ADA CURB RAMP INSPECTION MANUAL

PBOT

PORTLAND BUREAU OF TRANSPORTATION

Effective Date 9/17/2021

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1. Introduction

The City of Portland welcomes the opportunity to create a most accessible City. To accomplish this, the significance of providing curb cuts in the form of ADA compliant curb ramps cannot be over emphasized. The purpose of this ADA Curb Ramp Inspection Manual is to provide the user with step by step instructions to complete the Inspection Form. This will help ensure that newly constructed curb ramps within the public right-of-way meet the City of Portland's requirements as further supported by the Americans with Disabilities Act (ADA). This document is intended to describe the City's processes and best practices for collecting the data needed to confirm ADA compliant curb ramps within City right-of-way are constructed throughout the City.
As of January 1, 2021, for projects advertised or permitted by PBOT and for ramps constructed by City crews, PBOT will use the 2' level (rather than the 4' level) to measure maximum grades on ramps and landings.

Updates and advancements of this document are anticipated. Please send suggestions for modifications to adaramps@portlandoregon.gov.

2. Applicability

This Inspection Manual applies to curb ramps constructed within the City of Portland right-of-way. For curb ramps criteria for ramps located within City of Portland right-of-way including those on or along ODOT roadways, *See* Design and Review of Curb Ramps On or Along State Highways Letter of Intent at:

https://www.portlandoregon.gov/transportation/article/758856

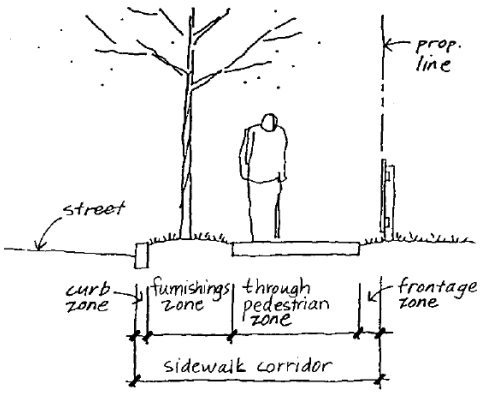
and City Engineer Directive ST 002:

https://www.portlandoregon.gov/transportation/article/642948

In summary, for ramps on or along an ODOT roadway, ODOT inspection criteria apply (including ODOT inspection forms and design exceptions). For ramps on or along an ODOT roadway AND within the City's jurisdiction, the additional criteria of ramp perpendicularity and a maximum 11% grade break at the bottom of the ramp to the street cross slope apply.

3. Definitions

- **Accessible Route:** A continuous, unobstructed path connecting all accessible elements and spaces in a building, facility, or site.
- **AD Algebraic Difference:** In civil engineering slope values are calculated as grades. The measured rise (height) is divided by the run (length) and the result is displayed as a percentage. For example, a 2' rise on a length of 100' would be a 2% grade. (0.02 ft/ft). Where 2 grades meet the angle formed at the meeting is calculated and expressed as a difference in gradients.
- **Level, or flat**: slopes that are equal to or less than 2%.
- **Flush**: No vertical discontinuities. No lips greater than ¼".
- **Ramp Cross Slope**: Measurements "B" and any measurement perpendicular to "J" and "K".
- **Street Cross Slope**: Measurements in the roadway perpendicular to the running profile.
- **Counter Slope:** Measurements taken in the street at the bottom of the ramp perpendicular to "G".
- **Landing**: Part of the Accessible Route (AR) used by a pedestrian to change direction of travel.
    - The entirety of the landing must be level. The landing must be minimum of 4' x4'. A landing is required at the top of ramp on all ramps. The landing must be in-line with the ramp.
    - For diagonal ramps a landing is required at the bottom connection to pavement.
- **Through Pedestrian Zone (TPZ):** Typically, the minimum corridor width of 6' is required, with 4-foot minimum width allowable at pinch points, hard and smooth surfacing path that has a level cross slope and is free from all vertical obstructions, including but not limited to curbs, hydrants, trees, poles, benches, and tables. The Through Pedestrian Zone is the area intended for pedestrian travel. This zone should be entirely free of permanent and temporary objects. *See* Portland Pedestrian Design Guide at: https://www.portlandoregon.gov/article/437808

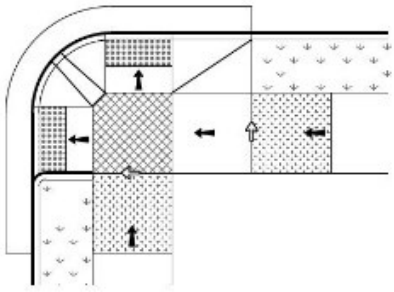


4. Ramp Geometry Types

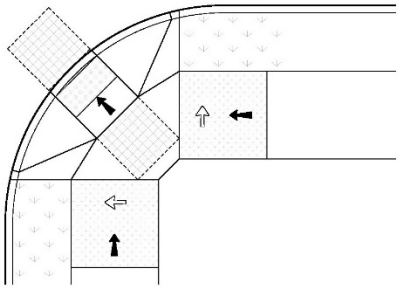
For City of Portland Standard Ramp Drawings see *Standard Drawing P-547, P-548, P-549,* and *P-550.* Ramp drawings are examples of possible configurations and variations may exist within a configuration. The most recent version of these drawings can be found at:

https://www.portlandoregon.gov/transportation/index.cfm?&c=50383

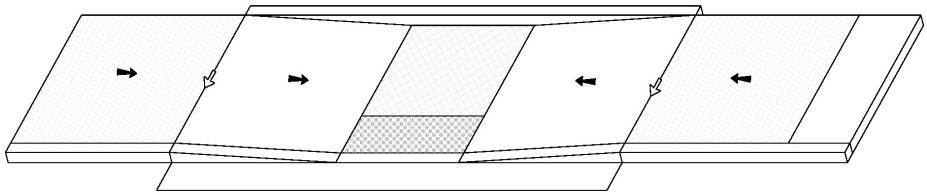
- **Perpendicular Ramp**: The ramp is perpendicular to the curb, and users will generally be traveling perpendicular to vehicular traffic when they enter the street at the bottom of the ramp. Perpendicular ramps may be at corners or mid-block locations.



