

Appendix A – Stakeholder Contacts

Stakeholder Contacts

Company: LTD Properties
Address: 106 North Third Street
Grand Forks, North Dakota 58203
Contact: Dan Sampson
Phone: (701) 885-1111
Fax: (701) 795-1111

Company: Central High School
Address: 115 North Fourth Street
Grand Forks, North Dakota 58503
Contact: Jeff Schatz – Principal
Phone: (701) 746-2375
Fax: (701) 746-2387 → Attn. Jeff Schatz

Company: Dakota Harvest Bakers
Address: 17 North Third Street
Grand Forks, North Dakota 58203-3713
www.dakotaharvest.com
Contact: Paul D. Holje or George E. Kelley
Phone: (701) 722-2100
Email: paul@dakotaharvest.com
george@dakotaharvest.com

Company: Amazing Grains
Address: 214 Demers Avenue
Grand Forks, North Dakota 58201
Contact: Betsy Perkins
Phone: (701) 775-4542
Fax: (701) 787-7068

Company: Widman's
Address: 106 South Third Street
Grand Forks, North Dakota 58201
Contact: George Widman
Phone: (701) 775-3480
Fax: (701) 775-5590

Company: Avant Hair & Skin Care Studio
Address: 33A South Third Street
Grand Forks, North Dakota 58201
www.avanthairstudio.com
Contact: Sommar Broden
Phone: (701) 775-5333
Email: sommarbroden@hotmail.com

Company: Sanders Dakota Cuisine
Address: 22 South Third Street
Grand Forks, North Dakota 58201
Contact: P. Kimball Holmes – Owner/Chef
Phone: (701) 746-8970
Email: kim@sanders1907.com

Company: Wells Fargo
Address: 33 South Third Street, Suite E
Grand Forks, North Dakota 58201
Contact: Judd Graham - President
Phone: (701) 792-5964
Cell: (218) 779-0563
Fax: (701) 775-2114
Email: judd.graham@wellsfargo.com

Company: Meadowbrook Furniture
Address: 308 Demers Avenue
Grand Forks, North Dakota 58201
Contact: Julie Danks
Phone: (701) 795-5709
Fax: (701) 795-5713
Email: meadowbrookhf@hotmail.com

Company: Marcil Management Inc.
Address: 4200 James Ray Drive
Grand Forks, North Dakota 58203
Contact: Sondre Loberg – Regional/Local Property Manager
Phone: (701) 739-2077
Fax: (701) 777-2339
Email: sondre@marcilgroup.com

Company: The Toasted Frog
Address: 124 North Third Street
Grand Forks, North Dakota
Contact: Sean Clapp
Phone: (701) 772-3764
Email: jon.thetoastedfrog@midconetwork.com → Attn Sean

Company: Joe Black's
Address: 118 North Third Street
Grand Forks, North Dakota
Contact: Joe
Phone: (701) 775-2017
Fax: (701) 775-2018
Email: Jschnei319@msn.com

Company: Grand Forks Herald
Address: 375 Second Avenue North
Grand Forks, North Dakota 58203
Contact: Marsha Gunderson
Phone: (701) 787-6731
Email: mgunderson@gfherald.com

Company: Caulfield Studio
Address: 13 North 3rd Street
Grand Forks, North Dakota 58203-3713
Contact: Cindy
Phone: (701) 746-0078
Fax: (701) 746-8821

Company: Lyons Auto Supply
Address: 210 North 4th Street
Grand Forks, North Dakota 58203
Contact:
Phone: (701) 775-5571
Email: Doesn't have one.
Fax: Won't give out.

Company: NDDOT
Address: District 6 – Grand Forks
1951 North Washington
P.O. Box 3077
Grand Forks, North Dakota 58208-3077
Contact: Les Noehre
Phone: (701) 787-6500
Fax: (701) 787-6515
Email: lnoehre@nd.gov

Company: NDDOT
Contact: Paul Benning
Phone: (701) 328-2217
Email: pbenning@state.nd.us

Company: Grand Forks Police Department
Contact: Sergeant Kevin Kallinen
Phone: (701) 787-8000

Appendix B – Stakeholder Comments

Stakeholder Comments

LTD Properties

- Lack of parking
- Hardest time to park is at night (11:00 p.m.-12:00 a.m.)
- Not many complaints about parking during the day

