New WSDOT-Developed Job Aids for ADA Curb Ramp Evaluation and Design: Show and Tell

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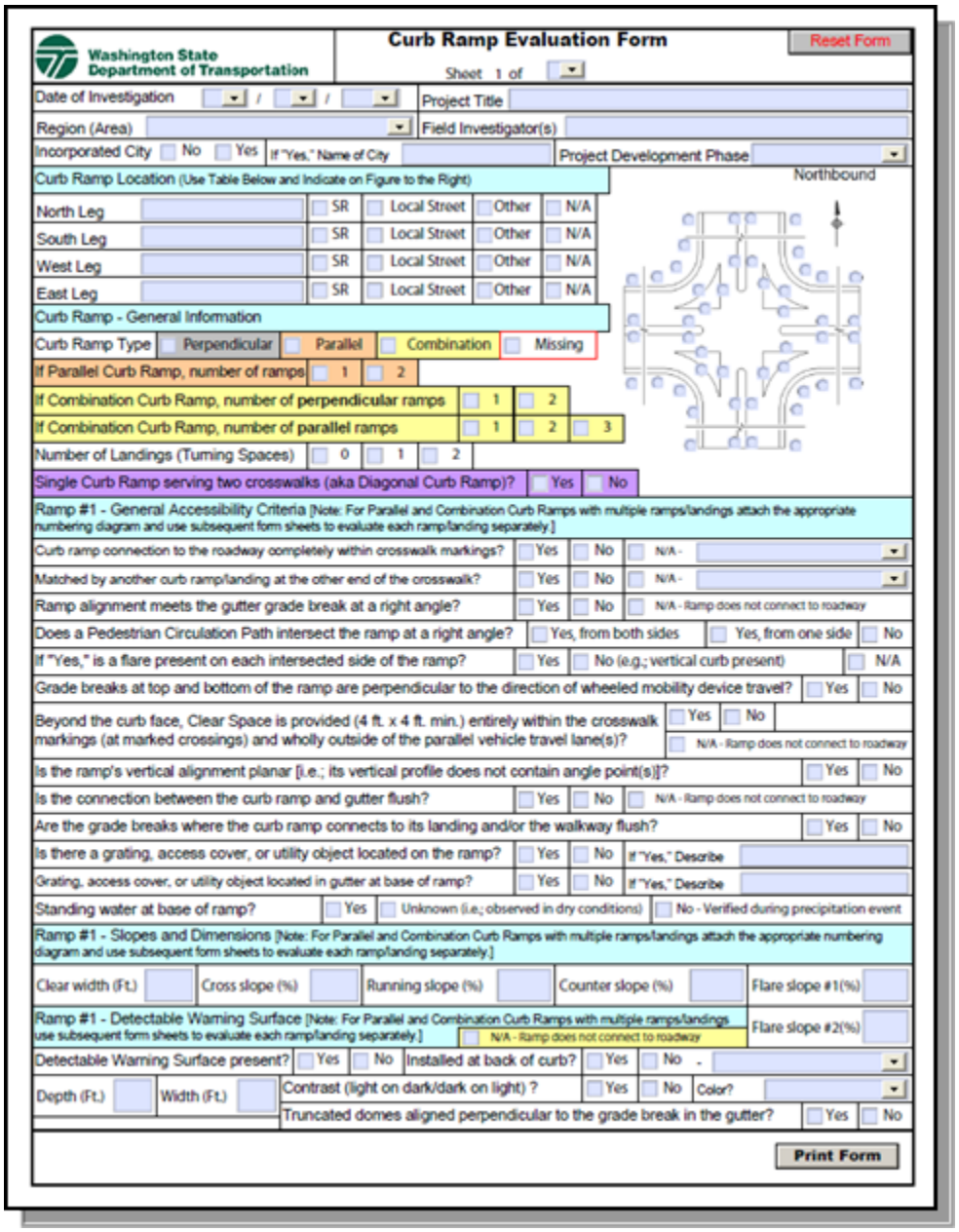
Washington State Department of Transportation

Introducing the CREF

The Curb Ramp Evaluation Form (CREF) is a tool developed to ensure completeness of data collection when performing curb ramp investigations in the field.

