by using the sample standard deviation.

[PDF] One-Sample T-Test - NCSS.com
www.ncss.com/wp-content/themes/ncss/pdf/Procedures/.../One-Sample_T-Test.pdf -
the one-sample t-test is the best choice for assessing whether the measure of ... This section describes the assumptions that are made when you use one of ...

Independent One-Sample T-Test - Testing Samples against a Population
https://explorable.com/independent-one-sample-t-test -

One-Sample T-Test using SPSS Statistics

Introduction

The one-sample t-test is used to determine whether a sample comes from a population with a specific mean. This population mean is not always known, but is sometimes hypothesized. For example, you want to show that a new teaching method for pupils struggling to learn English grammar can improve their grammar skills to the national average. Your sample would be pupils who received the new teaching method and your population mean would be the national average score. Alternately, you believe that doctors that work in Accident and Emergency (A & E) departments work 100 hour per week despite the dangers (e.g., tiredness) of working such long hours. You sample 1000 doctors in A & E departments and see if their hours differ from 100 hours.

This "quick start" guide shows you how to carry out a one-sample t-test using SPSS Statistics, as well as interpret and report the results from this test. However, before we introduce you to this procedure, you need to understand the different assumptions that your data must meet in order for a one-sample t-test to give you a valid result. We discuss these assumptions next.

One-Sample *t*-Test

Hypothesis

The one-sample *t*-test is used when we want to know whether our sample comes from a particular population but we do not have full population information available to us. For instance, we may want to know if a particular sample of college students is similar to or different from college students in general. The one-sample *t*-test is used only for tests of the sample mean. Thus, our hypothesis tests whether the average of our sample (M) suggests that our students come from a population with a know mean (μ) or whether it comes from a different population.

The statistical hypotheses for one-sample *t*-tests take one of the following forms, depending on whether your research hypothesis is directional or nondirectional. In the equations below μ_1 refers to the population from which the study sample was drawn; μ is replaced by the actual value of the population mean. The statistical hypotheses are identical to those used for one-sample *Z* tests.

$$H_0 : \mu_1 = \mu$$
$$H_A : \mu_1 \neq \mu$$

$$H_0 : \mu_1 \leq \mu$$
$$H_A : \mu_1 > \mu$$

$$H_0 : \mu_1 \geq \mu$$
$$H_A : \mu_1 < \mu$$

Study Design

The name of the one-sample *t*-test tells us the general research design of studies in which this statistic is selected to test hypotheses. We use the one-sample *t*-test when we collect data on a single sample drawn from a defined population. In this design, we have one group of subjects, collect data on these subjects and compare our sample statistic (M) to the population parameter (μ). The population parameter tells us what to expect if our sample came from that population. If our sample statistic is very different (beyond what

we would expect from sampling error), then our statistical test allows us to conclude that our sample came from a different population. Again, in the one-sample *t*-test, we are comparing the mean (M) calculated on a single set of scores (one sample) to a known population mean (μ).

Available Information

The one-sample *t*-test compares a sample to a defined population. When we say "defined" population, we are saying that the parameters of the population are known. We typically define a population distribution in terms of central tendency and variability/dispersion. But, for a one-sample *t*-test, only the population μ is known. The one-sample *t*-test cannot be done if we do not have μ. The population s is not required for the one-sample *t*-test. All *t*-tests estimate the population standard deviation using sample data (S). Population means are available in the technical manuals of measurement instruments or in research publications. Population information for the attachment scales used in the class dataset is available in the articles on reserve.

Test Assumptions

All parametric statistics have a set of assumptions that must be met in order to properly use the statistics to test hypotheses. The assumptions of the one-sample *t*-test are listed below. These assumptions are identical to those of the one-sample *Z* test.

- Random sampling from a defined population
- Interval or ratio scale of measurement
- Population is normally distributed

When reading the psychological literature, we can find many studies in which all of these assumptions are violated. Random sampling is required for all statistical inference because it is based on probability. Random samples are difficult to find, however, and psychologists and researchers in other fields will use inferential statistics but discuss the sampling limitations in the article. We learned in our scale of measurement tutorial that psychologists will apply parametric statistics like the *t* test for dependent means on approximately interval scales even though the tests require interval or ratio data. This is an accepted practice in psychology and one that we use when we analyze our class data. Finally, the assumption of normal distribution in the population is considered "robust". This means that the the statistic has been shown to yield useful results even when the assumption is violated. The central limit theorem tells us that even if the population distribution is unknown, we know that the sampling distribution of the mean will be

approximately normally distributed if the sample size is large. This helps to contribute to the *t*-test being robust for violations of normal distribution. There are conditions we may encounter when we should not use the t-test for dependent means. If we are conducting a directional test and our sample data are highly skewed, we should consider a nonparametric alternative.

Click here to review the one-sample *Z* test:	One-Sample *Z*
Click here to review the t-test for dependent means:	Dependent *t*
Click here to review the t-test for independent means:	Independent *t*
Click here to return to the main page:	Main Page

Appendix S

SECOND CANADIAN EDITION

Statistics
A First Course

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Toronto Montréal Boston Burr Ridge, IL Dubuque, IA Madison, WI New York San Francisco
St. Louis Bangkok Bogotá Caracas Kuala Lumpur Lisbon London Madrid
Mexico City Milan New Delhi Santiago Seoul Singapore Sydney Taipei

Example 3.16 **AIDS in the Americas** In Example 3.12 (page 65), we found that the mean rate of incidence of AIDS per 100,000 in 1995 for the Americas was 13.81. Obtain the standard deviation of this data set.