Central High School

- 1150 students, 130 staff – one small reserved lot with 90 stalls
- Staff and students park on the street, in the ramp, and in the civic auditorium lot.
- Local businesses can reserve spots in the ramp forcing students to park on the upper floors
- There is only a two hour time limit around the school for on-street parking
 - Many students go out every two hours to move their cars
- Would like to lease a large lot behind the city dike for students
 - Issue – Construction of dike has to be finished first
 - Issue – Security
 - Issue – Only 1 way to get in & out, will get very backed up after school

Dakota Harvest Bakers

- Customers only aware of on-street parking, need signage at lots to tell you where you can park
- Central Ramp – Only top level open & no signage
- Bemidji has angle & parallel parking on Central Business District Streets
- During construction too much street pavement is fenced off causing very narrow lanes
- More 15 minute parking spots for short term customers
- Parking Assessment is assumed by frontage
 - Pays \$250/yr±
 - 25' = \$110/yr, at another site
- Have nine employee spaces behind building, therefore some employees must park on-street
- Residents park on-street over night
- 7:00 a.m.-7:00 p.m. need on-street parking for businesses not residential
- Not enough on-street enforcement
- Improve signage

Amazing Grains

- Apartment to north a mistake, removes parking availability & adds cars to existing gravel lot
- On-street parking is ok, except during Town Square events, may get worse when new apartment opens
- Currently leases spaces from city (no charge until it's paved)
- Want six along the building – later
 - Worried that customers will be fighting for spaces with residents

- Landlord looks after the parking assessment
- Want four, one hour spots along the dike if possible
- Not enough enforcement
- Staff have to park in remote areas

Widman's

- Everything is ok the way it is

Avant Hair & Skin Care Studio

- Has five reserved spots in a lot for customers, others use it
- Not enough enforcement
- two hour time limit can be too short for some customers
- Parking ramp too far especially in winter & rain
- People don't know they can park in the ramps (not enough signage)

Sanders 1907

- Need more parking
- Would like to see perpendicular parking on at least on side of 3rd street
- People don't like parking in ramps, everybody wants on-street parking

Wells Fargo

- Employees park in back
 - No problem except when the farmers market is on
 - People try parking in the rear & vendors block spaces as the unload
- Not enough parking for customers, mostly in early morning before residents leave
- Assessment for parking too high – don't use ramps or lot
 - Pays \$600-700/quarter
- 15-30 spaces would be helpful
- Sanders & residents uses up most on-street parking

Meadowbrook Furniture

- Insufficient parking
- Don't feel safe in the parking ramps
 - Prefer open lots and streets
- Long walk from parking ramps
- Customers and staff are part of a downtown leadership group
 - Has been around a little over one year
- Was interviewed about angle parking a few weeks ago
 - Thinks it will be a positive addition to downtown Grand Forks
- New condos and apartments are being built and using the existing parking without adding any extra spaces for its tenants

Marcil Management Inc.

- Parking is very tight, the new Dakota building (apartment building) was just built and takes up part of the existing city parking lot

- Would like to see the large gravel lot between the building and the dike paved and diagonal parking on both sides of the lot.
- Has 27 apartments and can only offer one spot per apartment, would like to be able to offer 1.8 spots per bedroom
- Lots of tenants park on the street
- Feels that diagonal parking would allow him to offer more than one spot per unit
- Has noticed the diagonal parking in downtown and has only heard positive responses

The Toasted Frog

- There could always be more parking
- A lot of parking is being used right now due to the construction but doesn't see it getting any better when construction finishes
- Worked in Fargo and believes the angle parking there is a positive addition
- Would like to see angle parking in Grand Forks
- Employees have to park far away
- Nobody parks in the parking ramps
- New building have increased the parking problems
- Can see there becoming more issues with parking in the near future

Joe Black's

- Don't have any reserved parking
- There is some on-street parking but very little
- Some customers have to walk three blocks
- Wants to see diagonal parking
- Customers don't like using the parking ramps
- Can tell when their business will be busy, because at 4:00 p.m. there is on-street parking
- Worried about business if parking is not improved