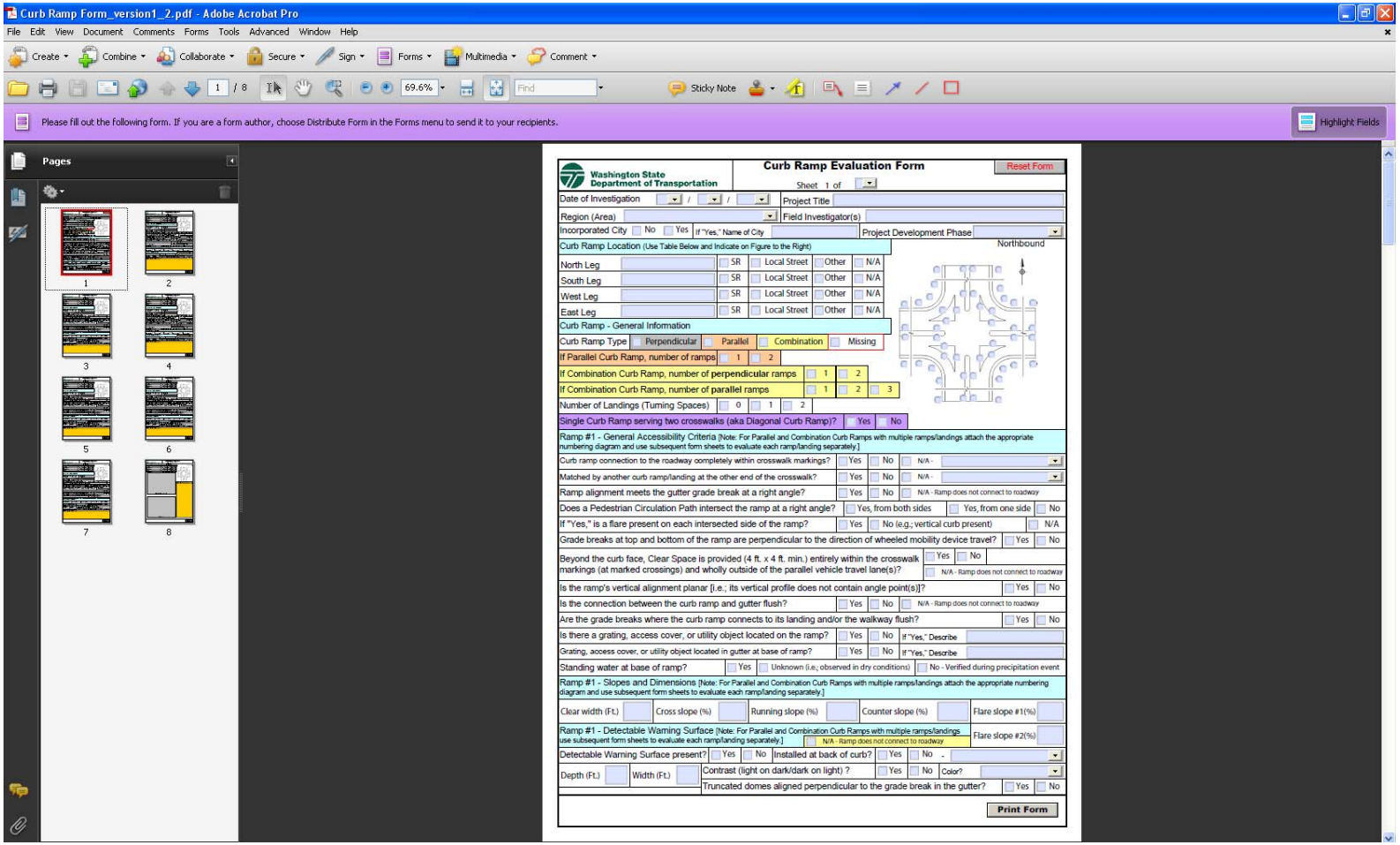
The CREF also can generate standardized, legible and professional looking hard-copy and electronic documentation for scoping files, project files, design documentation, and other databases.

The CREF is NOT a checklist of ADA curb ramp requirements. Rather, the CREF is designed to ensure that all data relevant to making a determination of compliance with state and federal accessibility standards is collected.



CREF* User's Manual

[*Curb Ramp Evaluation Form]

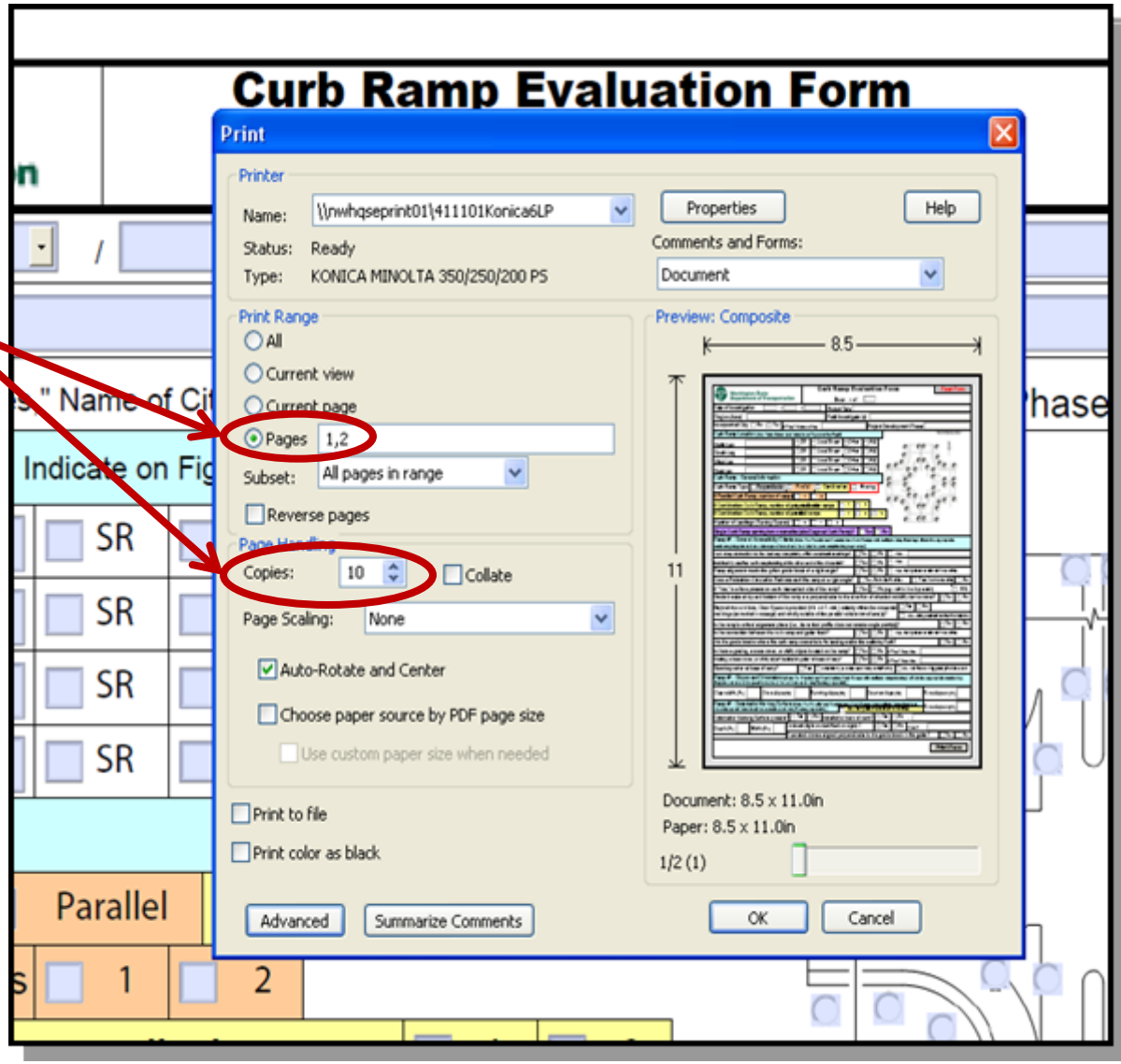


Preparing for the field evaluation

- Open the CREF file
- Estimate the number of curb ramps to be evaluated and print out the appropriate number of both page 1 and page 2 of the file.

