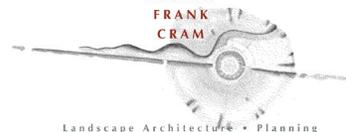


VISITABLE HOUSING
COST ESTIMATE SUMMARY
June 2007

PARA
Progressive Accessibility
Re-Form Associates

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ARCHITECT

This report summarizes our findings related to the cost and market implications of incorporating **basic visitable** features into two single-family detached houses in Manitoba. It was prepared at the request of Manitoba Housing and Renewal Corporation (MHRC). Refer to Appendix I for the mandatory requirements for **basic visitability**.

Because this cost analysis is a case study, based on two specific model homes and sites, caution should be exercised in generalizing the results. For example, the laned lot solution involved adding a side door, which would not be required in all or even the majority of cases of visitable construction.

SITE | HOUSE PLAN SELECTION

For this analysis we used Waverley West sites and typical housing units designed for this development as models. Two test sites were selected: one with a back lane and one without, to observe the effect of different grading patterns on costs. Both are gently sloping (approx. 2% grade) mid-block sites, avoiding the non-typical conditions of corner lots. The laned lot has split drainage, with the high point in the front yard. The non-laned lot provides standard front to back drainage.

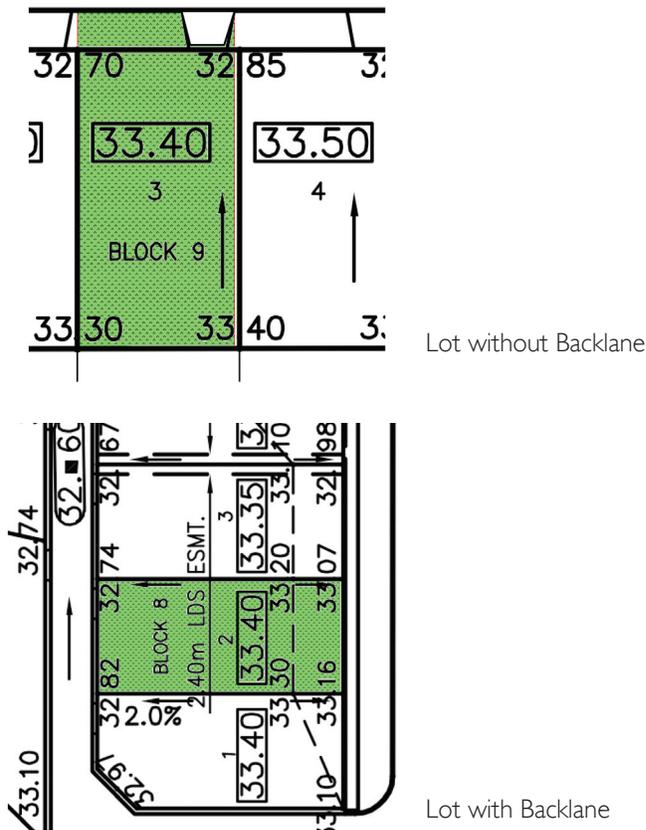


Figure 1. Waverley West lots used for the cost analysis

House plans were provided by Qualico Homes, and selected to represent typical features, widths, door types, and finish floor grades within the current market. We rejected units that had too many visitable features incorporated – this could skew the results and make this analysis less useful.