◆ **Solution:**

Two possible ways of answering this question are to use either formula 3.5 or 3.6. But, examining *Figures 3.15a* and *3.15b*, we find that MINITAB and the TI-83 calculator, in addition to calculating the measures of central tendency that we have previously considered, also compute several other items, including the standard deviation, denoted as "StDev" by MINITAB and as "Sx" by the TI-83 calculator. Both agree that for this data, $s = 23.92$. ◆

Interpreting the Standard Deviation

We know that dispersion is the amount of spread or scatter that occurs in a data set. If, for example, the values in the set are clustered tightly about their mean, the measured dispersion—in this case the standard deviation—is small. But if we have other data sets where the values become more and more scattered about their means, the standard deviations for those sets become larger and larger. To summarize, then, if a standard deviation is small, the items in the data set are bunched about their mean, and if the standard deviation is large, the data items are widely dispersed about their mean. To drive home this generalization in a more tangible way, let's first consider *Chebyshev's theorem*.

Russian mathematician P. P. Chebyshev has been dead for a century now, but his theorem lives on.

STATISTICS IN ACTION

Government Statistical Engines

Many government departments collect descriptive statistics that have multiple uses. Every five years, Statistics Canada tries to determine how many people there are in the provinces and in the country. These figures, along with facts about births and deaths that are generated elsewhere to advance public health, are raw materials used by demographers—the scientists who analyze the characteristics of human populations. Similarly, government-generated international trade data and weather facts support the development of new insights in economics and atmospheric sciences.

Chebyshev's Theorem

Chebyshev's theorem states that the proportion of *any* data set that lies within k standard deviations of the mean (where k is any positive number greater than or equal to 1) is *at least* $1 - (1/k^2)$.

Thus, if we substitute 2 for k in the theorem, we get $1 - (1/k^2) = 1 - (1/2^2) = 1 - (1/4) = 3/4$, or, in percentage form, $3/4 \times 100 = 75$ percent. This result means that *at least* 75 percent of the items in *any* data set (no matter how skewed it is) must lie within two standard deviations of the mean. And at least 88.9 percent [$1 - (1/3^2)$ or 8/9] of the items in *any* data set must fall within three standard deviations of the mean.

Chebyshev's theorem shows us how the standard deviation is related to the scatter of data items. But it tells us only the minimum percentage of items that must fall within given intervals in any data set. We've seen earlier (and in *Figure 3.8* on page 53) though that many data sets have values that are found to be distributed or scattered about their means in reasonably symmetrical ways.

For bell-shaped distributions, known as normal distributions, the *empirical rule* applies and is of greater significance than Chebyshev's theorem.

Empirical Rule

The empirical rule for distributions that are generally bell-shaped or normal is that

- About 68 percent of all data items lie within one standard deviation of the mean ($\mu \pm 1\sigma$ or $\bar{x} \pm 1s$).
- About 95 percent of all data items lie within two standard deviations of the mean ($\mu \pm 2\sigma$ or $\bar{x} \pm 2s$).
- About 99.7 percent of all data items lie within three standard deviations of the mean ($\mu \pm 3\sigma$ or $\bar{x} \pm 3s$).

Let's look at an example of an application of this empirical rule. Suppose that many people are given a new type of IQ test, and the resulting raw scores are organized into a frequency distribution. A frequency polygon is prepared from the distribution and is found to be symmetrical in shape. The arithmetic mean of this mound-shaped distribution is 100 points, and the standard deviation is ten points. In this situation, the mean IQ score is directly under the peak of the curve, and the following relationships exist: (1) about 68 percent of the test scores fall within one standard deviation of the mean—that is, about 68 percent of the people have test scores between 90 and 110 points; (2) about 95 percent of the test scores fall within two standard deviations of the mean—that is, about 95 percent of those taking the test have scores between 80 and 120 points; and (3) virtually all (99.7 percent) of the test scores fall within three standard deviations of the mean (scores between 70 and 130). *Figure 3.21* shows these relationships.

The relationships that exist between the mean and the standard deviation in a bell-shaped distribution may also be used for analysis purposes with distributions that are only approximately symmetrical. Let's return to our Slimline Fizzy Cola example and interpret the meaning of the standard deviation of 14.78 litres, since that distribution is approximately normal. We can conclude that about the middle two-thirds of the 50 employees sold syrup quantities between $\bar{x} \pm 1s$, that is, between 115.20 litres ± 14.78

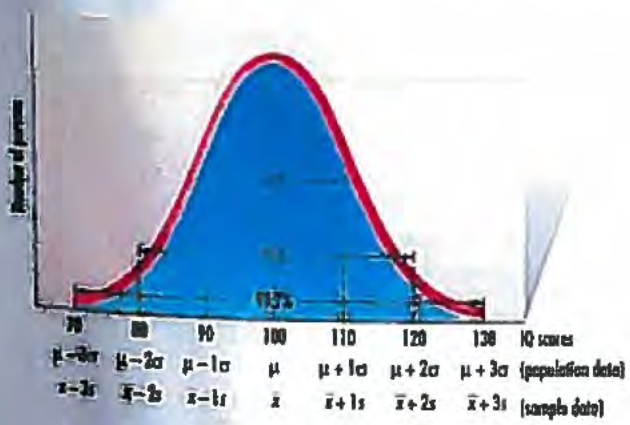

FIGURE 3.21 Illustration of the empirical rule

Appendix T

Standard on Ratio Studies

Approved April 2013

INTERNATIONAL ASSOCIATION OF ASSESSING OFFICERS

The assessment standards set forth herein represent a consensus in the assessing profession and have been adopted by the Executive Board of the International Association of Assessing Officers. The objective of these standards is to provide a systematic means by which concerned assessing officers can improve and standardize the operation of their offices. The standards presented here are advisory in nature and the use of or compliance with such standards is purely voluntary. If any portion of these standards is found to be in conflict with the Uniform Standards of Professional Appraisal Practice (USPAP) or state laws, USPAP and state laws shall govern.