Grand Forks Herald

- Believes there is serious parking issues
- Worried because Grand Forks sold a parking lot to a residential structure
- High school students take up a lot of parking
- There is never a space outside of the building
- The general public does not park in the parking ramps
- There is lots of parking in the summer and after school

Caulfield Studio

- Caulfield Studio has no off-street parking
- Employees were able to park in the free lot across from them (sometimes referred to the Beavis and Butthead lot) but that is now reserved
- On-street parking is timed which makes it impossible for her to park there
- The parking ramp is thought to have security issues, both personal and vehicle

NDDOT

- North 5th Street and Demers are both state highways
- Federal aid used on most arterial streets in downtown
- Diagonal parking is prohibited on streets where federal aid was used
 - Most of them in the study area
- Could potentially change agreement saying no diagonal parking if everybody who signed the original agreement will allow diagonal parking
 - Will be a lengthy process – Lots of jurisdictions involved
 - NDDOT will have to hear from MPO's new study on diagonal parking

Grand Forks Police Department

- There has not been any safety issues with on-street parking
- Safety issues with parking ramps
 - Vandalism every couple weeks
 - Haven't had any complaints about personal violence
 - Safety issue more of a perception rather than a fact
 - No more safety issues associated with ramps compared to surface lots
- Safety concerns with angle parking
 - Sight restrictions when backing out
 - Speed limits may need to be reduced if on a through street
 - If on 3rd street, speed limits may need to be lower
- On-street parking enforcement
 - Have community service officer enforcing the on-street parking
 - Officer not sworn in with the police department
 - Downtown parking enforced when manpower is there
 - Enforced about two days a week at this point
 - The police department is short one community service officer
 - When replaced will enforce parking three to four days per week
 - Overnight regular police officers enforce parking restrictions for street maintenance
- Off-street parking enforcement
 - Don't do much in terms of off-street enforcement
 - Not enough manpower to enforce parking in the off-street lots
 - Will enforce after a complaint
 - Generally towing a car that has been left for more than 24 hours
 - Would consider it a big help to have a parking authority enforce parking in the off-street lots

Grand Forks County Commissioner

- Concern with sight lines for eastbound left turn traffic on Bruce Avenue turning onto S. 4th Street

Appendix C – Open House #1 Summary

Open House #1 Summary

The first open house for the Grand Forks Downtown Parking Study was held on Tuesday June 13, 2006 in the Community Room at the Grand Forks Herald. There were a total of 15 people who attended the open house.

The purpose of the open house was to provide background information on downtown parking, obtain input on parking concerns and issues and to obtain input on parking solutions the consultant team should consider.

There were a total of 11 comment sheets that were received following the first open house. A summary of these comment sheets are listed below:

Main Parking Issues

- Enforcement
- Not enough parking
- Time limits too long/short
- People don't know where to park

Current Positive Aspects

- Free parking
- Few restrictions
- Shuttles from ramps to events
- Ramps always have a place to park

Changes You Would Like To See

- Keep existing lots – no new apartment buildings
- Increase parking supply – key locations
- More enforcement
- Year round bike racks
- Signage to free parking
- Fix leaks in ramps
- Diagonal parking
- Make developers adhere to parking codes
- Consider 1 hour time limits in some locations

Things You Would Like To See Stay

- Free parking
- Anytime parking
- Parallel parking
- All the parking lots

Solutions The MPO Should Consider

- Leasing lot 4B to local businesses for employee parking
- More bike parking
- Expand lot 9A between the existing lot & dike
- Shorter parking times tied with enforcement
- On-street angle parking
- Parking ramp in place of lot 4B

Appendix D – Open House # 2 Summary

Open House #2 Summary

The second open house for the Grand Forks Downtown Parking Study was held on Tuesday July 25, 2006 in the Community Room at the Grand Forks Herald. There were a total of seven people who attended the open house.

The purpose of the open house was to update the parking utilization in downtown Grand Forks, provide walking distance information, results from the first open house, parking strategies, possible angle parking concepts, a parking management strategy and transportation demand management options and receive public feedback on proposed strategies.

There were a total of three comment sheets that were received following the open house and are summarized below:

Do you feel there is a parking shortage?

- Yes
- No – sometimes you just have to look
- No – The problem is businesses and residential units who did not secure off street parking.