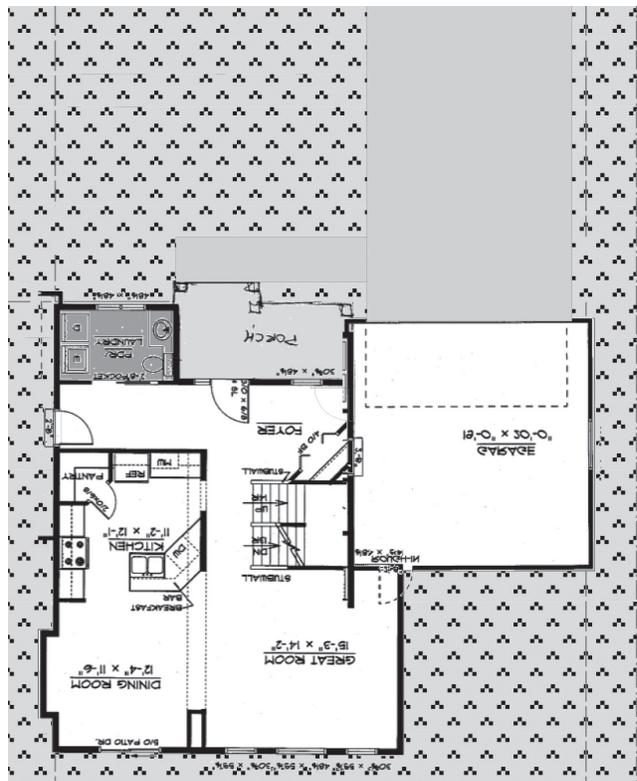
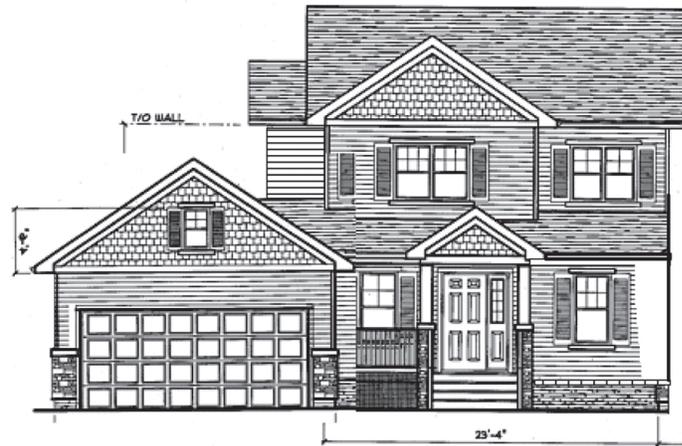


Figure 2a: Qualico plans selected for the cost analysis. The Broadview DG-11 model currently in development was used for the non-laned lot

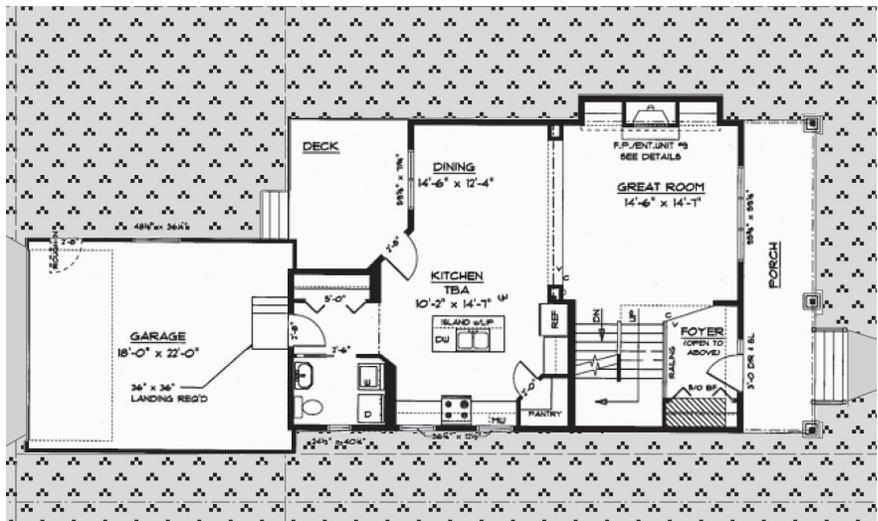
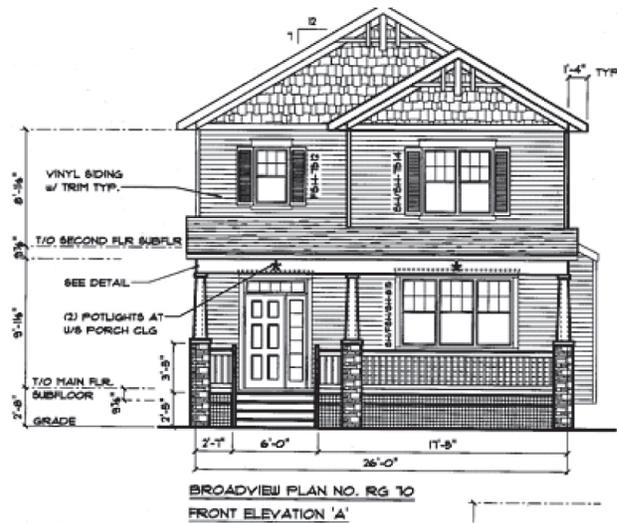