4.5 Sample Representativeness

In general, a ratio study is valid to the extent that the sample is sufficiently *representative* of the population.

The distribution of ratios in the population cannot be ascertained directly and appraisal accuracy can vary from property to property. By definition, a ratio study sample would be representative when the distribution of ratios of properties in the sample reflects the distribution of ratios of properties in the population. Representativeness is improved when the sample proportionately reflects major property characteristics present in the population of sold and unsold properties. As long as sold and unsold parcels are appraised in the same manner and the sample is otherwise representative, statistics calculated in a sales ratio study can be used to infer appraisal performance for unsold parcels.

However, if parcels that sell are selectively reappraised based on their sale prices and if such parcels are in the ratio study, uniformity inferences will not be accurate (appraisals appear more uniform than they are). In this situation, measures of appraisal level also will not be supportable unless similar unsold parcels are appraised by a model that produces the same overall percentage of market value (appraisal level) as on the parcels that sold (see Appendix E, "Sales Chasing Detection Techniques"). Assessing officials must incorporate a quality control program; including checks and audits of the data, to ensure that sold and unsold parcels are appraised at the same level.

Operationally, representativeness is improved when the following occur:

1. Appraisal procedures used to value the sample parcels are similar to procedures used to value the corresponding population
2. Accuracy of recorded property characteristics data for sold property does not differ substantially from that of unsold property,
3. Sample properties are not unduly concentrated in certain areas or types of property whose appraisal levels differ from the general level of appraisal in the population
4. Sales have been appropriately screened and validated (see Appendix A).

The first requirement generally is met unless sampled parcels are valued or updated differently from nonsampled parcels, or unless appraisals of sample parcels were done at a different time than appraisals of nonsampled parcels. For example, it is unlikely that the sample is representative of unsold parcels when the sample consists mostly of new construction, first-time sales of improved properties, condominium conversions, or newly platted lots.

The second requirement is met only if value-related property characteristics are updated uniformly for all property in a class as opposed to being updated only upon sale.

The third requirement relates to the extent to which appraisal performance for the sample reflects appraisal performance for the population.

The fourth requirement generally is met when the sales to be used in the sample are properly screened, adjusted if necessary, and validated.

4.6 Acquisition and Validation of Sales Data

Sales data are important in ratio studies and play a crucial role in any credible and efficient mass appraisal system. In some instances, it may be necessary to make adjustments to sales prices so they are more representative of the market. When there is more than one sale of the same property during a study period, only one of the transactions should be used in the ratio study. For guidelines on sales validation see Appendix A.

5. Ratio Study Statistics and Analyses

Once data have been properly collected, reviewed, assembled, and adjusted, outlier handling and statistical analysis can begin. This process involves the following steps.

1. A ratio should be calculated for each observation in the sample by dividing the appraised (or assessed) value by the sale price.
2. Graphs and exhibits can be developed that show the distribution of the ratios.
3. Exploratory data analysis, including outlier identification and screening, and tests of the hypotheses of normality may be conducted.
4. Ratio study statistics of both appraisal level and uniformity should be calculated.
5. Reliability measures should be calculated.

An example of a ratio study statistical analysis report is given in table 1-1.

5.1 Data Displays

Displays or exhibits that provide a profile or picture of ratio study data are useful for illustrating general patterns and trends, particularly to nonstatisticians. The particular form of the displays, as well as the data used (e.g., sales prices, sales ratios, and property characteristics) depends on the purposes of the particular display. Types of displays useful in ratio studies are arrays, frequency distributions, histograms, plots, and maps (Gloudemans 1999).

Graphic displays can be used to

- indicate whether a sample is sufficiently representative of the properties in a stratum
- indicate the degree of nonnormality in the distribution of ratios
- depict the overall level of appraisal

Table 1-1. Example of Ratio Study Statistical Analysis Data Analyzed

Rank of observation	Appraised value ($)	Sale Price ($)	Ratio (AV/SP)
1	48,000	138,000	0.348
2	28,800	59,250	0.486
3	78,400	157,500	0.498
4	39,840	74,400	0.535
5	68,160	114,900	0.593
6	94,400	159,000	0.594
7	67,200	111,900	0.601
8	56,960	93,000	0.612
9	87,200	138,720	0.629
10	38,240	59,700	0.641
11	96,320	146,400	0.658
12	67,680	99,000	0.684
13	32,960	47,400	0.695
14	50,560	70,500	0.717
15	61,360	78,000	0.787
16	47,360	60,000	0.789
17	58,080	69,000	0.842
18	47,040	55,500	0.848
19	136,000	154,500	0.880
20	103,200	109,500	0.942
21	59,040	60,000	0.984
22	168,000	168,000	1.000
23	128,000	124,500	1.028
24	132,000	127,500	1.035
25	160,000	150,000	1.067
26	160,000	141,000	1.135
27	200,000	171,900	1.163
28	184,000	157,500	1.168
29	160,000	129,600	1.235
30	157,200	126,000	1.248
31	99,200	77,700	1.277
32	200,000	153,000	1.307
33	64,000	48,750	1.313
34	192,000	144,000	1.333
35	190,400	141,000	1.350
36	65,440	48,000	1.363

Note: Due to rounding, totals may not add to match those on following table, which reports results of statistical analysis of above data.