Do you support on-street angle parking?

- Be better than current parking
- Yes – One side only
- Yes – Will help clean up the perception of not enough parking

Do you support the recommended measures?

- Reallocate ground floor spaces for casual use.
- Differential fees for monthly parking by space locations.
- Increased parking enforcement.
- Additional parking signage, parking map.
- Upgrade to ramps such as white walls, additional lighting, cameras, etc.

Would these changes make it more likely for you to use on-street parking?

- Always park on-street wouldn't change anything
- Yes

Would these changes make it more likely for you to use ramp parking?

- No, ramp has too bad of a reputation to overcome
- Yes
- No, have a reserved parking spot in downtown 24/7

Additional Comments/Suggestions

- Don't use the packet parks for parking – they're part of the ambience
- More enforcement
- Make 3rd St. and 4th St. one-way streets to make room for angle parking

- Make a free shuttle bus route along 3rd and 4th passing all ramps and major destinations
- Use the wet side of the dike for parking off of Demers Ave.
- Problems with vendors and others using reserved lots during events in the town square.

A question and answer session was held following the presentation and is summarized below:

- q) Is the angle parking going to interfere with the current overnight parking restriction system for street maintenance?
- a) There should be no reason that the angle parking would have to change the current overnight parking restriction system.
- q) What would be the approximate time frame when angle parking would be able to be implemented?
- a) First Our recommendation will be given to the Grand Forks – East Grand Forks MPO
- Second The MPO will have to have to get the approval from NDDOT to implement an angle parking test section
- Third The MPO will have to have the test section approved by City Council
- Fourth The test section will be able to be implemented; potentially as early as October, but depending on how long discussions with NDDOT require, this could be extended.
- Comment – Public Works would like the layout plans for angle parking far enough in advance to provide adequate time for striping.

Appendix E – Angle Parking Research

Angled Parking Research

The American Association of State Highway and Transportation Officials (AASHTO) publication “A Policy on Geometric Design of Highways and Streets: 2001” includes a section on on-street parking. It notes that while “a roadway network should be designed and developed to provide for the safe and efficient movement of vehicles operating on the system: with this seen as the primary function of a roadway network, it also states that “segments of the network may, as a result of land use, also provide on-street parking”. If on-street parking is to be allowed, it notes that parallel parking should be considered, however, “angle parking is an allowable form of street parking”. It does caution that angle parking can present special problems due to varying vehicle lengths and sight distance issues associated with vans and recreational vehicles. AASHTO suggest a transition of 20 feet between the property line of the intersecting street and the introduction of on-street parking.

One method encouraged by the Victoria Transport Policy Institute (VTPI, 2006) to increase capacity of existing parking facilities is to change from parallel to angled on-street parking where there is adequate street width. Facilitating this change could lead to a reduction in parking demand in the order of 5-15%.

In “Safety Evaluation of Converting On-Street Parking from Parallel to Angle”, McCoy et al. found that although the number of associated crashes increased when this conversion was undertaken in Lincoln, Nebraska, the parking related crash rate did not significantly change. The on-street conversion was cost effective when the cost of increased crashes was compared with providing comparable off street facilities (McCoy et al., 1990).

An *ITE Journal* article entitled *Angle Parking Issues Revisited, 2001* (Box, P.C., 2002) investigated the safety and collision concerns surrounding angled, parallel and no parking scenarios. The article detailed a number of case studies throughout the United States. In Clarendon Hills, IL (pop. 7,300), a small suburb of Chicago, 60% of all parked-car accidents were related to angle parking on a few streets. Low-activity angle parking for commuters near a rail station had an annual rate of only three accidents per 100 spaces. Higher-turnover angle locations next to retail had a rate of 22. By comparison, high-turnover retail streets with parallel parking had a rate of only eight, or about one-third as much. In Hinsdale, IL (pop. 15,000), another Chicago suburb, 95% of curb-parking accidents involved angle parking. When related to volume, the accident rates for the angle parking sections ranged from 23 to 70 per MVM vs. a rate of only two to five for those with parallel or no parking. As well, in Mesa, AZ (pop. 379,000) and Scottsdale, AZ (pop. 205,000), suburbs of Phoenix, mid-block accident data were tabulated for three years (1998 through 2000) on streets of approximately equal length with angle parking

and with parallel layout. For streets with business and retail land use, collector streets with angle parking had rates 1.5 to 3 times the rates of those with parallel parking.