Figure 2b: Qualico plans selected for the cost analysis. The Broadview RG-70 model currently in development was used for the laned lot.

PROCESS

Interior revisions were designed and costed by Lanny Silver, architect, in consultation with Edgar Rosales of Qualico Homes. Hilderman Thomas Frank Cram developed designs for the external visitable features, based on original design drawings prepared by Stantec Consulting. The designs and preliminary costs were reviewed by Qualico, and Dave Rapson reviewed the work for compliance with mandatory requirements as identified in our policy document (April, 2006).

DESIGN NOTES

Determining the best accessible path of travel to the door took some effort. On each site, we looked for opportunities to create an accessible path that added amenities such as planting areas and seating spaces, while maintaining continuity with adjacent properties. Because ramps were not used, some lowering of the finish floor grades - between 3.5" (83mm) and 6" (150mm) - was required to keep the walkway grades at 5% or less. Earthwork berm grades are 20% or shallower: well within mowable limits. Landings were priced as cast-in-place concrete, unless they were extensions to decks or porches, in which case they will be constructed of matching materials. Walkways were also priced as cast-in-place concrete.

Front door access is only possible on the laned lot. In all cases, the side yard requires either a retaining wall or mirrored treatment on the house next door to accommodate the grade changes. This suggests that there will be economic benefit in designing and building visitable sites in pairs.

Non-Laned Lot

Figure 3 shows a curving 5% walkway leading to the side door. This scheme provides a formal front planting space and good access to the front door (reducing the number of stairs). Subdrainage will also be required at the side entrance, or a trough on the property line to move water past or under the raised grade. Note that this option requires relocating the garage and therefore would require some engineering fees, as indicated on the spreadsheet (Tables 1a-c).

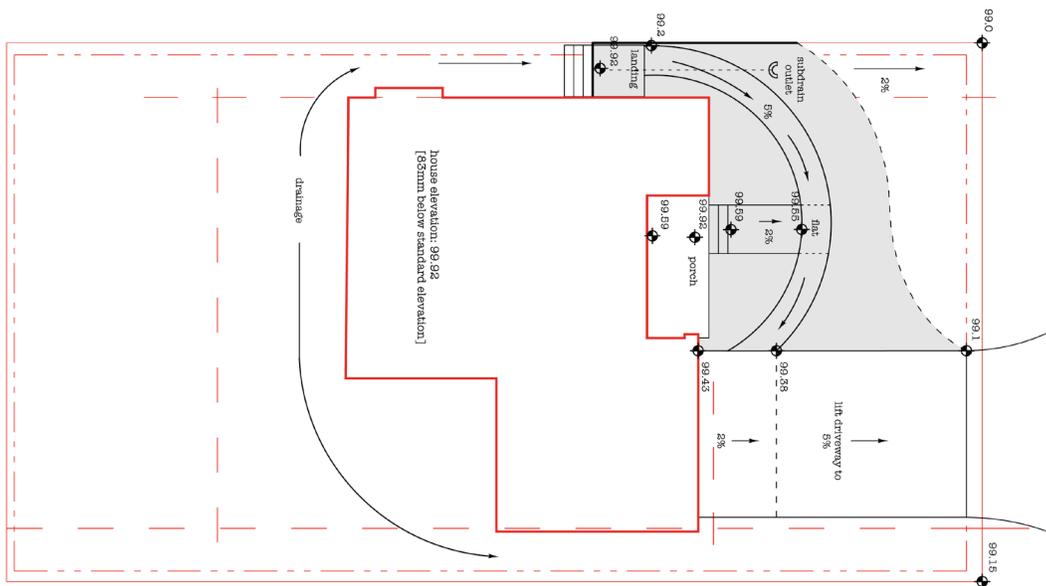


Figure 3: Visitable design concept for Non-Laned Lot.