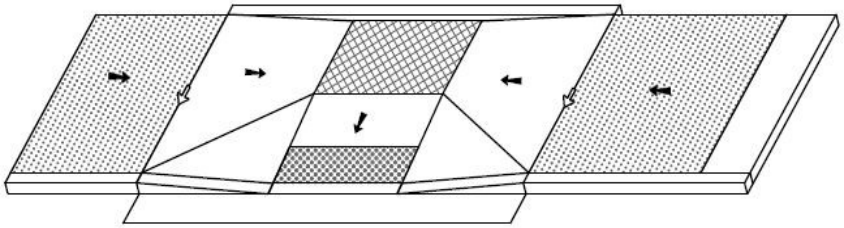
- **Diagonal Ramp**: A straight path of travel down the ramp will lead diagonally into the center of the intersection. The ramp is diagonal to the user's path of travel and users will be traveling diagonal to the vehicular traffic when they enter the street at the bottom of the ramp. The ramp may be intended for multiple target directions of travel.



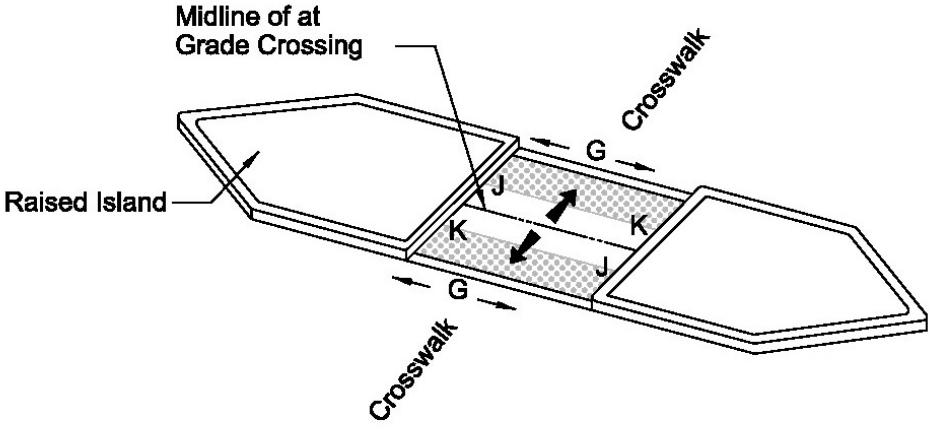
- **Parallel Ramp (Drop Ramp)**: A parallel curb ramp has two ramps leading down towards a center level landing at the bottom between both ramps with a level landing at the top of each ramp. A parallel curb ramp is one that is oriented in line with the user's path of travel on the sidewalk. This is sometimes referred to as a “drop” ramp.



- **Combination Ramp (Split Ramp)**: This is an intermediate geometry type between perpendicular and parallel ramps. A combination curb ramp uses the concept of the parallel ramp to lower the elevation level of the landing and then uses a perpendicular ramp to bridge the remaining elevation gap between the landing and the street.



- **Islands / Median Refuge Islands:** This is a special geometry designed to minimize pedestrian exposure during crossing. An elevated, curbed area sometimes landscaped, is placed to define the island refuge. The refuge island accessible route can be asphalt or concrete. Tactile panels are placed at the entrances to the refuge. Each tactile panel is recorded as a ramp. The pedestrian accessible route through the island refuge is at grade with the surrounding roadway. Profile slope, "G" measurement, should conform to the roadway profile. Ramp slope, "J" and "K" measurement should conform to roadway grading plan detail and typical section cross slopes. If there is a landing between the tactile panels the ramps may be evaluated as 2 perpendicular ramps. The construction inspector has the responsibility to accept the ramp as "built per plan". The ADA Technical Advisor will review the ensurance inspection for ramp acceptance.



RAISED REFUGE ISLAND (AT GRADE CROSSING)
RAMP MEASUREMENTS

5. How to Inspect a Curb Ramp

a. Preparation

Safety:

- Be Safe. If any condition compromises safety for you or the public then hold off inspection until the unsafe condition can be eliminated.
- Follow all safety guidance, and PPE (Personal Protective Equipment) requirements, of your work group and any site specific safety plan.

Workmanship:

Before measuring the ramp, check that:

- All curb ramp surfaces are smooth and even, and that there are no humps, bump, lumps or sags as required in Section 0759.50 of the City of Portland Standard Specifications.
- There are no lips or ridges at any point on the surface, score lines, or edge of panels, including at the interface between the bottom of the ramp and street paving.
- The tactile panel shall be firmly attached per manufacturer's recommendation.
- All accessible route grade breaks are perpendicular to the direction of travel.
- Ponding or puddles in the accessible route should be noted and pictures taken.

Measurement:

- See Appendix for graphical representations of where to take measurements.
- Verify the work is sufficiently complete to establish pass/fail measurements.
- Clean the area to be measured with a broom.
- Use the inspection form to identify where each measurement is to be taken.
  - Lengths and widths are measured to the nearest 0.1 foot.
  - Slopes are measured to the nearest 0.1%.

Tools to Use for Inspection:

- PPE (Personal Protective Equipment
- Tape measure(s) that can measure in tenths of a foot and inches.
- 4-foot, 2-foot and 6" electronic spirit (bubble) levels that have a digital display which can be set to display tenths of a percent. The City uses both Stabila and Smarttool levels. The 2 brands we use measure to an internal accuracy of 0.04% and display to 0.1%. (0.0004'/' and 0.001'/') The inspector shall follow the calibration instructions for the specific brand and model of level used. Below are links to examples of calibration instructions for two models.
  - STABILA 196-2 Electronic-IP65 Instructions:
    https://www.stabila.com/files/default/products/static/products/USType196electronic/downloads/bedienungsanleitung/en/1962electr_manual_us-en.pdf
  - Smart Tool Instructions:
    http://smarttoollevels.com/manuals/ (Model Gen 3)
    http://smarttoollevels.com/content/downloads/manuals/SmartTool-Gen3-Owners-

Manual_ENG-ESP.pdf

- The 2-foot level is the default grade measurement tool.
- The 6" level is used for measuring grades for features less than 2' wide.
- A square or rectangular straightedge, the same length as the level, for use when the level will not fit between the tactile panel domes.
- Camera. Note: Ensure that the camera is capable of, and set to, record date, time, and location coordinates in the photo's metadata.
- Broom for clearing ramp area prior to taking measurements.

b. Inspection Form - Step by Step Instructions

See Inspection Form below for references

① Project #_____Federal Aid #_____(When Available)

② Street 1: (Generally "Street" running east-west)
Street 2: (Generally "Avenue" running north-south)

③ Ramp Location: Select the designation of the ramp being inspected. Select one location per ramp. For non-standard intersections draw a field sketch.