Another *ITE Journal* article entitled *Changing On-Street Parallel Parking to Angle Parking* (Edwards, J.D., 2002) stated that this conversion should be considered in many urban areas since it is known that angled parking will almost double the number of spaces of parallel parking and these spaces are easy to use. A case study from downtown San Marcos, TX showed that mid-block accident frequency was relatively insignificant in this city with extensive angle parking on almost all downtown streets. The author presents criteria under which the conversion from parallel to angled parking could be considered, such as area type, street classification, street width, pedestrian activity, operating speeds, traffic volumes, parking angles and maneuvers, land use, and transit operations. The author indicated that these considerations should be kept in mind:

- Each candidate for change is an individual case. The concept of changing from parallel to angle parking is well proven in many case studies, but should not be universally applied without study.
 - The minimum criteria of traffic volumes under 12,000 vehicles per day, unless diversion routes are provided; operating speeds of 15 to 20 mph; abutting retail and retail-service land uses and minimum street widths should be kept in mind.
 - It is unlikely that the change from parallel to angle will, by itself, stimulate downtown revitalization. It must be coupled with other programs, such as retail recruitment, marketing and downtown organization efforts.
 - When a change is indicated, and is to be implemented, it should be coupled with an educational program, which will explain the pros and cons of the change.
 - It would be helpful if before-and-after studies of accidents, congestion and the impact on retail trade were done. There is a lack of well-documented data on these aspects of parallel to angle-parking conversions.
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In January 2003, a study was completed by the Center for Transportation Research and Education at Iowa State University (CTRE, 2003) to compare diagonal parking locations to other types with regard to related crash histories. The research focused primarily on smaller communities with population ranges from 200 to 9,500. When average crash rates for various parking types were compared for non-intersection crashes, differences in rates between areas with diagonal parking and those with parallel parking were almost negligible. In fact, those observed rates were less than sample locations with no parking at all. The study concludes that no compelling justification exists for blanket prohibition of angle parking along Iowa's primary extensions in all urban areas. Rather, a case-by-case investigation with each project design of the most applicable parking type would seem appropriate.

The Parking Generation 3rd Edition published by the Institute of Transportation Engineers determines parking generation rates for various land uses. The rates shown in the table below are based on data from suburban sites with isolated single land uses with free

parking. Therefore, they do not consider parking demand restrictions due to type of area, transit availability, pedestrian friendly design, land use density or trip linking and thus, should be adjusted accordingly. While this approach prevents spillover parking in all but extreme cases, it often means that a large supply sits vacant almost every day of the year. Parking requirements established solely through use of this publication may not be appropriate in denser urban communities.

Parking Generation Rates (COL, 2006)

Land Uses	Office	Retail	Service/Auto	Restaurant	Hotel	Cinema	Cultural
Parking Rate (spaces/sq. ft.)	3/1000	3/1000	3/1000	13/1000	1/room	0.3/seat	0.34/seat

The city of Livermore, CA (pop. 77,000) intends to provide approximately 105 additional parking spaces by re-stripping parallel parking spaces to angle parking spaces at various locations in the downtown (COL, 2006). This is estimated to cost approximately \$100 per new space and should be completed in 2006.

The Transportation Department of Minnesota State Aid Manual stipulates that diagonal parking may be established by cooperative agreement between the local road authority and the Commissioner of Transportation if the street width and traffic volumes meet Standards in State Aid Rules 8820.9961, and the legal speed limit is 30 mph or less. Rule 8820.9961 states that all diagonal parking must be between 45 and 60-degree angles to the curb. As such, all diagonal-parking projects must meet or exceed the minimum dimensions indicated in the following design chart.

Minimum Parking Dimensions for Diagonal Parking

Parking Angle	Present ADT	Parking Stall Width (feet)	Parking Stall Depth (feet)	Distance Between Traffic Lane and Parking Stall (feet)	Length Along Curb (feet)
45 degrees	<3,000	9	20	2	12.7
60 degrees	<3,000	9	21	7	10.4
45 degrees	≥3,000	9	20	14	12.7
60 degrees	≥3,000	9	21	19	10.4

Note: Maximum legal speed limit must be 30 mph and at least two through-traffic lanes must be provided.