Notes:

elevations are in metres

elevation 99.92 finished floor grade is 83mm (3 1/4") below grade indicated on Qualico plan.

Laned Lot

Two options were priced for this lot. Option A (Figure 4a) gives access to the front door from the back lane. It is a straight run, and would require construction of an extension on the front porch for the most elegant connection. No amenity space is created by this option. Subdrainage is not required, as this lot has split drainage.

Option B (Figure 4b) takes advantage of the large sideyard to provide a shallow (4.2%) accessible route from the front yard to the back deck. This option is costly because it requires a large extension to the deck, and probably would require a variance, but it also creates the most marketable amenity in the double-sized deck.

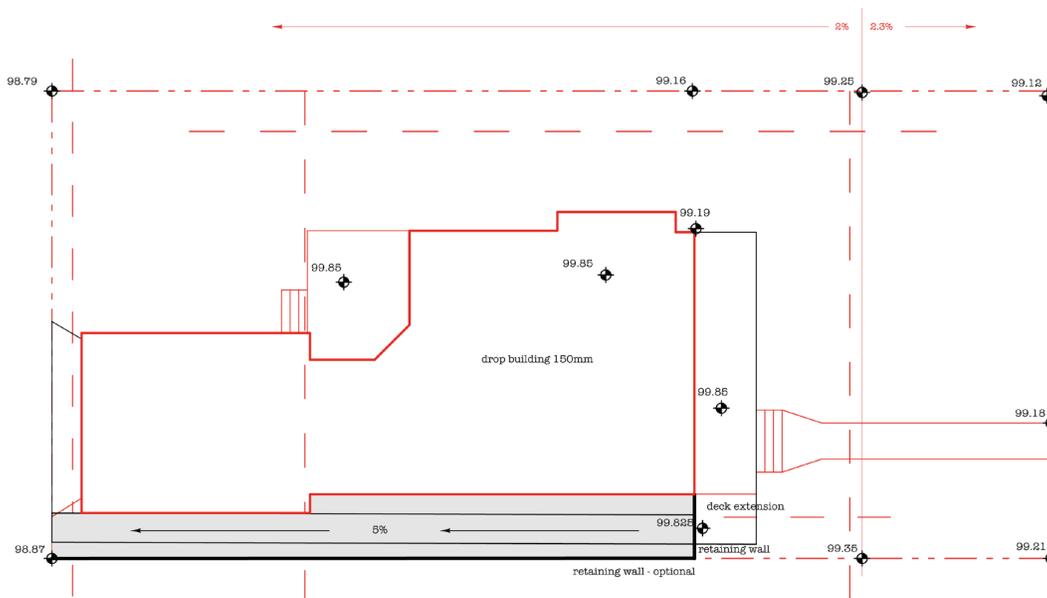


Figure 4a: Visitable design concept for Laned Lot - Option A.

Notes:

elevations are in metres

elevation 99.85 finished floor grade is 150mm (6") below grade indicated on Qualico plan.