- NW1, NE1, SE1, SW1 cross perpendicular to Street 1.
- NW2, NE2, SE2, SW2 cross perpendicular to Street 2.
- NWC, NEC, SEC, SWC are diagonal ramps situated in the middle of the curb radius which may have one or two crossings.

④ Measurements "A, B, C, D": Using the 2' level, take measurements within 3" of the joint line (not on the joint line) for the full length of lines A, B, C and D and at least every 2' parallel and offset to the joint line and to the midline of the landing. Record the highest measurements found for A, B, C and D. Note: If an obstruction is adjacent to a landing, take a picture. This includes curbing, walls, foundations, stairways, and any feature that may affect the turning path of the wheelchair on the landing.

⑤ Measurements "E" and "I": Document the width and grade of the first panel connecting the landing to the running sidewalk profile. Using the 2' level, take measurements within 3" of the joint line (not on the joint lines) for the full length of lines E and I. Record the highest measurements found for E and I.

⑥ Measurements "F" and "H" are taken from the back of the pedestrian circulation path to the front edge of the Through Pedestrian Zone. Measurements for "F" and "H" are taken within the accessible route perpendicular to the circulation path. Using the 2' level, take measurements within 3" of the joint line (not on the joint line) for the full length of lines F and H. Record the highest measurements found for F and H.

⑦ Ramp Run “J” and “K”:

Using the 2’ level, take measurements within 3” of the joint line (not on the joint line) for the full length of lines J and K and at least every 2’ parallel and offset to the joint line and to the midline of the ramp. Record the highest measurements found for J and K.

- Some tactile panels will not allow the level to fit between the buttons. It is acceptable to offset the level to the edge of the tactile panel if needed. DO NOT tilt the level between domes. Use an intermediate straightedge, the same length as the level, where the domes would interfere.
- “J” and “K” may be taken from the back of curb to the top landing if the top of curb slope does not match the ramp. If this is the case, then use 6” level to measure and record the top of curb slope at “J” and “K”. Note in the comments section the top of curb slope values.
- Ramps where the landing is higher than the gutter have positive “J” and “K” values.
- Note that for parallel ramps, measurements for “J” and “K” are not applicable.

⑧ Tactile Panel

- Record the manufacturer.
- Confirm the color of panel is Federal Yellow.

⑨ Measurement “G” should be taken on the street side surface of the face of gutter. This distance should be a single plane.

- Where standard curb is used “G” shall have a flush transition from ramp concrete to roadway surfacing. The full width of “G” shall be flush. (See PBOT Standard Drawing P-540)
- Where monolithic curb and gutter is used “G” shall have a flush transition from ramp concrete to gutter pan and a flush transition at the transition from gutter to roadway surfacing. (See PBOT Standard Drawing P-540)

⑩ Counter Slope

- Counter slope (CS) shall be taken on the street side of the curb opposite of the J and K measurements taken in step 7 above and record the highest value. In cases where (a) there is not curb and gutter or (b) the curb and gutter that is used is less than 2’ wide, the CS shall be taken at the gutter and in the street out to 2’ from the face of curb.
- Street slopes toward the gutter are recorded as positive. Street slopes away from gutter are recorded as negative. The algebraic difference (AD) is taken by adding the greater of “J” and “K” to the CS.

- Diagonal Ramps: Counter slope bottom landing for diagonal ramps shall be measured in the street in the area immediately in front of the ramp in a pattern documenting a 4’ x 4’ rectangular landing. Fill in “LA,” “LB,” and “LC.” “LA” and “LC” are always recorded out to a 4’ distance measured from the flow line perpendicular to the face of curb.

⑪ Flare Slopes FS1 and FS2:

Measure Flare Slopes along the top back of curb starting at the bottom of “J” or “K”. For parallel ramps begin at the base of “A” or “C”. Positive slopes have the top of wing where the wing meets the back of curb higher than the ramp throat. If the top of wing is lower than the ramp throat, then record the result as a negative slope. Flare slopes shall also be measured at a 2’ interval along the flare parallel to the face of curb.

Note: If flare slope value is equal to or less than less than 10% absolute, then the flare slope is compliant.

⑫ Street Grades G1 and G2:

- Measure G1 and G2 at the face of curb relative to the bottom of “J” or “K”. Positive slopes have the outside edge higher than the ramp throat. If the outside edge is lower than the ramp throat, then record the result as a negative slope. Draw sketch or photograph catch basins. Do not include inlet depressions in slope measurement.

⑬ Flare Slope Evaluation:

- Flare slopes are recorded along the top back of curb. Measure every 2’ along the Flair slope. Positive slope values slope towards the ramp throat.

⑭ Diagonal Ramp Bottom Landing: Is the 4’ x 4’ landing at gutter completely within any striped crosswalk? Show in photos and confirm in notes.

⑮ Pushbutton Location:

- Check that the face of the pushbutton is generally parallel to the crosswalk that the pushbutton is intended for.
- The center of the pushbutton shall be located approximately 3.5’, but no more than 4’, above the sidewalk.
- To measure the distance from the edge of the top landing to the pushbutton, use the 4-foot electronic level held vertically and a tape measure to define the distance to the edge of the landing.
- The maximum reach distance to the pushbutton from the edge of the flat landing must be no more than 10”. The flat landing includes all the continuously level surface adjacent to the ramp.

⑯ Historical Features: Are there any Historical Features within the limits measured on this form? If so, then document in notes and with photos.

⑰ Signature lines:

- Inspector Sign and Date
- Construction Manager (For post-construction inspection)
- The box for “Check if Design Variance has been approved” is checked by the Technical Advisor during post inspection review

Photos:

- Take at least two photos: one standing at the back of ramp facing the street, and one from the street facing the ramp. Take additional photos of any features that might cause the ramp to not be ADA compliant. Get pictures of any obstructions within the ADA ramp measurement area.

❖ Note: If the length of feature items ④ to ⑧ is longer than 2’, then measure in enough locations to capture entire dimension and record the largest slope value.