Results of statistical analysis

Statistic	Result
Number of observations in sample	36
Total appraised value	$3,627,040
Total sale price	$3,964,620
Average appraised value	$100,751
Average sale price	$110,128
Mean ratio	0.900
Median ratio	0.864
Weighted mean ratio	0.915
Coefficient of dispersion (COD)	29.8%
Price-related differential (PRD)	0.98
Price-related bias (PRB) coefficient (*t*-value)	.232 (3.01)
95% median two-tailed confidence interval	(0.684, 1.067)
95% weighted mean two-tailed confidence interval	(0.806, 1.024)
Normal distribution of ratios (0.05 level of significance)	Reject—D'Agostino, Pearson K^2, and Shapiro-Wilk W
Date of analysis	9/99/9999
Category or class being analyzed	Residential

- depict the degree of uniformity
- depict the degree of value bias (regressivity or progressivity)
- compare the level of appraisal or degree of uniformity among strata
- detect outlier ratios
- identify specific opportunities to improve mass appraisal performance
- track performance measures over time

5.2 Outlier Ratios

Outlier ratios are very low or high ratios as compared with other ratios in the sample. The validity of ratio study statistics used to make inferences about population parameters could be compromised by the presence of outliers that distort the statistics computed from the sample. One extreme outlier can have a controlling influence over some statistical measures. However, some statistical measures, such as the median ratio, are resistant to the influence of outliers and trimming would not be required. Although the coefficient of dispersion (COD) is affected by extreme ratios, it is affected to a lesser extent than the coefficient of variation (COV) and the mean. The weighted mean and price-related differential (PRD) are sensitive to sales with high prices even if the ratios on higher priced sales do not appear unusual relative to other sales. Regression analysis, sometimes used in assessment ratio analyses (e.g., when ratios are regressed on sales prices or property characteristics, such as lot size or living area), is also affected by outliers: both ratio outliers and outliers based on the comparison characteristics (an excellent treatment of the assumptions made in regression and deviations from can be found in Cook, R.D. and Weisberg, S. 1982).

Outlier ratios can result from any of the following:

1. an erroneous sale price
2. a nonmarket sale
3. unusual market variability
4. a mismatch between the property sold and the property appraised
5. an error in the appraisal of an individual parcel
6. an error in the appraisal of a subgroup of parcels
7. any of a variety of transcription or data handling errors

In preparing any ratio study, outliers should be

1. identified
2. scrutinized to validate the information and correct errors
3. trimmed if necessary to improve sample representativeness

indicates, for example, that assessment ratios fall by 4.5% when values double and increase by 4.5% when values are halved. Like all regression coefficients, the statistical reliability of the PRB can be gauged by noting its *t*-value and related significance level, and by computing confidence intervals. In table 1-4 the PRB is -0.035 and is not statistically significant.

Unacceptable vertical inequities should be addressed through reappraisal or other corrective actions. In some cases, additional stratification can help isolate the problem. Measures of level computed for value strata should not be compared as a way of determining vertical inequity because of a boundary effect that is most pronounced in the highest and lowest strata (Schultz 1996).

5.7 Tests of Hypotheses

An appropriate test should be used whenever the purpose of a ratio study is implicitly or explicitly to test a hypothesis. A hypothesis is essentially a tentative answer to a question, such as, Are residential and commercial properties appraised at equal percentages of market value? A test is a statistical means of deciding whether the answer "yes" to such a question can be rejected at a given level of confidence. In this case, if the test leads to the conclusion that residential and commercial properties are not appraised at equal percentages of market value, some sort of corrective action on the part of assessing officials is clearly indicated.

Tests are available to determine whether the

- level of appraisal of a stratum fails to meet an established standard
- meaningful differences exist in the level of appraisal between two or more strata
- high-value properties are appraised at a different percentage of market value than low-value properties

Appropriate tests are listed in table 1-2 and discussed in Gloudemans (1999), *Property Appraisal and Assessment Administration* (IAAO 1990), and *Improving Real Property Assessment* (IAAO 1978, 137–54).

5.8 The Normal Distribution

Many conventional statistical methods assume the sample data conform to the shape of a bell curve, known as the normal (or Gaussian) distribution. Performance measures based on the mean or standard deviation can be misleading if the study sample does not meet the assumption of normality. As a first step in the analysis, the distribution of sample ratios should be examined to reveal the shape of the data and uncover any unusual features. Although ratio study samples typically do not conform to the normal distribution, graphical techniques and numerical tests can be used to explore the data thoroughly. Traditional choices are the binomial, chi-square, and Lilliefors tests. Newer and more powerful procedures are the Shapiro-Wilk W, the D'Agostino-Pearson K^2, and the Anderson-Darling A^2 tests (D'Agostino and Stephens 1986).