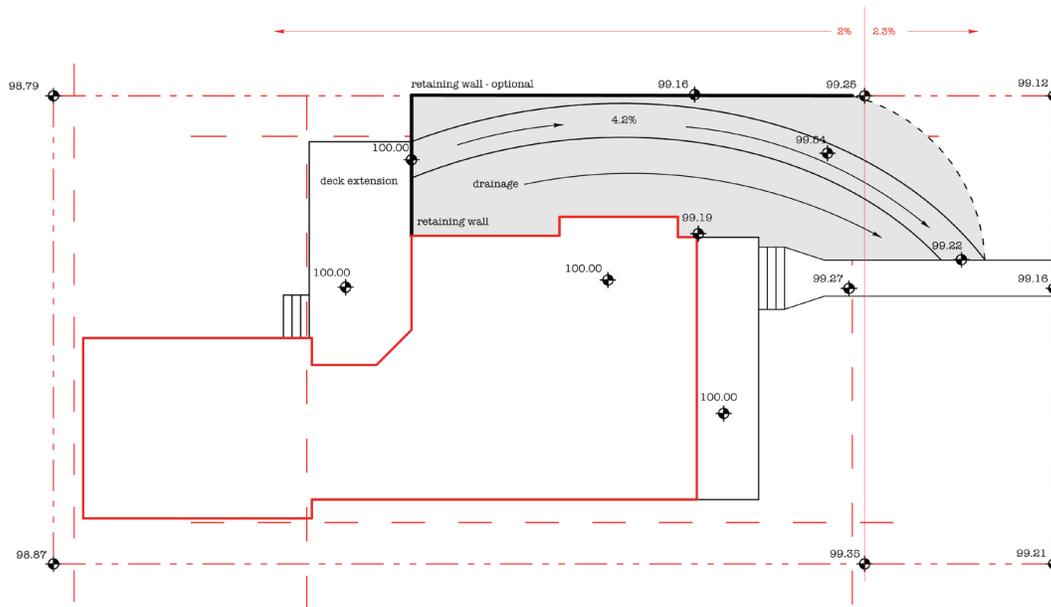


Figure 4b: Visitable design concept for Laned Lot - Option B.

Notes:

elevations are in metres

elevation 100.00 finished floor grade is as indicated on the Qualico plan

Interiors

Modifying the interiors was to follow the minimum requirement of allowing access and visit capability. The interior modifications to most of the homes in this development will be minimal as the homes have very generous room sizes and circulation space. Most of the interior cost resulted from modifying existing drawings to fit the site and raising the grade at the perimeter. As an example, the Option #1 floor plan resulted from flipping the two car garage from the right side of the original plan to the left side and tucking it into the existing jog. The solution resulted in having to add another door and landing for the new side entrance. A concrete foundation upstand was required at this location.

Laned Lot interior changes were:

No Step Entrance: Required additional exterior door 2'-8" x 6'-8" with low profile threshold and lever lockset. When grade is brought up to the Main floor a concrete upstand would be required to maintain an 8" separation from finished grade and any wood or products affected by water (such as floor joists, siding, sheathing and wood framing etc.).

Washroom: The washroom met visitable requirements but the pocket door was changed to a swing door with lever lockset , an “enhanced feature” that we felt would not cost more than the pocket door.

Circulation: The designs used, in some cases, seemed to indicate a dropped foyer. This would not be suitable for “Visitable” design and was deleted. This change should not result in extra cost.

Non-Laned Lot - Option A interior changes were:

No Step Entrance: The existing design only required a low threshold door.

Washroom: The washroom in this unit required a modification to the design. The washer/dryer had to be relocated or the kitchen had to be reduced. We opted for relocating the washer/dryer.

Circulation: Within the unit, this was ample and no changes were required.

Non-Laned Lot - Option B interior changes were:

This design would require zoning approval for the wider than normal side yard. If this plan were used the interior considerations would not change.

COSTING

The costs provided in this report are in addition to normal requirements, such as driveway and sidewalk.

Table 1a: Costing - visitable design concept for Non-Laned Lot.