❖ Note: Where an adjacent ramp covers the area normally measured for “E”, “F”, “H”, or “I” then for the length write the word Ramp and use a dash for the slope measurement.

C. The Inspection Form

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FORM DATE: 1/1/2021

Form Printed Date: 12/21/2020

Project #: (1) Federal Aid #:

Inspected by: Date:

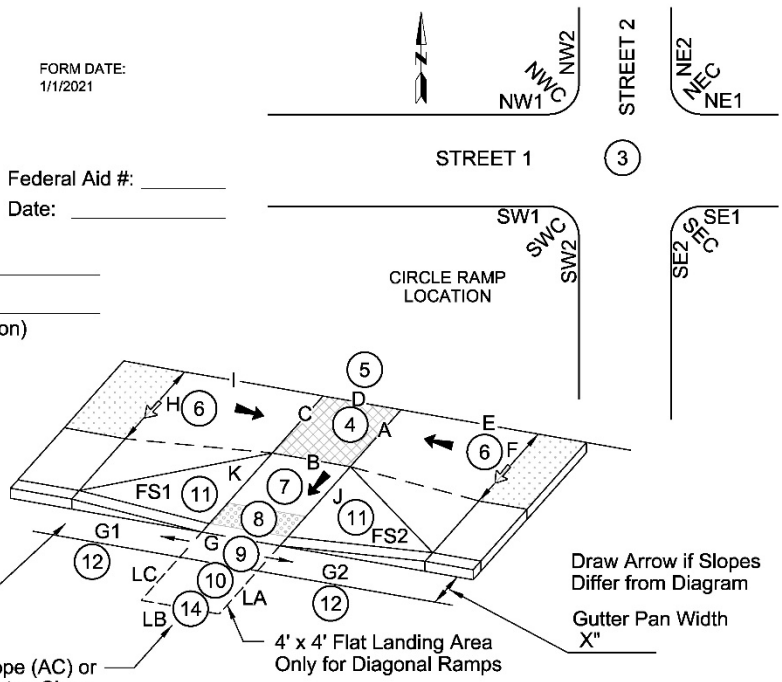
Additional Comments Attached? ☐

Street 1: (2)

Street 2:

(Include Station as needed for location)

Comments:



PERPENDICULAR RAMP MEASUREMENT

Measure Dimensions Length and Slope in Tenths			Meets Std. Drg. P-547 or P-548 Requirements ?	
A		%	Y	N
B		%	Y	N
C		%	Y	N
D		%	Y	N
E		%	Y	N
F		%	Y	N
G		%	Y	N
H		%	Y	N
I		%	Y	N
J		%	Y	N
K		%	Y	N
Diagonal Ramps Only				
LA		%	Y	N
LB		%	Y	N
LC		%	Y	N

Measure Slopes

Algebraic Difference ≤ 11%?

(10) Counter Slope: % Y N

Greater of J & K: %

Relative Flare Slope ≤ 10% ?

(11)(12)(13)

Flare Slope 1: % Y N

G1 (Street Slope): %

Flare Slope 2: % Y N

G2 (Street Slope): %

Has the Ramp Been Altered From Design? Y N

Only Tactile Panel Installed? Y N

(8) Approved Federal Color - Yellow: Y N

Tactile Panel Manufacturer:

(15) Is the Ped. / Signal Pole Located Per Plans? Y N N/A (N - Attach photo) Is the Ped Push Button positioned wtih face of push button parallel to the crosswalk to be used, with a mounting height of approximately 3.5', but no more than 4', above the sidewalk, at a maximum reach distance of 10" from edge of landing ? Y N N/A (Explain)

(9) Is The Ramp Lip Flush? Y N

(16) Any Historical Features? Y N If 'Yes' Attach Picture

RULES FOR MEASURING

1. See PBOT ADA Ramps Inspection Manual for level selection.
2. Follow level Manufacturer's calibration instructions.
3. Provide completed report to Construction Manager or Inspection Supervisor for review and signature.

Inspected by: (17) (Print Name) (Signature) / Date

Approved by: Construction Manager (Print Name) (Signature) / Date

☐ Check if ADA Design Variance applies
Note: If Design Variance has been approved, attach it.

S:_VIIII_ CREEC Program\Inspections\Inspection References\CREEC ADA Curb Ramp Inspection Manual\MicroStation Source Document\ADA Curb Ramp Inspection Form .dgn 1-1-21.dgn

c. Ramp Geometry Type Measurements

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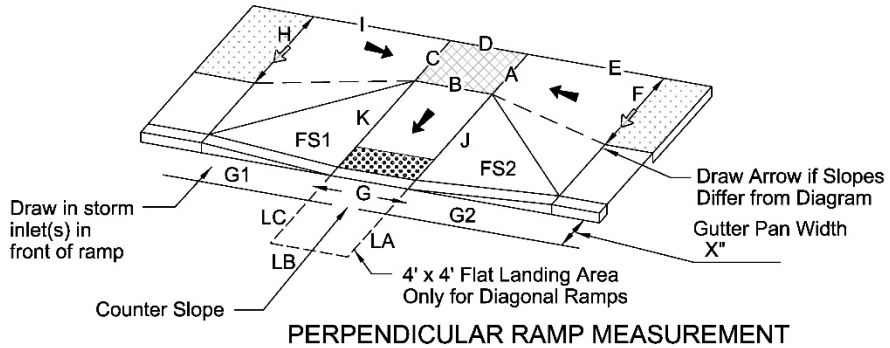
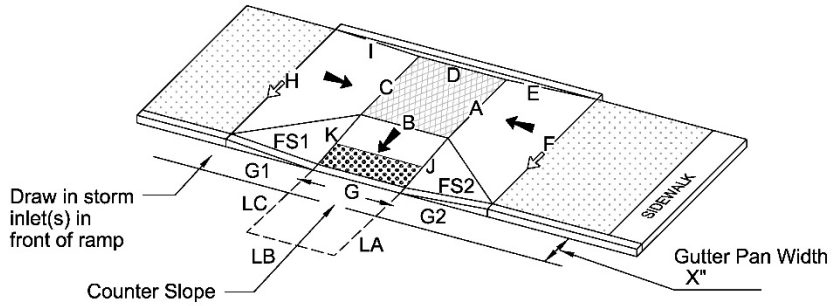
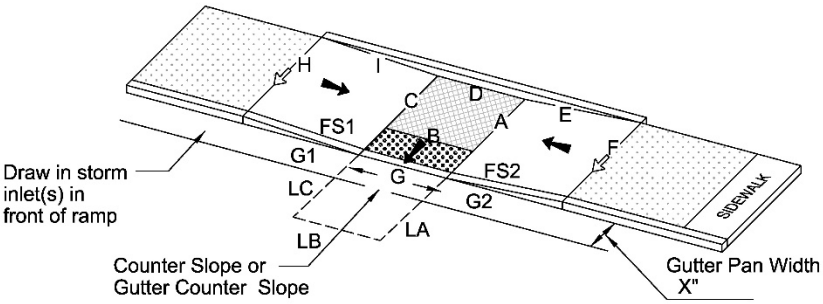