5.9 Parametric and Distribution-Free (Nonparametric) Statistics

For every problem that might be solved by using statistics, there is usually more than one measure or test. These measures and tests can be divided into two broad categories: parametric and distribution-free (nonparametric). Parametric statistics assume the population data conform to a known family of probability distributions (such as the normal distribution). When the mean, weighted mean, and standard deviation are used in this context, they tend to be more meaningful. Distribution-free statistics make less restrictive assumptions and do not require knowledge about the shape of the underlying population distribution. Given similar distribution of ratios in the underlying populations, distribution free tests, such as the Mann-Whitney test, can determine the likelihood that the level of assessment

Table 1-2. Tests of Hypotheses

Null Hypothesis	Nonparametric Test	Parametric Test
1. Ratios are normally distributed.	Shapiro-Wilk W test D'Agostino-Pearson K^2 test Anderson-Darling A^2 test Lillifores Test	N/A
2. The level of appraisal meets legal requirements.	Binomial test	*t*-test
3. Two property groups are appraised at equal percentages of market value.	Mann-Whitney test	*t*-test
4. Three or more property groups are appraised at equal percentages of market value.	Kruskal-Wallis test	Analysis of Variance
5. Low- or high-value properties are appraised at equal percentages of market value.	Spearman Rank test	PRB, correlation or regression analysis
6. Sold and unsold parcels are treated equally.	Mann-Whitney test	*t*-test

to determine whether it can be reasonably concluded that appraisal level differs from the established goal in a particular instance. Additionally, when uniformity measures show considerable variation between ratios, level measurements may be less meaningful.

9.1.1 Purpose of Level-of-Appraisal Standard

Jurisdictions that follow the IAAO recommendation of annual revaluations *(Standard on Property Tax Policy* [IAAO 2010] and *Standard on Mass Appraisal of Real Property* [IAAO 2013]) and comply with USPAP standard rules should be able to develop mass appraisal models that maintain an overall ratio level of 100 percent (or very near thereto). However, the local assessor may be compelled to follow reappraisal cycles defined by a legal authority or public policy that can extend beyond one year. During extended cycles the influence of inflation or deflation can shift the overall ratio.

The purpose of a performance standard that allows reasonable variation from 100 percent of market value is to recognize uncontrollable sampling error and the limiting conditions that may constrain the degree of accuracy that is possible and cost-effective within an assessment jurisdiction. Further, the effect of performance standards on local assessors must be considered in light of public policy and resources available.

9.1.2 Confidence Intervals in Conjunction with Performance Standards

The purpose of confidence intervals and similar statistical tests is to determine whether it can be reasonably concluded that the appraisal level differs from the established performance standard in a particular instance. A conclusion of noncompliance requires a high degree of confidence; thus, a 90 percent (two-tailed) or 95 percent (one-tailed) confidence level should be used, except for small or highly variable samples. The demonstration ratio study report in table 1-4 presents 95% two-tailed confidence interval estimates for the mean, median, and weighted mean ratio.

9.2 Appraisal Uniformity

Assuming the existence of an adequate and sufficiently representative sample, if the uniformity of appraisal is unacceptable, model recalibration and/or reappraisal should be undertaken. It is important to recognize that the COD is a point estimate and, especially for small samples, should not be accepted as proof of assessment uniformity problems. Proof can be provided by recognized statistical tests, including bootstrap confidence intervals.

In unusually homogeneous strata, low CODs can be anticipated. In all other cases, CODs less than 5 percent should be considered suspect and possibly indicative of nonrepresentative samples or selective reappraisal of selling parcels.

9.2.1 Uniformity among Strata

Although the goal is to achieve an overall level of appraisal equal to 100 percent of the legal requirement, ensuring uniformity in appraisal levels among strata also is important. The level of appraisal of each stratum (class, neighborhood, age group, market areas, and the like) should be within 5 percent of the overall level of appraisal of the jurisdiction. For example, if the overall level of appraisal of the jurisdiction is 1.00, but the appraisal

Table 1-4. Demonstration Ratio Study Report

Rank	Parcel #	Appraised value	Sale price*	Ratio	Statistic	Result
1	9	$87,200	138,720	0.629	Number (n)	17
2	10	38,240	59,700	0.641	Total appraised value	$1,455,330
3	11	96,320	146,400	0.658	Total sale price	$1,718,220
4	12	68,610	99,000	0.693	Avg appraised value	$85,608
5	13	32,960	47,400	0.695	Avg sale price	$101,072
6	14	50,560	70,500	0.717		
7	15	61,360	78,000	0.787	Mean ratio	0.827
8	16	47,360	60,000	0.789	Median ratio	0.820
9	17	56,580	69,000	0.820	Weighted mean ratio	0.847
10	18	47,040	55,500	0.848		
11	19	136,000	154,500	0.880	Coefficient of dispersion	14.5
12	20	98,000	109,500	0.895	Price-related differential	0.98
13	21	56,000	60,000	0.933	PRB	−0.035
14	22	159,100	168,000	0.947	PRB coefficient (*t*-value)	0.135 (2.4)
15	23	128,000	124,500	1.028		
16	24	132,000	127,500	1.035	95% conf. int. mean (two-tailed)	0.754 to 0.901
17	25	160,000	150,000	1.067	95% conf. int. median (two-tailed)	0.695 to 0.933
					95% conf. int. wtd. mean (two-tailed)	0.759 to 0.935

Date: 0/0/00. No outlier trimming

** or adjusted sale price*

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Normality Tests for Statistical Analysis: A Guide for Non-Statisticians

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Abstract

Go to

Statistical errors are common in scientific literature and about 50% of the published articles have at least one error. The assumption of normality needs to be checked for many statistical procedures, namely parametric tests, because their validity depends on it. The aim of this commentary is to overview checking for normality in statistical analysis using SPSS.