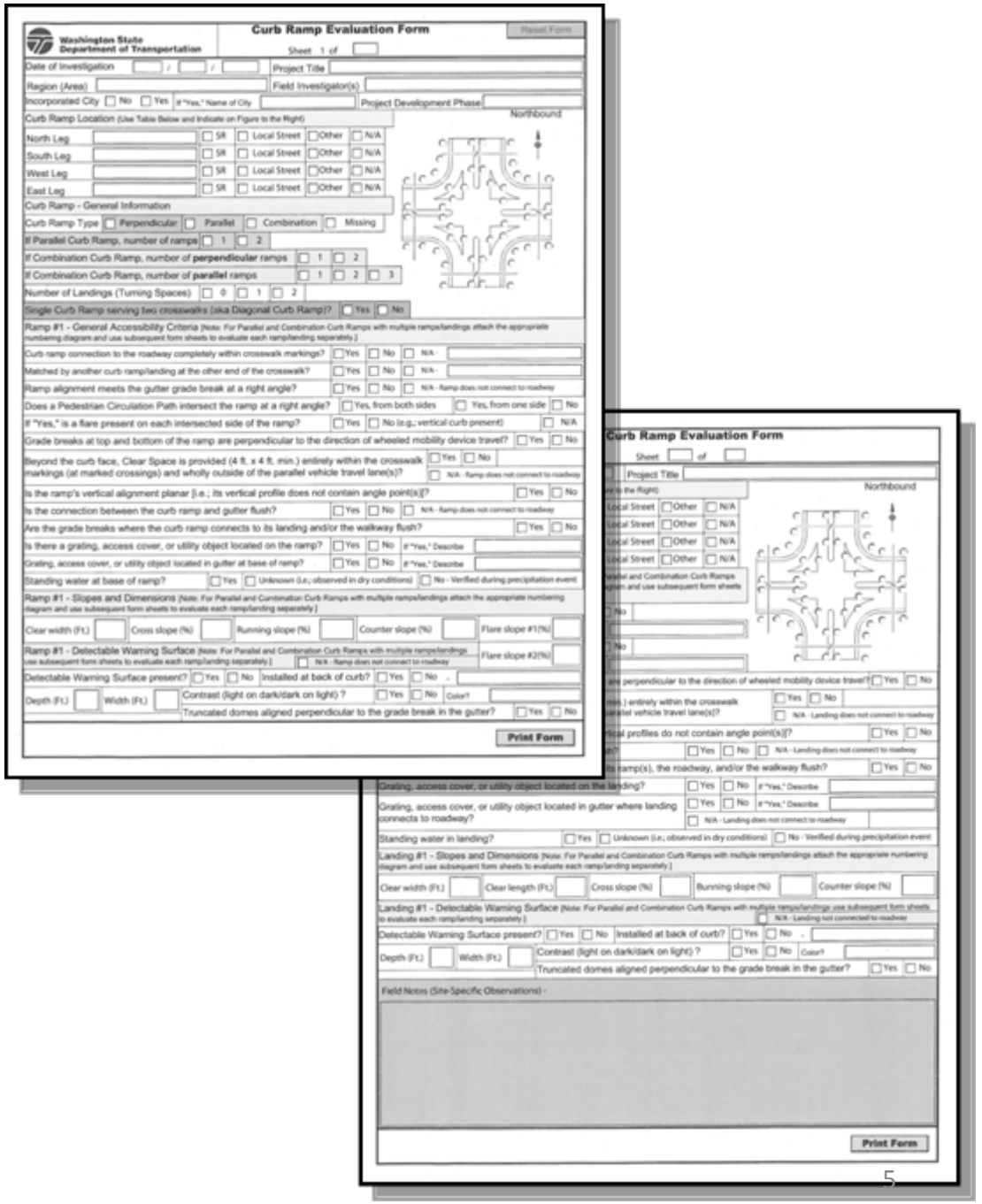
Notes:

1. **Page 1** is for evaluating a ramp while **page 2** is for evaluating a landing. Thus a typical perpendicular curb ramp with landing requires two sheets for the evaluation.
2. If there are “Type A” parallel curb ramps (i.e.; two ramps and a landing) to be evaluated, print the appropriate number of copies of **page 3** to cover the additional ramps.
3. Similarly, if there are any combination curb ramps to be evaluated then extra copies of landing (page 4) and ramp (pages 3 & 5-7) sheets will be needed.



Preparing for the field evaluation

For economy of State resources, the form pages can be printed Black & White for the field evaluation…saving the Color printing for the final product after data entry back at the office.