	Item	Size	Extra Cost - Materials	Extra Cost - Labour	Unit Price	Mark-up Overhead 25%	Cost Estimate Total
House	Additional exterior door framing		\$50.00	\$50.00	-	\$25.00	\$125.00
	Door c/w access threshold + added weather-stripping	2'10" x 6'8"	\$500.00	\$100.00	-	\$150.00	\$750.00
	Washroom door c/w lever lockset	2'8" x 6'8"	\$150.00	\$100.00	-	\$60.00	\$310.00
	Modified floor joist detail (pocket in foundation wall) required where finish grade is raised against foundation	15 linear ft. by 10" height	\$150.00	\$150.00	-	\$75.00	\$375.00
Site	Cast-in-place concrete walkway max. 5% grade, 4'8" wide	145 sq. ft.	-	-	\$6.80	\$245.00	\$1,230.00
	Reinforced concrete entry landing. Provision to ensure platform does not settle or heave.	12 cu. ft.	-	-	\$33.50	\$100.00	\$500.00
	Drainage pipe	18 linear ft.	-	-	\$45.50	\$205.00	\$1,025.00
	Earthwork - assume site material	185 cu. ft.	-	-	\$1.00	\$45.00	\$230.00
	Concrete porch stairs	7.5 cu. ft.	-	-	\$33.50	\$65.00	\$315.00
Credits	Cast-in-place concrete walkway to front door	55 sq. ft.	-	-	\$6.80	\$95.00	\$470.00
	Reinforced concrete entry landing	4.5 cu. ft.	-	-	\$33.50	\$40.00	\$190.00
	Concrete porch stairs	25 cu. ft.	-	-	\$33.50	\$210.00	\$1,050.00
	Earthwork - 25% of grading attributed to standard site grading	46 cu. ft.	-	-	\$1.00	\$10.00	\$55.00
						TOTAL	\$3,095.00
Optional	Engineering services - garage flipped	-	-	-	-	-	\$500.00
	Precast concrete block retaining wall	75 sq. ft.	-	-	\$31.50	\$590.00	\$2,950.00

Table Ib: Costing - visitable design concept for Laned Lot - Option A.

	Description	Size	Extra Cost - Materials	Extra Costs - Labour	Unit Price	Mark-up Overhead	Cost Estimate Total
House	Door c/w access threshold + added weather-stripping	2'10" x 6'8"	\$50.00	-	-	\$13.00	\$63.00
	Design change - washroom walls and plumbing	-	\$200.00	\$200.00	-	\$100.00	\$500.00
	30" Biofold doors where required by design	30" wide	\$150.00	\$150.00	-	\$75.00	\$375.00
	Modified floor joist detail (pocket in foundation wall) required where finish grade is raised against foundation	50 linear ft. by 10" height	\$250.00	\$500.00	-	\$185.00	\$935.00
Site	Cast-in-place concrete walkway max. 5% grade, 2'10" wide	190 sq. ft.	-	-	\$6.80	\$325.00	\$1,615.00
	Deck - standard + extension	180 sq. ft.	-	-	\$30.00	\$1,350.00	\$6,750.00
	Earthwork - assume site material	620 cu. ft.	-	-	\$1.00	\$155.00	\$775.00
Credits	Standard deck	150 sq. ft.	-	-	\$30.00	\$1,125.00	\$5,625.00
	Earthwork - 25% of grading attributed to standard site grading	155 cu. ft.	-	-	\$1.00	\$40.00	\$195.00
						TOTAL	\$5,193.00
Optional	Precast concrete block retaining wall	100 sq. ft.	-	-	\$31.50	\$790.00	\$3,940.00

Table Ic: Costing - visitable design concept for Laned Lot - Option B.

	Description	Size	Extra Cost - Materials	Extra Costs - Labour	Unit Price	Mark-up Overhead	Cost Estimate Total
House	Door c/w access threshold + added weather-stripping	2'10" x 6'8"	\$50.00	-	-	\$13.00	\$63.00
	Design change - washroom walls and plumbing	-	\$200.00	\$200.00	-	\$100.00	\$500.00
	30" Biofold doors where required by design	30" wide	\$150.00	\$150.00	-	\$75.00	\$375.00
	Modified floor joist detail (pocket in foundation wall) required where finish grade is raised against foundation.	50 linear ft. by 10" height	\$250.00	\$500.00	-	\$185.00	\$935.00
Site	Cast-in-place concrete walkway max. 5% grade, 3'2" wide	190 sq. ft.	-	-	\$6.80	\$325.00	\$1,615.00
	Deck - standard + extension	210 sq. ft.	-	-	\$30.00	\$1,575.00	\$7,875.00
	Earthwork - assume site material	680 cu. ft.	-	-	\$1.00	\$170.00	\$850.00
	Variance application	-	-	-	-	-	\$1,200.00
Credits	Standard deck	120 sq. ft.	-	-	\$30.00	\$900.00	\$4,500.00
	Earthwork - 25% of grading attributed to standard site grading	170 cu. ft.	-	-	\$1.00	\$40.00	\$210.00
						TOTAL	\$8,703.00
Optional	Precast concrete block retaining wall	140 sq. ft.	-	-	\$31.50	\$1,100.00	\$5,510.00