Keywords: Normality, Statistical Analysis

1. Background

Go to

Statistical errors are common in scientific literature, and about 50% of the published articles have at least one error (1). Many of the statistical procedures including correlation, regression, t tests, and analysis of variance, namely parametric tests, are based on the assumption that the data follows a normal distribution or a Gaussian distribution (after Johann Karl Gauss, 1777–1855); that is, it is assumed that the populations from which the samples are taken are normally distributed (2-5). The assumption of normality is especially critical when constructing reference intervals for variables (6). Normality and other assumptions should be taken seriously, for when these assumptions do not hold, it is impossible to draw accurate and reliable conclusions about reality (2, 7).

With large enough sample sizes (> 30 or 40), the violation of the normality assumption should not cause major problems (4); this implies that we can use parametric procedures even when the data are not normally distributed (8). If we have samples consisting of hundreds of observations, we can ignore the distribution of the data (3). According to the central limit theorem, (a) if the sample data are approximately normal then the sampling distribution too will be normal; (b) in large samples (> 30 or 40), the sampling distribution tends to be normal, regardless of the shape of the data (2, 8); and (c) means of random samples from any distribution will themselves have normal distribution (3). Although true normality is considered to be a myth (8), we can look for normality visually by using normal plots (2, 3) or by significance tests, that is, comparing the sample distribution to a normal one (2, 3). It is

important to ascertain whether data show a serious deviation from normality (8). The purpose of this report is to overview the procedures for checking normality in statistical analysis using SPSS.

2. Visual Methods

Go to:

Visual inspection of the distribution may be used for assessing normality, although this approach is usually unreliable and does not guarantee that the distribution is normal (2, 3, 7). However, when data are presented visually, readers of an article can judge the distribution assumption by themselves (9). The frequency distribution (histogram), stem-and-leaf plot, boxplot, P-P plot (probability-probability plot), and Q-Q plot (quantile-quantile plot) are used for checking normality visually (2). The frequency distribution that plots the observed values against their frequency, provides both a visual judgment about whether the distribution is bell shaped and insights about gaps in the data and outliers outlying values (10). The stem-and-leaf plot is a method similar to the histogram, although it retains information about the actual data values (8). The P-P plot plots the cumulative probability of a variable against the cumulative probability of a particular distribution (e.g., normal distribution). After data are ranked and sorted, the corresponding z-score is calculated for each rank as follows: $z = x - \bar{x}/s$. This is the expected value that the score should have in a normal distribution. The scores are then themselves converted to z-scores. The actual z-scores are plotted against the expected z-scores. If the data are normally distributed, the result would be a straight diagonal line (2). A Q-Q plot is very similar to the P-P plot except that it plots the quantiles (values that split a data set into equal portions) of the data set instead of every individual score in the data. Moreover, the Q-Q plots are easier to interpret in case of large sample sizes (2). The boxplot shows the median as a horizontal line inside the box and the interquartile range (range between the 25 th to 75 th percentiles) as the length of the box. The whiskers (line extending from the top and bottom of the box) represent the minimum and maximum values when they are within 1.5 times the interquartile range from either end of the box (10). Scores greater than 1.5 times the interquartile range are out of the boxplot and are considered as outliers, and those greater than 3 times the interquartile range are extreme outliers. A boxplot that is symmetric with the median line at approximately the center of the box and with symmetric whiskers that are slightly longer than the subsections of the center box suggests that the data may have come from a normal distribution (8).

3. Normality Tests

Go to:

The normality tests are supplementary to the graphical assessment of normality (8). The main tests for the assessment of normality are Kolmogorov-Smirnov (K-S) test (7), Lilliefors corrected K-S test (7, 10), Shapiro-Wilk test (7, 10), Anderson-Darling test (7), Cramer-von Mises test (7), D'Agostino skewness test (7), Anscombe-Glynn kurtosis test (7), D'Agostino-Pearson omnibus test (7), and the Jarque-Bera test (7). Among these, K-S is a much used test (11) and the K-S and Shapiro-Wilk tests can be conducted in the SPSS Explore procedure (Analyze → Descriptive Statistics → Explore → Plots → Normality plots with tests) (8).

The tests mentioned above compare the scores in the sample to a normally distributed set of scores with the same mean and standard deviation; the null hypothesis is that "sample distribution is normal." If the test is significant, the distribution is non-normal. For small sample sizes, normality tests have little power to reject the null hypothesis and therefore small samples most often pass normality tests (7). For large sample sizes, significant results would be derived even in the case of a small deviation from normality (2, 7), although this small deviation will not affect the results of a parametric test (7). The K-S test is an empirical distribution function (EDF) in which the theoretical cumulative distribution function of the test distribution is contrasted with the EDF of the data (7). A limitation of the K-S test is its high sensitivity to extreme values; the Lilliefors correction renders this test less conservative (10). It has been reported that the K-S test has low power and it should not be seriously considered for testing

normality (11). Moreover, it is not recommended when parameters are estimated from the data, regardless of sample size (12).