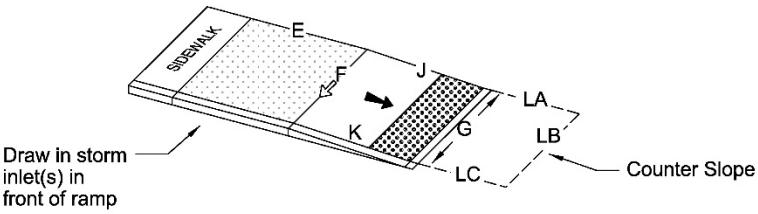
PERPENDICULAR RAMP MEASUREMENT



COMBINATION RAMP MEASUREMENTS



PARALLEL RAMP MEASUREMENTS



SIDEWALK END RAMP MEASUREMENTS

FORM DATE:
1/1/2021

Form Printed Date: 12/21/2020

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Ramp Geometry Type Measurements cont.

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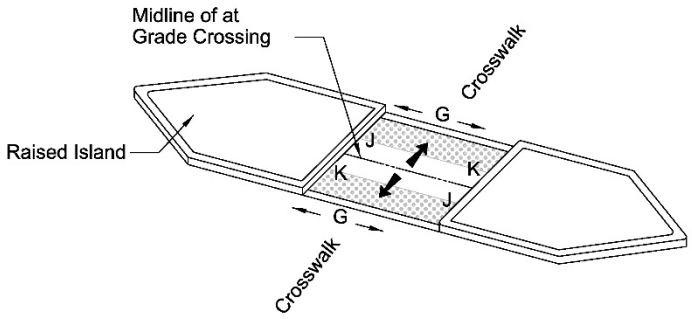
Form Printed Date: 12/21/2020



RAISED REFUGE ISLAND (AT GRADE CROSSING)
RAMP MEASUREMENTS

Legend

ADA ramp or ADA compliant sidewalk panel adjacent to flat landing - 8.33% Maximum

Slope 2% Maximum

Flat landing 2% or less - 4' x 4' Minimum

Truncate dome tactile panel

Transition panel connecting fully compliant ramp with existing sidewalk.

FORM DATE:
1/1/2021

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d. Sample Completed Inspection Form

PBOT

FORM DATE: 1/1/2021

PORTLAND BUREAU OF TRANSPORTATION

Project #: WO # 1234 Federal Aid #: _____

Inspected by: J. Scanlon Date: 1/1/2021

Additional Comments Attached? ☐

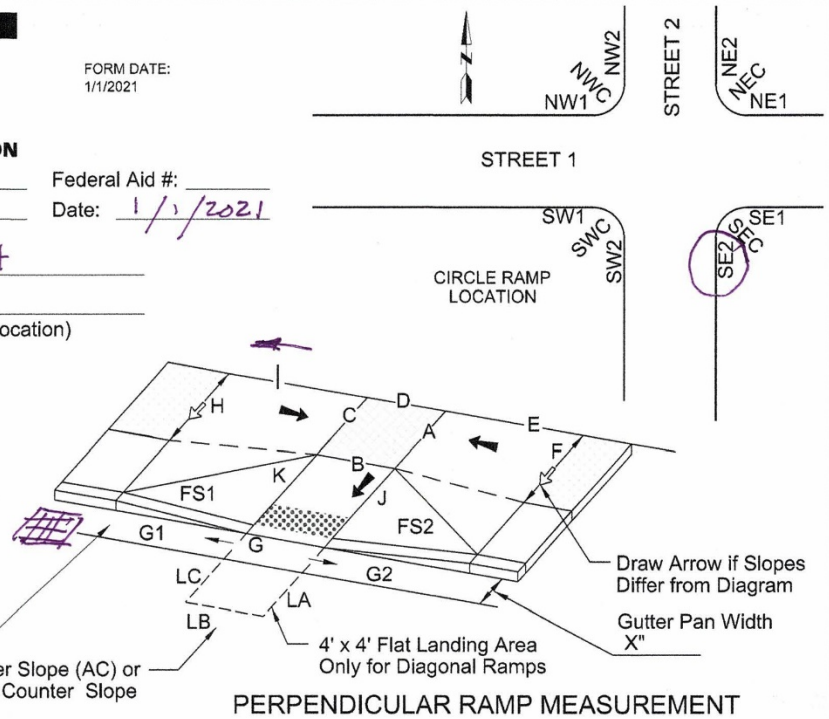
Street 1: SW Gerenic St

Street 2: SW 1st Ave

(Include Station as needed for location)

Comments: Sample

Photo Time 1:23 PM



PERPENDICULAR RAMP MEASUREMENT

	Measure Dimensions Length and Slope in Tenths		Meets Std. Drg. P-547 or P-548 Requirements ?
A	4.0'	1.8 %	Y N
B	4.0'	1.3 %	Y N
C	4.0'	1.8 %	Y N
D	4.0'	1.1 %	Y N
E	5.5'	5.9 %	Y N
F	6.0'	2.0 %	Y N
G	4.0'	0.8 %	Y N
H	6.0'	2.0 %	Y N
I	3.5'	-4.0 %	Y N
J	4.6'	3.5 %	Y N
K	4.6'	3.1 %	Y N
Diagonal Ramps Only			
LA		%	Y N
LB		%	Y N
LC		%	Y N

Measure Slopes

Algebraic Difference ≤ 11%?

Counter Slope: 5.5 %

Greater of J & K: 3.5 % (Y) N

Relative Flare Slope ≤ 10% ?