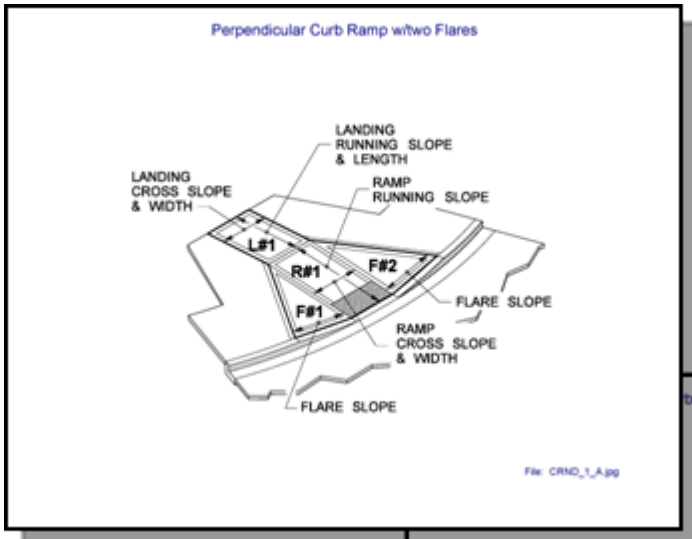


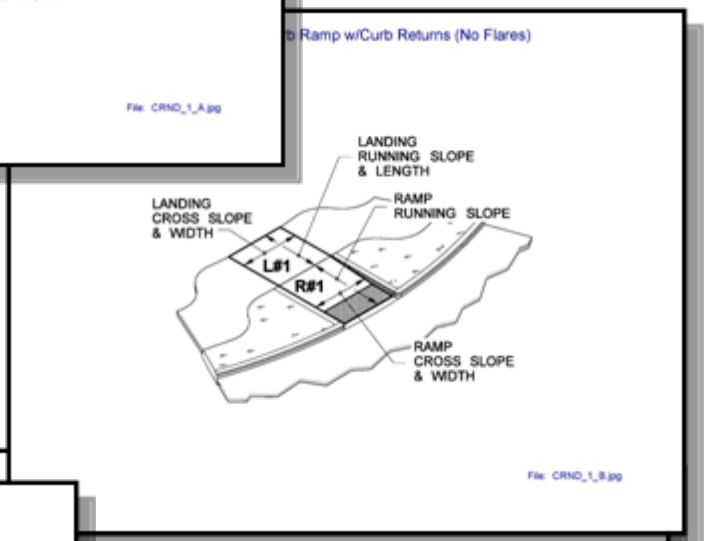
Preparing for the field evaluation

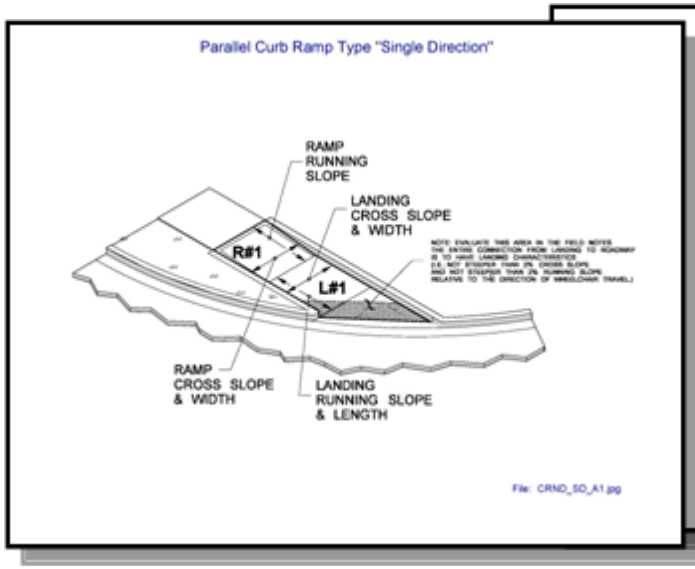
Also, print out a copy of the Curb Ramp Numbering Diagram (CRND) Index for reference out in the field.

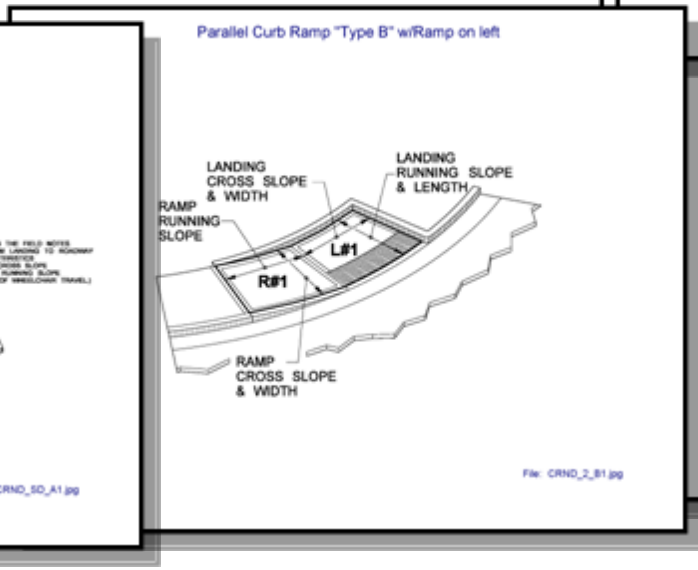
The CRNDs are designed to promote consistent data entry on the CREF.

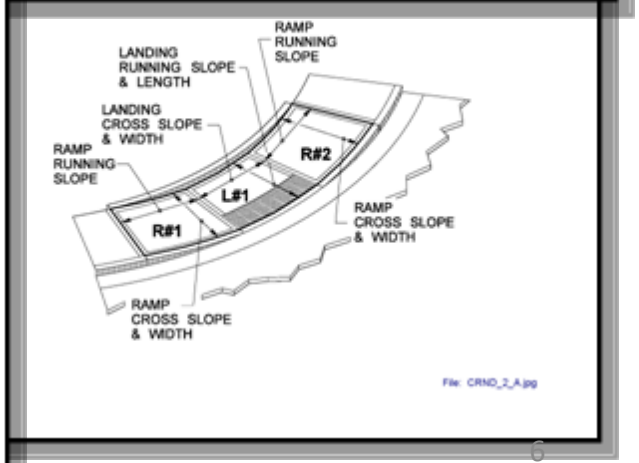
As of 3/9/12, the CRND library covers all perpendicular and parallel curb ramps. In the near future, the CRND library will be expanded to cover the wide variety of combination curb ramps as well as blended transitions.











Field data entry

The CREF is designed to be legible in the field for field data entry.