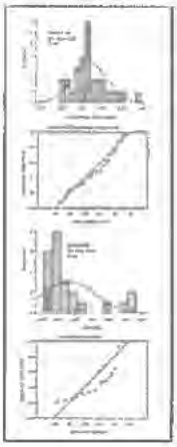
The Shapiro-Wilk test is based on the correlation between the data and the corresponding normal scores (10) and provides better power than the K-S test even after the Lilliefors correction (12). Power is the most frequent measure of the value of a test for normality—the ability to detect whether a sample comes from a non-normal distribution (11). Some researchers recommend the Shapiro-Wilk test as the best choice for testing the normality of data (11).

4. Testing Normality Using SPSS

Go to

We consider two examples from previously published data: serum magnesium levels in 12–16 year old girls (with normal distribution, n = 30) (13) and serum thyroid stimulating hormone (TSH) levels in adult control subjects (with non-normal distribution, n = 24) (14). SPSS provides the K-S (with Lilliefors correction) and the Shapiro-Wilk normality tests and recommends these tests only for a sample size of less than 50 (8).

In Figure, both frequency distributions and P-P plots show that serum magnesium data follow a normal distribution while serum TSH levels do not. Results of K-S with Lilliefors correction and Shapiro-Wilk normality tests for serum magnesium and TSH levels are shown in Table. It is clear that for serum magnesium concentrations, both tests have a p-value greater than 0.05, which indicates normal distribution of data, while for serum TSH concentrations, data are not normally distributed as both p values are less than 0.05. Lack of symmetry (skewness) and pointiness (kurtosis) are two main ways in which a distribution can deviate from normal. The values for these parameters should be zero in a normal distribution. These values can be converted to a z-score as follows:



Figure

Histograms (Left) and P-P Plots (Right) for Serum Magnesium and TSH Levels

Table

Skewness, kurtosis, and Normality Tests for Serum Magnesium and TSH Levels Provided by SPSS

$Z_{Skewness} = Skewness\text{-}0 / SE_{Skewness}$ and $Z_{Kurtosis} = Kurtosis\text{-}0 / SE_{Kurtosis}$.

An absolute value of the score greater than 1.96 or lesser than -1.96 is significant at $P < 0.05$, while greater than 2.58 or lesser than -2.58 is significant at $P < 0.01$, and greater than 3.29 or lesser than -3.29 is significant at $P < 0.001$. In small samples, values greater or lesser than 1.96 are sufficient to establish normality of the data. However, in large samples (200 or more) with small standard errors, this criterion should be changed to ± 2.58 and in very large samples no criterion should be applied (that is, significance tests of skewness and kurtosis should not be used) (2). Results presented in Table indicate

that parametric statistics should be used for serum magnesium data and non-parametric statistics should be used for serum TSH data.

5. Conclusions

Go to:

According to the available literature, assessing the normality assumption should be taken into account for using parametric statistical tests. It seems that the most popular test for normality, that is, the K-S test, should no longer be used owing to its low power. It is preferable that normality be assessed both visually and through normality tests, of which the Shapiro-Wilk test, provided by the SPSS software, is highly recommended. The normality assumption also needs to be considered for validation of data presented in the literature as it shows whether correct statistical tests have been used.

Acknowledgments

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Footnotes

Go to:

Implication for health policy/practice/research/medical education: Data presented in this article could help for the selection of appropriate statistical analyses based on the distribution of data.

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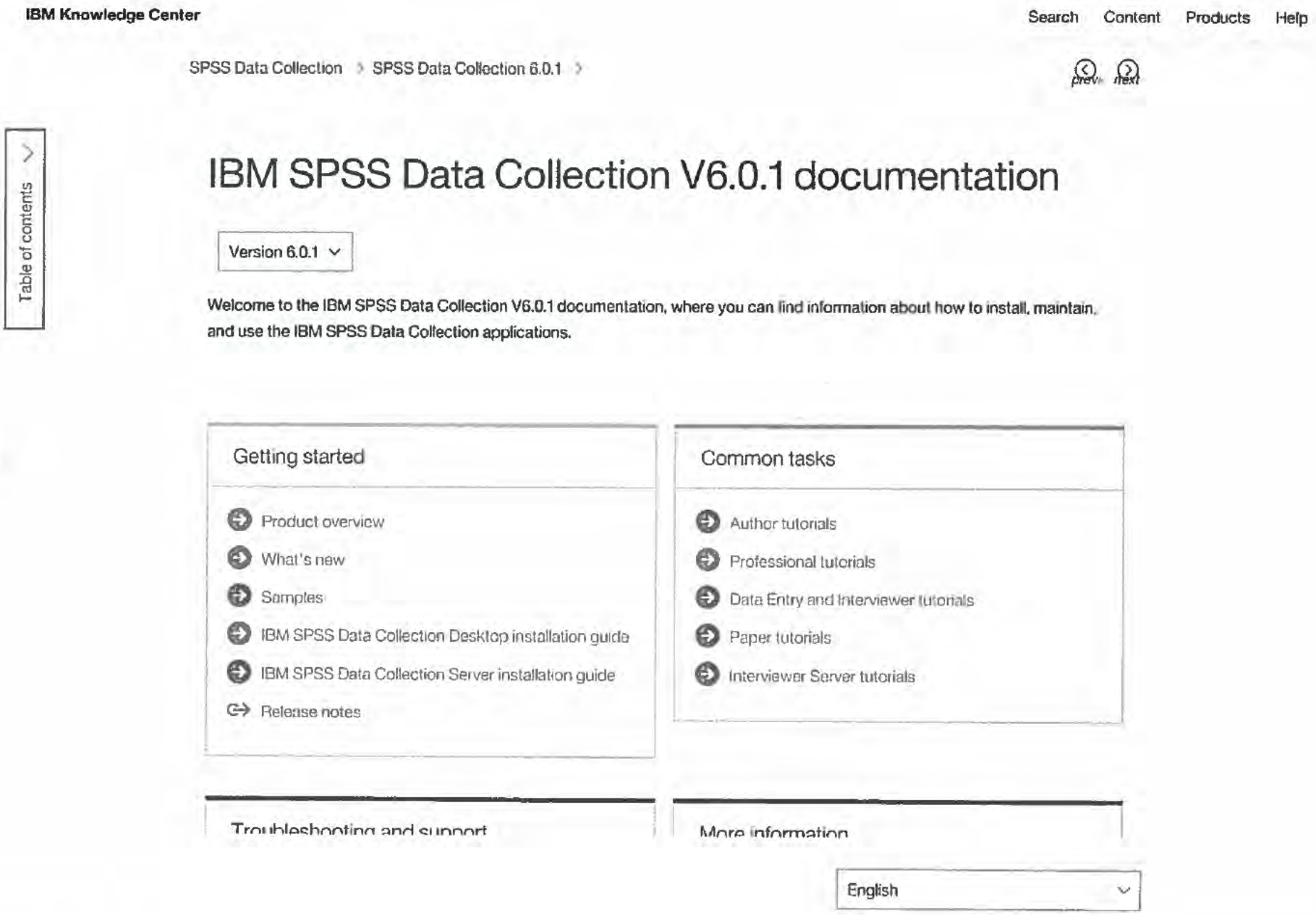