Flare Slope 1: 3.0 % (Y) N

G1 (Street Slope): -5.0 %

Flare Slope 2: 12.5 % (Y) N

G2 (Street Slope): 5.5 %

Has the Ramp Been Altered From Design? Y (N)

Only Tactile Panel Installed? Y (N)

Approved Federal Color - Yellow: (Y) N

Tactile Panel Manufacturer: Armor Tile

Is the Ped. / Signal Pole Located Per Plans? Y N (N/A) (N - Attach photo) Is the Ped Push Button positioned wtih face of push button parallel to the crosswalk to be used, with a mounting height of approximately 3.5', but no more than 4', above the sidewalk, at a maximum reach distance of 10" from edge of landing ? Y N (N/A) (Explain)

Is The Ramp Lip Flush? (Y) N

Any Historical Features? Y (N) If 'Yes' Attach Picture

RULES FOR MEASURING

1. See PBOT ADA Ramps Inspection Manual for level selection.
2. Follow level Manufacturer's calibration instructions.
3. Provide completed report to Construction Manager or Inspection Supervisor for review and signature.

Inspected by: J. Scanlon (Print Name) _____ (Signature) / Date

Approved by: C. M. DeJour Construction Manager (Print Name) _____ (Signature) / Date

☐ Check if ADA Design Variance applies
Note: If Design Variance has been approved, attach it.

Form Printed Date: 12/21/2020

S:_VIIII_ CREEC Program\Inspections\Inspection References\CREEC ADA Curb Ramp Inspection Manual\ADA Curb Ramp Inspection Source Document\ADA Curb Ramp Inspection Form_JMS 1-1-21.dgn

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RAMP SLOPE MEASUREMENT DIAGRAMS

Inspection Manual Step #:
④

Note:
1. Record highest value found ONLY per each inspection line shown below

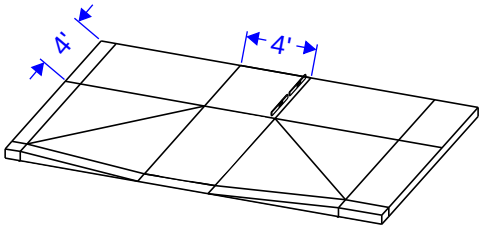
Inspection Form Measurements:
A, B, C, D

Measurement Description:
Top Landing

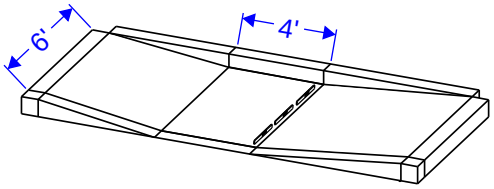
= Smart Level Placement

Example 2' smart level placement based on **BLUE** dimensions (NTS):

Measurement: **A**

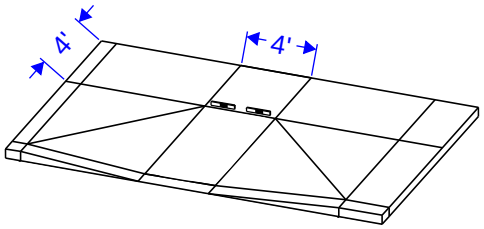


Perpendicular Ramp

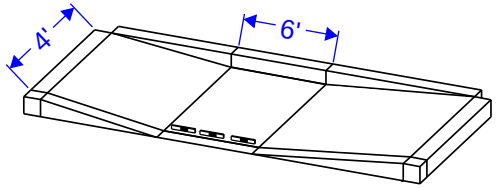


Parallel (drop) Ramp

Measurement: **B**

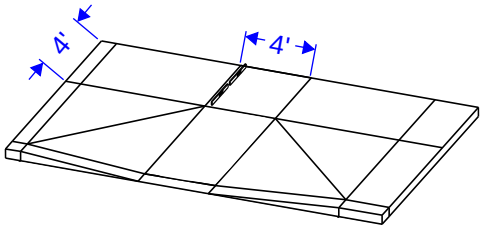


Perpendicular Ramp

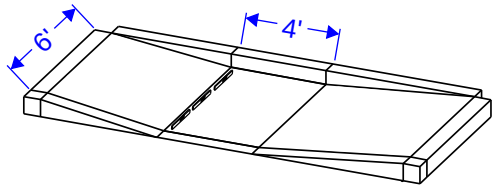


Parallel (drop) Ramp

Measurement: **C**

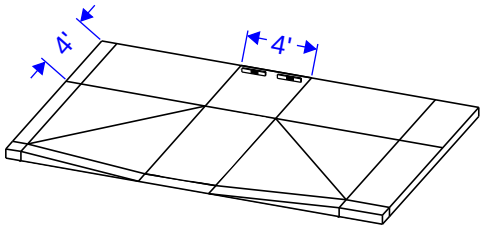


Perpendicular Ramp

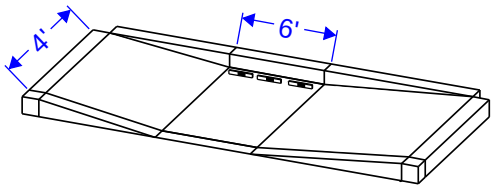


Parallel (drop) Ramp

Measurement: **D**



Perpendicular Ramp



Parallel (drop) Ramp

RAMP SLOPE MEASUREMENT DIAGRAMS

Inspection Manual Step #:
⑤

Inspection Form Measurements:
E, I

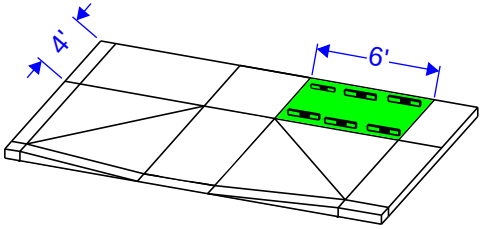
Measurement Description:
Transitions (Running Slope)

Notes:
1. For each measurement taken along the (E or I) line, move level 2' along the accessible route from the landing to the first grade break.
2. Record highest value found ONLY per each GREEN region shown below