ITE's *Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities* suggests the following recommended practices (ITE, 2006):

- The width of the edge zone adjacent to angled parking should account for the depth of vehicle overhang, which can vary between 1.5 and 2.5 ft. depending on the angle of the parking spaces.

- If reverse (back in) angled parking is considered, the edge zone lateral clearance must be at least 30 in. due to the added overhang of the rear of most vehicles.
- Designated bicycle facilities adjacent to angled parking are discouraged because of the lack of visibility between bicyclists and drivers backing out of spaces.
- Where possible on one-way streets, angled parking can be implemented on the left side of the street while the bicycle lane remains adjacent to parallel parking on the right side of the street. Some communities use reverse (back in) angled parking, which is thought to improve driver visibility of bicyclists.
- Orientation of parking (parallel or angled) should be determined according to the thoroughfare's desired volume and speed, context and ability of the right-of-way width to accommodate the desired elements.
- On-street parking should be primarily parallel parking on urban arterial boulevards and avenues. Angled parking may be used on low-speed and low-volume commercially oriented collector avenues and streets, primarily those serving as main streets.
- Angled parking should have the dimensions shown in the table below for a variety of different angles.

Minimum Dimensions for On-Street Parking

Angle	Stall Width	Stall Depth (Perpendicular to curb)	Minimum Width of Adjacent Lane	Curb Overhang
45°	8.5 ft. – 9.0 ft.	17 ft., 8 in.	12 ft., 8 in.	1 ft., 9 in.
50°	8.5 ft. – 9.0 ft.	18 ft., 3 in.	13 ft., 3 in.	1 ft., 11 in.
55°	8.5 ft. – 9.0 ft.	18 ft., 8 in.	13 ft., 8 in.	2 ft., 1 in.
60°	8.5 ft. – 9.0 ft.	19 ft., 0 in.	14 ft., 6 in.	2 ft., 2 in.
65°	8.5 ft. – 9.0 ft.	19 ft., 2 in.	15 ft., 5 in.	2 ft., 3 in.
70°	8.5 ft. – 9.0 ft.	19 ft., 3 in.	16 ft., 6 ft.,	2 ft., 4 in.
90°	8.5 ft. – 9.0 ft.	18 ft., 0 in.	24 ft., 0 in.	2 ft., 6 in.

Typical design vehicle dimensions: 6 ft., 7 in. by 17 ft., 0 in. Use 9.0-foot wide stall in commercial areas with moderate to high parking turnover. Source: Adapted from *Dimensions of Parking*, 4th Edition, Urban Land Institute

Pottstown, PA commissioned a study of back in angle parking as part of a downtown revitalization (Nawn J.A., 2001). The idea being that the lack of available parking is seen as a deterrent in many central business districts. Two methodologies to provide more parking are the creation of traditional, pull in angle and back in angle parking. However, in order to properly implement traditional pull in angle parking, a substantial amount of right-of-way is necessary to provide the proper maneuver space for vehicles to back out without impeding traffic flow on the adjacent roadway. Therefore, the Borough of

Pottstown (pop. 22,000) investigated back in angle parking as a solution. The Pennsylvania Department of Transportation (PENNDOT) classifies the Borough's 'Main Street' in question as an urban arterial. The study determined that back in angle parking has clear biomechanical and safety advantages over traditional pull in angle and parallel parking. These facts along with right-of-way constraints lead to the decision to create a dedicated 6 ft. bicycle lane, and implement back in angle parking one side of the arterial roadway.