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Version 6.0.1

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Significance value

The significance value, or p value, is the probability that a result occurred by chance. The significance value is compared to a predetermined cutoff (the significance level) to determine whether a test is statistically significant. If the significance value is less than the significance level (by default, 0.05), the test is judged to be statistically significant.

The significance value does not indicate whether a result is practically significant. Effect size is another measure from a statistical test. It helps determine the practical significance. IBM® Watson Analytics™ uses both the significance value and the effect size to determine whether a result is important enough to display.

Parent topic:

Statistical terms

Setting the Significance Levels

Version 6.0.1

By default, the column proportions, column mean, net difference test, and paired preference tests are run at the 5% significance level. However, you can optionally run a test at another significance level, such as the 10% or 1% significance level.

You can also run the test at two significance levels on the same table. In the resulting table, the IDs of columns that are significant at the higher level appear in upper case, and those that are significant at the lower level appear in lower case.

You select this option using the *SigLevel* statistics property. For example:

```
TableDoc.Tables.MyTable.Statistics[0].Properties("SigLevel") = 1
```

The Statistics and Statistic objects implement the mrScriptBasic dynamic property expansion feature. This means that an alternative way of writing this would be:

```
TableDoc.Tables.MyTable.Statistics.ColumnProportions.SigLevel = 1
```

See the topic Dynamic Property Expansion for more information.

To run the test at two significance levels, use the *SigLevelLow* statistics property to display the lower significance level. For example:

```
TableDoc.Tables.MyTable.Statistics.ColumnProportions.SigLevel = 1
TableDoc.Tables.MyTable.Statistics.ColumnProportions.SigLevelLow = 5
```

In the resulting table, the IDs of columns that are significant at the higher level appear in upper case, and those that are significant at the lower level appear in lower case.

Note: If you are using two levels of significance, ensure that the value of the *SigLevelLow* property is greater than that of the *SigLevel* property, as it represents a higher probability that the results are due to chance, and therefore a lower level of significance.

What value should I use for significance level?

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Before you do a hypothesis test, you must choose a significance level for the test. Use the significance level to judge whether the test results are statistically significant. The significance level also determines the probability of error that is inherent in the test.

If the probability that an event occurs is less than α, the usual interpretation is that the event did not occur by chance. Formally, α is the maximum acceptable level of risk for rejecting a true null hypothesis (Type I error) and is expressed as a probability ranging between 0 and 1. The smaller the significance level, the less likely you are to make a Type I error, and the more likely you are to make a Type II error. Therefore, you should choose an alpha that balances these opposing risks of error based on their practical consequences in your specific situation.

Usually, a significance level (denoted as α or alpha) of 0.05 works well. A significance level of 0.05 indicates a 5% risk of concluding that a difference exists when there is no actual difference.

When to choose a larger alpha

Choose a larger alpha, such as 0.10, to be more certain that you will not miss detecting a difference that might exist.

For example, an engine manufacturer wants to compare the stability of new ball bearings with the current ones. If the new ball bearings are less stable, customers could have disastrous consequences. Therefore, they choose an α of 0.1 to be more certain that they will detect any possible difference in the stability.

When to choose a smaller alpha

Choose a smaller alpha, such as 0.01, to be more certain that you will only detect a difference that really does exist.

For example, a pharmaceutical company wants to be very certain before making an advertising claim that its new product significantly reduces symptoms. The company chooses an α of 0.001 to be sure that any significant difference in symptoms that they detect actually does exist.

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