The heading data can be entered later during final data entry back at the office…

Curb Ramp Evaluation Form

Reset Form

Washington State Department of Transportation

Sheet 1 of

Date of Investigation 5 / 9 / 2012 Project Title

Region (Area) Field Investigator(s)

Incorporated City ☐ No ☐ Yes If "Yes," Name of City Project Development Phase

Curb Ramp Location (Use Table Below and Indicate on Figure to the Right) Northbound

North Leg	SR 999	☒ SR	☐ Local Street	☐ Other	☐ N/A
South Leg	SR 999	☒ SR	☐ Local Street	☐ Other	☐ N/A
West Leg	ELM ST.	☐ SR	☒ Local Street	☐ Other	☐ N/A
East Leg	ELM ST.	☐ SR	☒ Local Street	☐ Other	☐ N/A

Curb Ramp - General Information

Curb Ramp Type ☒ Perpendicular ☐ Parallel ☐ Combination ☐ Missing

If Parallel Curb Ramp, number of ramps ☐ 1 ☐ 2

If Combination Curb Ramp, number of **perpendicular** ramps ☐ 1 ☐ 2

If Combination Curb Ramp, number of **parallel** ramps ☐ 1 ☐ 2 ☐ 3

Number of Landings (Turning Spaces) ☐ 0 ☒ 1 ☐ 2

Single Curb Ramp serving two crosswalks (aka Diagonal Curb Ramp)? ☒ Yes ☐ No

Ramp #1 - General Accessibility Criteria [Note: For Parallel and Combination Curb Ramps with multiple ramps/landings attach the appropriate numbering diagram and use subsequent form sheets to evaluate each ramp/landing separately.]

Curb ramp connection to the roadway completely within crosswalk markings?	☐ Yes	☐ No	☒ N/A -	UNMARKED
Matched by another curb ramp/landing at the other end of the crosswalk?	☐ Yes	☒ No	☐ N/A -	
Ramp alignment meets the gutter grade break at a right angle?	☒ Yes	☐ No	☐ N/A - Ramp does not connect to roadway	
Does a Pedestrian Circulation Path intersect the ramp at a right angle?	☒ Yes, from both sides	☐ Yes, from one side	☐ No	
If "Yes," is a flare present on each intersected side of the ramp?	☒ Yes	☐ No (e.g.; vertical curb present)	☐ N/A	
Grade breaks at top and bottom of the ramp are perpendicular to the direction of wheeled mobility device travel?	☒ Yes	☐ No		
Beyond the curb face, Clear Space is provided (4 ft. x 4 ft. min.) entirely within the crosswalk markings (at marked crossings) and wholly outside of the parallel vehicle travel lane(s)?	☒ Yes	☐ No	☐ N/A - Ramp does not connect to roadway	
Is the ramp's vertical alignment planar [i.e.; its vertical profile does not contain angle point(s)]?	☒ Yes	☐ No		
Is the connection between the curb ramp and gutter flush?	☒ Yes	☐ No	☐ N/A - Ramp does not connect to roadway	
Are the grade breaks where the curb ramp connects to its landing and/or the walkway flush?	☒ Yes	☐ No		
Is there a grating, access cover, or utility object located on the ramp?	☐ Yes	☒ No	If "Yes," Describe	
Grating, access cover, or utility object located in gutter at base of ramp?	☐ Yes	☒ No	If "Yes," Describe	
Standing water at base of ramp?	☐ Yes	☒ Unknown (i.e.; observed in dry conditions)	☐ No - Verified during precipitation event	

Ramp #1 - Slopes and Dimensions [Note: For Parallel and Combination Curb Ramps with multiple ramps/landings attach the appropriate numbering diagram and use subsequent form sheets to evaluate each ramp/landing separately.]

Clear width (Ft.) 3 Cross slope (%) 3.6 Running slope (%) 11.4 Counter slope (%) 5.7 Flare slope #1(%) 17.0

Ramp #1 - Detectable Warning Surface [Note: For Parallel and Combination Curb Ramps with multiple ramps/landings use subsequent form sheets to evaluate each ramp/landing separately.] ☐ N/A - Ramp does not connect to roadway Flare slope #2(%) 4.3

Detectable Warning Surface present? ☐ Yes ☒ No Installed at back of curb? ☐ Yes ☐ No

Depth (Ft.) Width (Ft.) Contrast (light on dark/dark on light) ? ☐ Yes ☐ No Color?

Truncated domes aligned perpendicular to the grade break in the gutter? ☐ Yes ☐ No

Print Form

Field data entry

However, it is **very important** that the location data for each evaluated ramp and landing be carefully entered in the location data fields on each page.

This is to prevent "mis-matching" of data back at the office (i.e.; to ensure that the correct landing data is attached to the correct ramp data).

Washington State Department of Transportation

Curb Ramp Evaluation Form

Reset Form

Sheet 1 of

Date of Investigation 5 / 9 / 2012 Project Title

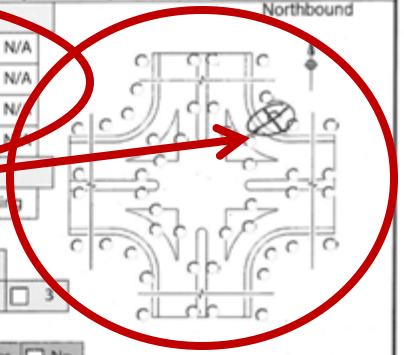
Region (Area) Field Investigator(s)

Incorporated City ☐ No ☐ Yes If "Yes," Name of City Project Development Phase

Curb Ramp Location (Use Table Below and Indicate on Figure to the Right)

North Leg	SR 999	☒ SR	☐ Local Street	☐ Other	☐ N/A
South Leg	SR 999	☒ SR	☐ Local Street	☐ Other	☐ N/A
West Leg	ELM ST.	☐ SR	☒ Local Street	☐ Other	☐ N/A
East Leg	ELM ST.	☐ SR	☒ Local Street	☐ Other	☐ N/A

Northbound



Curb Ramp - General Information

Curb Ramp Type ☒ Perpendicular ☐ Parallel ☐ Combination ☐ Missing

If Parallel Curb Ramp, number of ramps ☐ 1 ☐ 2

If Combination Curb Ramp, number of **perpendicular** ramps ☐ 1 ☐ 2

If Combination Curb Ramp, number of **parallel** ramps ☐ 1 ☐ 2 ☐ 3

Number of Landings (Turning Spaces) ☐ 0 ☒ 1 ☐ 2

Single Curb Ramp serving two crosswalks (aka Diagonal Curb Ramp)? ☒ Yes ☐ No

Ramp #1 - General Accessibility Criteria [Note: For Parallel and Combination Curb Ramps with multiple ramps/landings attach the appropriate numbering diagram and use subsequent form sheets to evaluate each ramp/landing separately.]