= Smart Level Placement

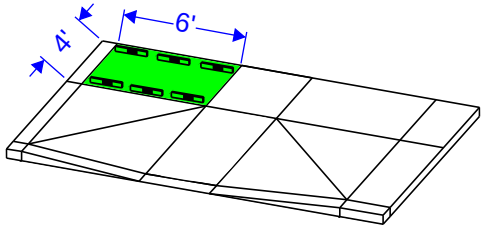
Example 2' smart level placement based on **BLUE** dimensions (NTS):

Measurement: **E**
GREEN AREA

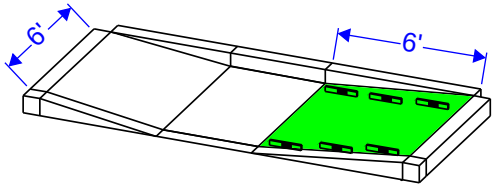


Perpendicular Ramp

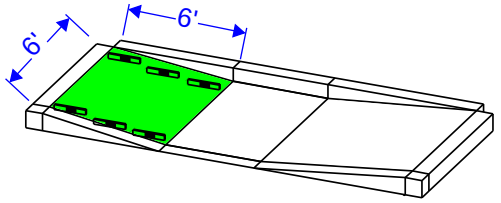
Measurement: **I**
GREEN AREA



Perpendicular Ramp



Parallel (drop) Ramp



Parallel (drop) Ramp

PBOT
PORTLAND BUREAU OF TRANSPORTATION

RAMP SLOPE MEASUREMENT DIAGRAMS

Inspection Manual Step #:
⑥

Inspection Form Measurements:
F, H

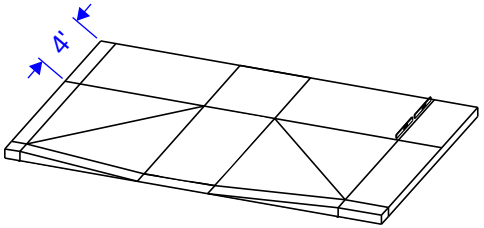
Measurement Description:
Transitions (Cross Slope)

Notes:
1. For each measurement taken along the (F or H) line, move level 2' along the existing sidewalk within the accessible route.
2. Record highest value found ONLY per each inspection line shown below

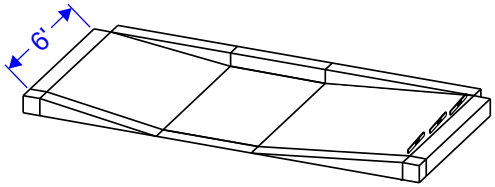
= Smart Level Placement

Example 2' smart level placement based on **BLUE** dimensions (NTS):

Measurement: **F**

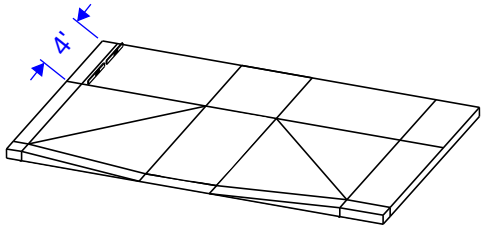


Perpendicular Ramp

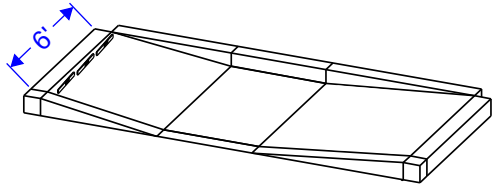


Parallel (drop) Ramp

Measurement: **H**



Perpendicular Ramp



Parallel (drop) Ramp

PBOT
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RAMP SLOPE MEASUREMENT DIAGRAMS

Inspection Manual Step #:
⑦

Inspection Form Measurements:
J, K

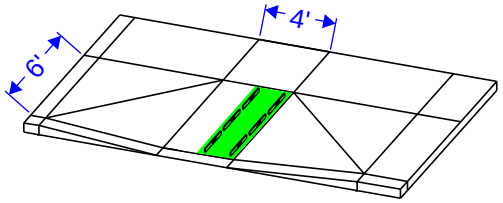
Measurement Description:
Ramp Run

Notes:
1. Record highest value found ONLY per each GREEN region shown below
2. Measurements J and K are not applicable on parallel (drop) ramps

= Smart Level Placement

Example 2' smart level placement based on **BLUE** dimensions (NTS):

Measurement: **J**
GREEN AREA

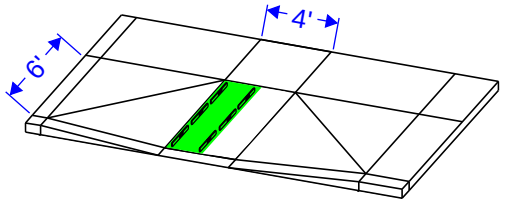


Perpendicular Ramp

NOT USED

Parallel (drop) Ramp

Measurement: **K**
GREEN AREA



Perpendicular Ramp

NOT USED

Parallel (drop) Ramp

PBOT
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RAMP SLOPE MEASUREMENT DIAGRAMS

Inspection Manual Step #:
⑨

Inspection Form Measurements:
G

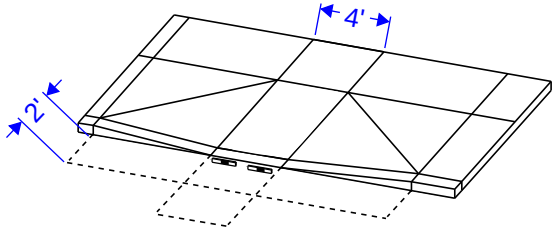
Measurement Description:
Gutter

Notes:
1. For each measurement taken along the G line, move level 2' along the gutter flow line
2. Record highest value found ONLY per each inspection line shown below

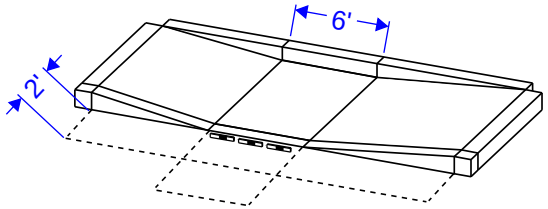
= *Smart Level Placement*

Example 2' smart level placement based on **BLUE** dimensions (NTS):

Measurement: G



Perpendicular Ramp



Parallel (drop) Ramp

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RAMP SLOPE MEASUREMENT DIAGRAMS