CONCLUSIONS + MARKET IMPLICATIONS

Interior costs are negligible if planned at the outset. The houseplans provided by Qualico were essentially visitable on the interior, so these features should present no negative market implications. Sales agents should capitalize on this, treating the accessibility of the main floor living spaces as a selling point.

Most of the additional costs we identified relate to creating the accessible route to the door and the no step entry. In all the design case studies, these modifications add value through creating more amenity space and more interest in the landscape. Many buyers will appreciate the convenience and value of having the walkways built by the developer, whose forces are mobilized on site and should be able to offer a volume discount.

The case studies lower the finished floor elevation by a maximum of 6" (150 mm), so standard basement windows can be installed without window wells. This maintains the elevated appearance and livability of basement spaces that is prized in today's market. If full-sized egress basement windows are desired to allow a basement bedroom, shallow window wells may be required.

Visitable homes built in isolation without any pre-planning are the most expensive option. The strategy of pairing visitable homes to avoid retaining walls along the side yards should be considered if visitable homes are to be incorporated into a development.

Appendix I
BASIC VISITABILITY
MANDATORY
REQUIREMENTS

1. An Accessible Path of Travel
 - A path of travel with a gentle grade (maximum 1:20 or 5%) from the street, sidewalk, back lane, or the dwelling unit's parking space to an accessible entrance into the dwelling unit. This dwelling unit's entrance may be located at the front, side, rear, or through the garage of the home. In certain situations, in order to gain access into the dwelling unit, a ramp may be required;
 - The path of travel shall be firm, stable, and slip resistant;
 - The path of travel shall be a minimum of 36" (915mm) in width (preferred 48" (1220mm));
 - The cross slope of the path of travel to be at a maximum of 1:50 or 2%;
 - No steps shall occur along this path of travel; and
 - No drop off or slopes over 1:20 shall occur along the edge of the path of travel.

2. A No-Step Entrance Area
 - An exterior landing entrance area with a minimum clear area of 5'-0" x 5'-0" (1525mm x 1525mm) (preferred 7'-6" x 7'-6" (2285 x 2285mm));
 - A landing area that is firm, stable, and slip resistant;
 - A landing area that has a slope in any direction of no more than 1:50 (2%);
 - One no-step entrance at the entrance door;
 - A minimum 36" (915mm) clear width of the entrance door;
 - A no or low profile threshold at the door. Raised thresholds of 1/4" (6mm) or less do not require any special requirements. Thresholds over 6mm to a maximum of 1/2" (13mm) must be beveled at a maximum slope of 1:2 (50%). Less steep is recommended. Thresholds over 1/2" must be ramped similar to those requirements of curb ramps as outlined in the references below;

3. Passable Interior Circulation on the Main Floor
 - Interior doorways – minimum 32" (810mm) (preferred 33 1/2" (850mm)) clear width;
 - Clear passage throughout with a minimum 36" (915mm) (preferred 48" (1220mm)) clear width to access all main floor activity areas, including the washroom. Where a turn is required by a person using a wheelchair to access various rooms on the main floor – sitting, dining, entertaining and the washroom, the clear width should be at least 53" (1350mm).

¹A ramp may be used in existing situations where the elevation of the floor above grade is too great to be accessed a gently sloped walkway alone.

4. Access to a Main Floor Washroom

- A main floor washroom that a person using a mobility device, such as a wheelchair, can enter, close the door, and use the facilities. This would require a 5'-0" (1520mm) turning circle in front of the toilet with the washroom door not crossing the turning circle while being closed or opened;
- Clear space under wall-hung fixtures can be included in the 5'-0" (1520mm) requirement.
- The washroom must have at a minimum one sink and one toilet.