Curb ramp connection to the roadway completely within crosswalk markings?	☐ Yes	☐ No	☒ N/A -	UNMARKED
Matched by another curb ramp/landing at the other end of the crosswalk?	☐ Yes	☒ No	☐ N/A -	
Ramp alignment meets the gutter grade break at a right angle?	☒ Yes	☐ No	☐ N/A - Ramp does not connect to roadway	
Does a Pedestrian Circulation Path intersect the ramp at a right angle?	☒ Yes, from both sides	☐ Yes, from one side	☐ No	
If "Yes," is a flare present on each intersected side of the ramp?	☒ Yes	☐ No (e.g.; vertical curb present)	☐ N/A	
Grade breaks at top and bottom of the ramp are perpendicular to the direction of wheeled mobility device travel?	☒ Yes	☐ No		
Beyond the curb face, Clear Space is provided (4 ft. x 4 ft. min.) entirely within the crosswalk markings (at marked crossings) and wholly outside of the parallel vehicle travel lane(s)?	☒ Yes	☐ No	☐ N/A - Ramp does not connect to roadway	
Is the ramp's vertical alignment planar [i.e.; its vertical profile does not contain angle point(s)]?	☒ Yes	☐ No		
Is the connection between the curb ramp and gutter flush?	☒ Yes	☐ No	☐ N/A - Ramp does not connect to roadway	
Are the grade breaks where the curb ramp connects to its landing and/or the walkway flush?	☒ Yes	☐ No		
Is there a grating, access cover, or utility object located on the ramp?	☐ Yes	☒ No	If "Yes," Describe	
Grating, access cover, or utility object located in gutter at base of ramp?	☐ Yes	☒ No	If "Yes," Describe	
Standing water at base of ramp?	☐ Yes	☒ Unknown (i.e.; observed in dry conditions)	☐ No - Verified during precipitation event	

Ramp #1 - Slopes and Dimensions [Note: For Parallel and Combination Curb Ramps with multiple ramps/landings attach the appropriate numbering diagram and use subsequent form sheets to evaluate each ramp/landing separately.]

Clear width (Ft.)	3	Cross slope (%)	3.6	Running slope (%)	11.6	Counter slope (%)	5.7	Flare slope #1(%)	17.0

Ramp #1 - Detectable Warning Surface [Note: For Parallel and Combination Curb Ramps with multiple ramps/landings use subsequent form sheets to evaluate each ramp/landing separately.] ☐ N/A - Ramp does not connect to roadway Flare slope #2(%) 4.3

Detectable Warning Surface present?	☐ Yes	☒ No	Installed at back of curb?	☐ Yes	☐ No		
Depth (Ft.)		Width (Ft.)	Contrast (light on dark/dark on light) ?	☐ Yes	☐ No	Color?	
			Truncated domes aligned perpendicular to the grade break in the gutter?	☐ Yes	☐ No		

Print Form

Field data entry

Pages 2 – 8 of the CREF include areas to write field notes of site-specific observations.

Washington State Department of Transportation

Curb Ramp Evaluation Form

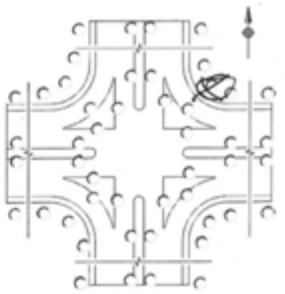
Sheet ____ of ____

Date of Investigation 5 / 9 / 12 Project Title

Curb Ramp Location (Use Table Below and Indicate on Figure to the Right)

North Leg	SR 999	☒ SR	☐ Local Street	☐ Other	☐ N/A
South Leg	SR 999	☒ SR	☐ Local Street	☐ Other	☐ N/A
West Leg	ELM ST	☐ SR	☒ Local Street	☐ Other	☐ N/A
East Leg	ELM ST	☐ SR	☒ Local Street	☐ Other	☐ N/A

Northbound



Landing #1 - General Accessibility Criteria [Note: For Parallel and Combination Curb Ramps with multiple ramps/landings attach the appropriate numbering diagram and use subsequent form sheets to evaluate each ramp/landing separately.]

Landing connection to the roadway completely within crosswalk markings? ☐ Yes ☐ No ☒ N/A -

Matched by another curb ramp/landing at the other end of the crosswalk? ☐ Yes ☐ No ☒ N/A -

Grade breaks where landing connects to ramp(s)/walkway are perpendicular to the direction of wheeled mobility device travel? ☒ Yes ☐ No

Beyond the curb face, Clear Space is provided (4 ft. x 4 ft. min.) entirely within the crosswalk markings (at marked crossings) and wholly outside of the parallel vehicle travel lane(s)? ☐ Yes ☐ No ☒ N/A - Landing does not connect to roadway

Is the landing's vertical alignments planar [i.e.; its vertical profiles do not contain angle point(s)]? ☒ Yes ☐ No

Is the connection between the landing and gutter flush? ☐ Yes ☐ No ☒ N/A - Landing does not connect to roadway

Are the grade breaks where the landing connects to its ramp(s), the roadway, and/or the walkway flush? ☒ Yes ☐ No

Grating, access cover, or utility object located on the landing? ☐ Yes ☒ No If "Yes," Describe

Grating, access cover, or utility object located in gutter where landing connects to roadway? ☐ Yes ☐ No If "Yes," Describe ☒ N/A - Landing does not connect to roadway

Standing water in landing? ☐ Yes ☐ Unknown (i.e.; observed in dry conditions) ☒ No - Verified during precipitation event

Landing #1 - Slopes and Dimensions [Note: For Parallel and Combination Curb Ramps with multiple ramps/landings attach the appropriate numbering diagram and use subsequent form sheets to evaluate each ramp/landing separately.]