Inspection Manual Step #:
(10) -1

Inspection Form Measurements:
CS

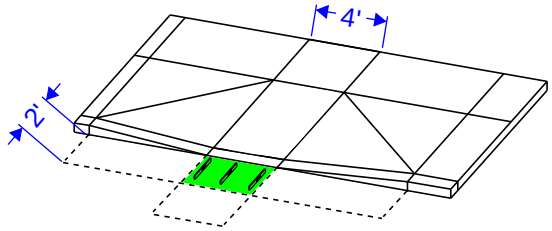
Measurement Description:
Counter Slope

Notes:
1. For each measurement taken perpendicular to the G line, move level 2' along the gutter flow line
2. Record highest value found ONLY per each GREEN region shown below

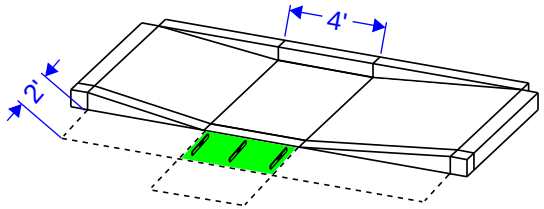
= *Smart Level Placement*

Example 2' smart level placement based on **BLUE** dimensions (NTS):

Measurement: CS
GREEN AREA



Perpendicular Ramp



Parallel (drop) Ramp

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RAMP SLOPE MEASUREMENT DIAGRAMS

Inspection Manual Step #:
10 -2

Inspection Form Measurements:
LA, LB, LC

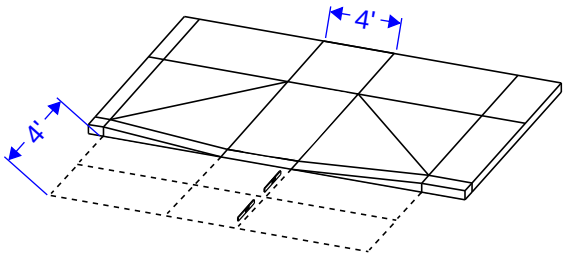
Measurement Description:
Bottom Landing

Notes:
1. LA, LB, and LC are only taken on diagonal ramps.
2. On all ramps, regardless of ramp width, LA, LB, and LC are measured as a 4' box centered on the mid-line of the ramp.
3. Record highest value found ONLY per each inspection line shown below

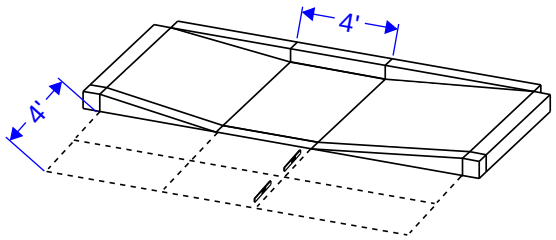
= *Smart Level Placement*

Example 2' smart level placement based on **BLUE** dimensions (NTS):

Measurement: LA

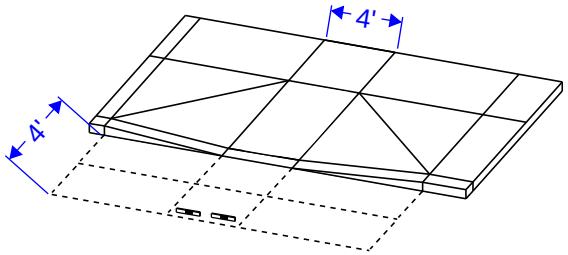


Perpendicular Ramp

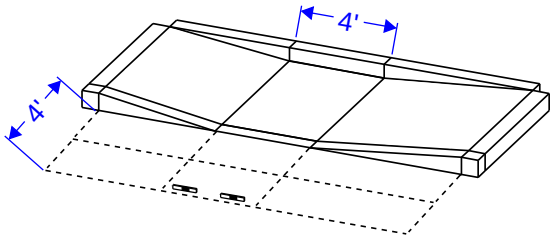


Parallel (drop) Ramp

Measurement: LB

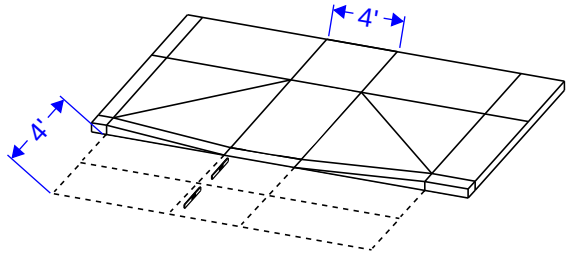


Perpendicular Ramp

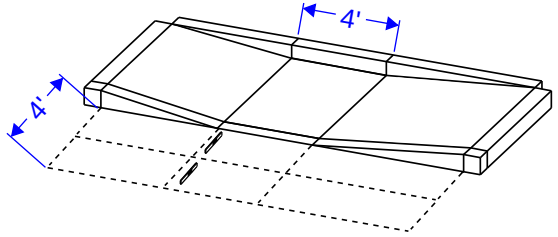


Parallel (drop) Ramp

Measurement: LC



Perpendicular Ramp



Parallel (drop) Ramp

RAMP SLOPE MEASUREMENT DIAGRAMS

Inspection Manual Step #:
(11)

Inspection Form Measurements:
FS1, FS2

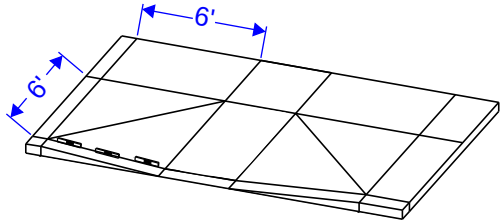
Measurement Description:
Flare Slope

Notes:
1. Record highest value found ONLY per each inspection line shown below
2. Measurements FS1 and FS2 are not applicable on parallel (drop) ramps

= Smart Level Placement

Example 2' smart level placement based on **BLUE** dimensions (NTS):

Measurement: FS1

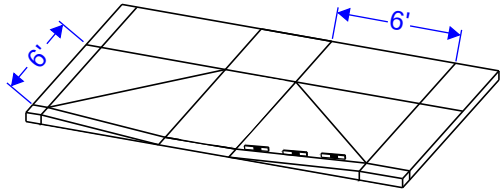


Perpendicular Ramp

NOT CAPTURED!

Parallel (drop) Ramp

Measurement: FS2



Perpendicular Ramp

NOT CAPTURED!

Parallel (drop) Ramp