Other notes of interest with respect to the application of back in parking in Pottstown:

- Pavement markings and signage were designed consistent with PENNDOT and the Manual on Uniform Traffic Control Devices.
- The angled parking allowed for the creation of a handicap accessible stall in each block of the downtown area.
- Overall, the downtown area gained a total of 95 new spaces, a 21% increase over existing conditions.
- There has been some negative public perception that needs to be overcome with the back in angle parking.
- Pennsylvania had no previous experiences with locations where back in angle parking had been implemented and thus a survey of other locations was done to determine their experiences.
- *Wilmington, DE* – The city of Wilmington, Delaware has six blocks of 60 and 90 degree, back in angle parking dating back fifty years. For 60 degree parking, regulations require 19 ft., measured from the curb, for the parking space and a minimum of 11 ft. for travel lanes. The highest daily traffic for any block with angle parking is 6,500 vpd and reports no significant problems with accidents or traffic flow resultant from the back in angle parking.
- *Seattle, WA* – The city of Seattle, Washington has approximately 280 blocks of angle parking, with the majority being back in angle parking, dating back over thirty years. Back in angle is preferred to pull in angle because it is perceived to be safer.
- *Washington, D.C.* – The city of Washington, D.C. has six blocks of back in angle parking dating back 15-20 years. The most heavily trafficked location has an ADT of 9,200 with two lanes of traffic in each direction and no manoeuvre space in front of the parking.
- *Indianapolis, IN* – The city of Indianapolis has one block of back in angle parking on a one-way street with three through lanes and an ADT of 13,800. The back in angle parking has been in place for 15 years.
- *Montreal, QE* – The city of Montreal has had a pilot project for back in angle parking on a one-way street since March 2001. Current to the date of the Pottstown study there had been no accidents reported. The project was apparently initiated as a method of traffic calming (speed were reduced by 5 km/h) and to increase parking (a 40% increase was seen). The angle of the parking is 43%.

The State of Wisconsin Department of Transportation *Facilities Development Manual* (WDOT, 2004) states that various studies have shown that angle parking is particularly unsafe and is to be replaced with parallel parking, if possible. Angle parking presents

problems because of the varying length of vehicles and the sight distance problems associated with vans and recreational vehicles. Angle parking also requires a much wider parking lane than parallel parking. Lane widths of 15 to 20 feet are required depending on the degree of angle used. Do not use angle parking, except in the following situation:

- On low volume local streets which have adequate width to safely accommodate this type of parking and
- The additional parking is absolutely necessary for the economic stability of the local community.

A typical situation when angle parking may become an issue is when a street improvement is planned and the angle parking already exists. In this case, review crash records to assess the safety impact of this type of parking before allowing it to continue. When angle parking is determined to be required, treat it as a design exception and document it accordingly. Documentation is to include an accident analysis, posted speed, street width, traffic volumes and a discussion of why it is necessary to the economic stability of the community to retain it.

Salt Lake City, UT has created a frequently asked questions website to answer any concerns regarding the conversion from parallel to angle parking (Salt Lake, 2005). Salt Lake City officials contend that reverse angle parking provides for a safer environment for bicyclists and other cities who have implemented this type of parking have reported a decrease in the number of parking related accidents. As well, they contend that the backing maneuver may be unfamiliar, but is much easier than parallel parking and the intention of a motorist to park (signal when slowing) is the same process as standard parallel parking. Due to this, the city does not expect accident rates to increase since the initial stopping and signaling required for back-in angle parking is already an everyday occurrence throughout the city with parallel parking and one of the most common causes of accidents is motorists reversing out of a standard angle parking spot without being able to see on-coming traffic. There are also inherent conveniences associated with back-in angle parking, such as the ability to unload packages from a vehicle's trunk while being on the sidewalk and the simplicity of re-entering traffic as compared to standard pull-in angle parking.

In the city of Seattle, conversion from parallel to angle parking has increases in the available number of parking spaces as high as 50% (SDOT, 2005). Not every street is a good candidate for angle parking and must meet standard minimum criteria, outlined by the Seattle Department of Transportation (SDOT), such as sufficient right-of-way and the prevention of hindering pedestrian movement due to overhanging vehicles narrowing the sidewalks. As well, SDOT feels that debris may be more likely to accumulate under the angled cars, and thus giving the block a less kempt appearance. Should a block be deemed a good candidate for converting to angle parking, local community members will be asked to petition all property owners (and/or their managers) on the affected block(s). A minimum of 60% of the adjacent property owners will need to agree to the change for SDOT to proceed with installing the angle parking.

Useful Links with further information and photographs:

- http://www.wgmgroup.com/pdf/BackIn_AngleParking.pdf
- <http://www.cyburbia.org/forums/showthread.php?t=12766>
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