Clear width (Ft.) 3 Clear length (Ft.) 4 Cross slope (%) 3.6 Running slope (%) 4.2 Counter slope (%) N/A

Landing #1 - Detectable Warning Surface [Note: For Parallel and Combination Curb Ramps with multiple ramps/landings use subsequent form sheets to evaluate each ramp/landing separately.] ☒ N/A - Landing not connected to roadway

Detectable Warning Surface present? ☐ Yes ☐ No Installed at back of curb? ☐ Yes

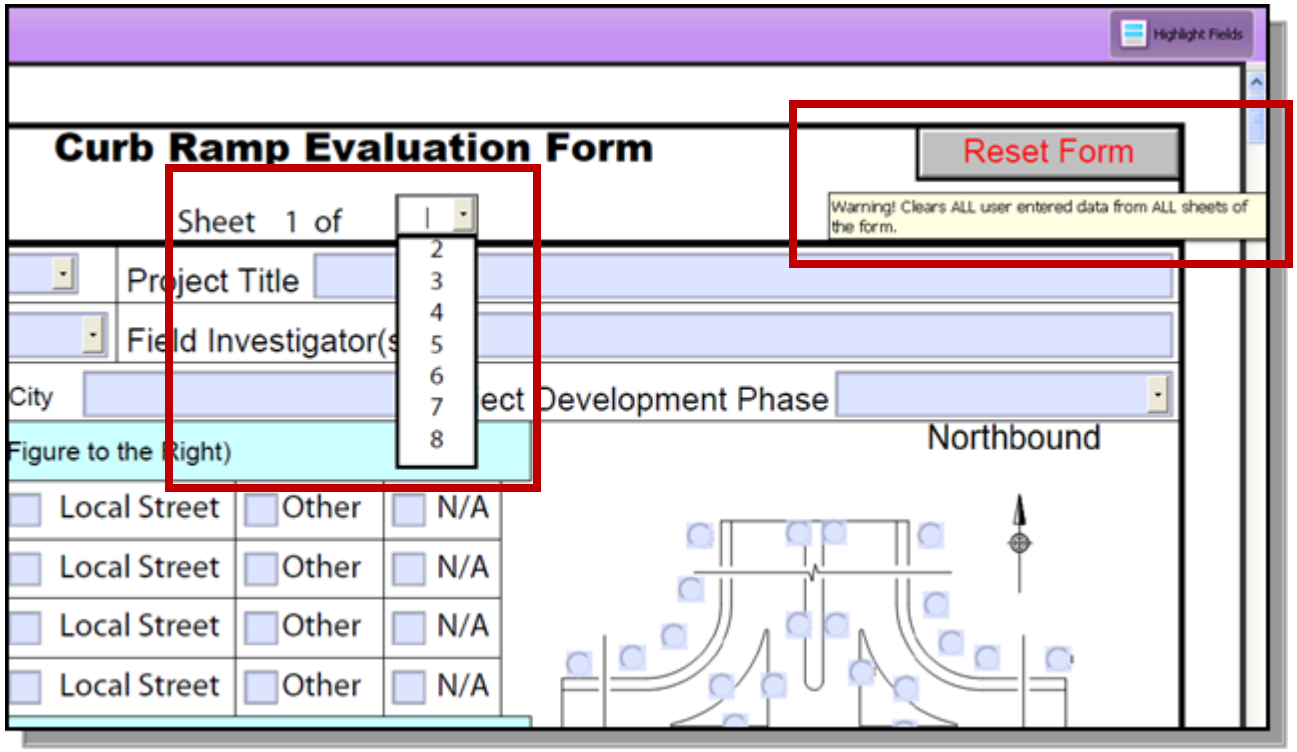
Depth (Ft.) Width (Ft.) Contrast (light on dark/dark on light) ? ☐ Yes ☐ No Color?

Truncated domes aligned perpendicular to the grade break in the gutter? ☐ No

Field Notes (Site-Specific Observations) -

Print Form

Data Entry and Form Function

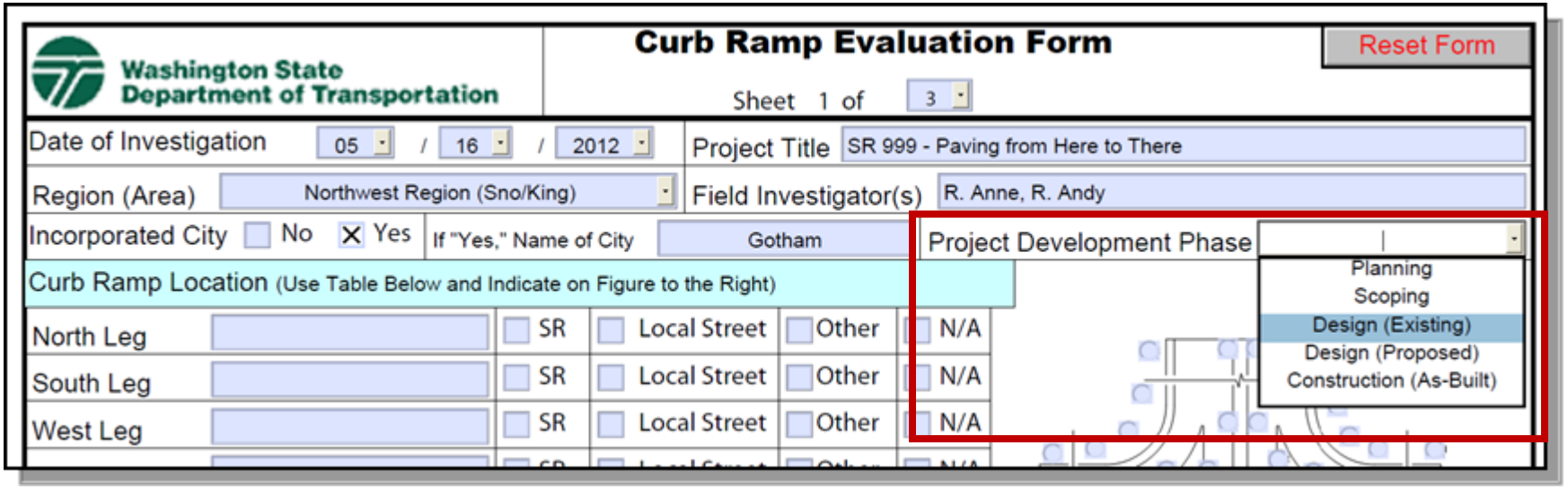


The "**Reset Form**" button will clear ALL user entered data from every sheet in the form file.

Note that the "**of #**" sheet pull down menu does not contain the number 1.

That is because the last sheet (page 8) of the form file should always be included with the evaluation. The minimum number of sheets of 2 results either when a curb ramp is "missing" from a location - OR – when evaluating a ramp that is missing its required landing. **A typical curb ramp consisting of a ramp and a landing will have a total of 3 sheets** (pages 1, 2, and 8 of the file). As discussed previously, curb ramp types that incorporate more ramps/landings will require more sheets (1 sheet per ramp and 1 sheet per landing).

Data Entry and Form Function



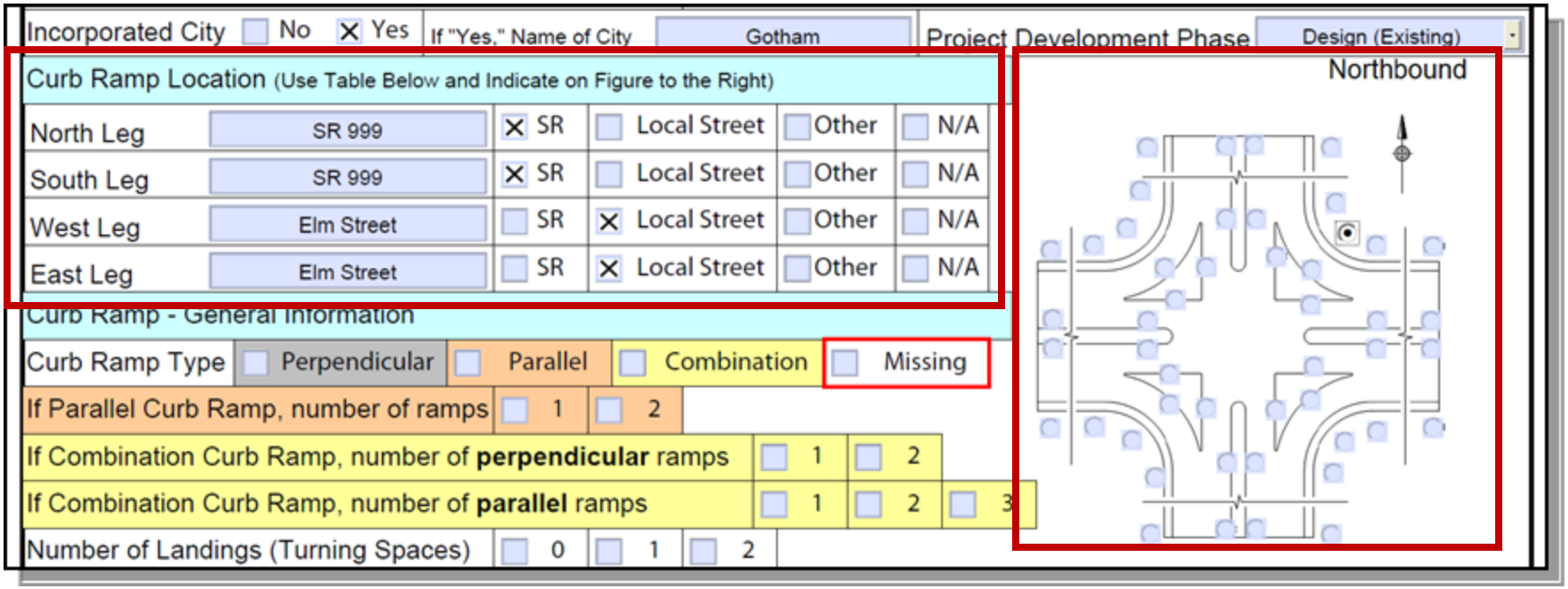
The general project and site information to be entered into the form header should be readily available.

"**Incorporated City**" information could be relevant for maintenance responsibilities and application of design standards.

The "**Project Development Phase**" pull down is designed to encourage use of the CREF for a variety of project purposes.

Note: Applicable heading information that is entered into sheet 1 is automatically transferred to the other sheets in the form file.

Data Entry and Form Function



The Curb Ramp Location Table and the intersection schematic with radio buttons are to be used in tandem to identify the location of the curb ramp location being evaluated.

Checking the "**Other**" box indicates that the intersection leg is a high ADT commercial driveway or a private road.

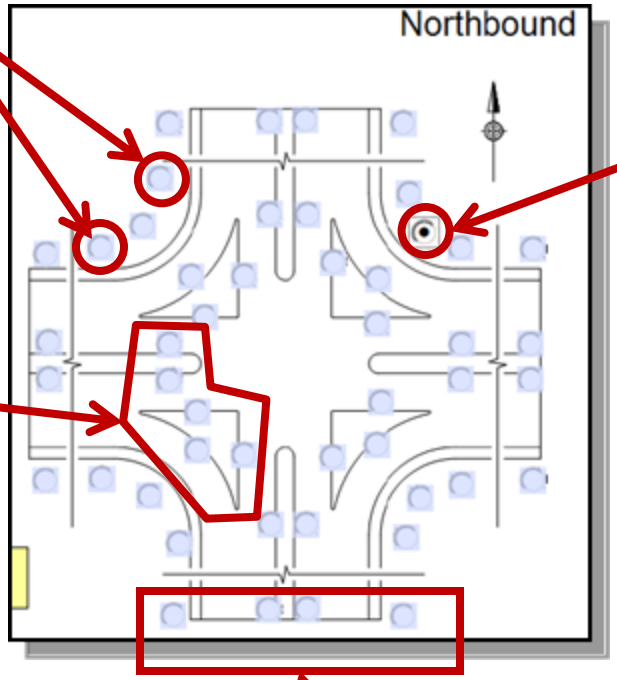
Checking the "**N/A**" box indicates that the intersection leg does not exist at this intersection (such as at a "T-intersection").

Note: The Curb Ramp Location information entered into sheet 1 is automatically transferred to the other sheets in the form file.

Data Entry and Form Function

The intersection schematic with radio buttons is designed to cover all the potential locations for curb ramps at an intersection and at midblock crossings as well.

Locations to indicate a curb ramp location when the quadrant has a separate curb ramp for each crosswalk

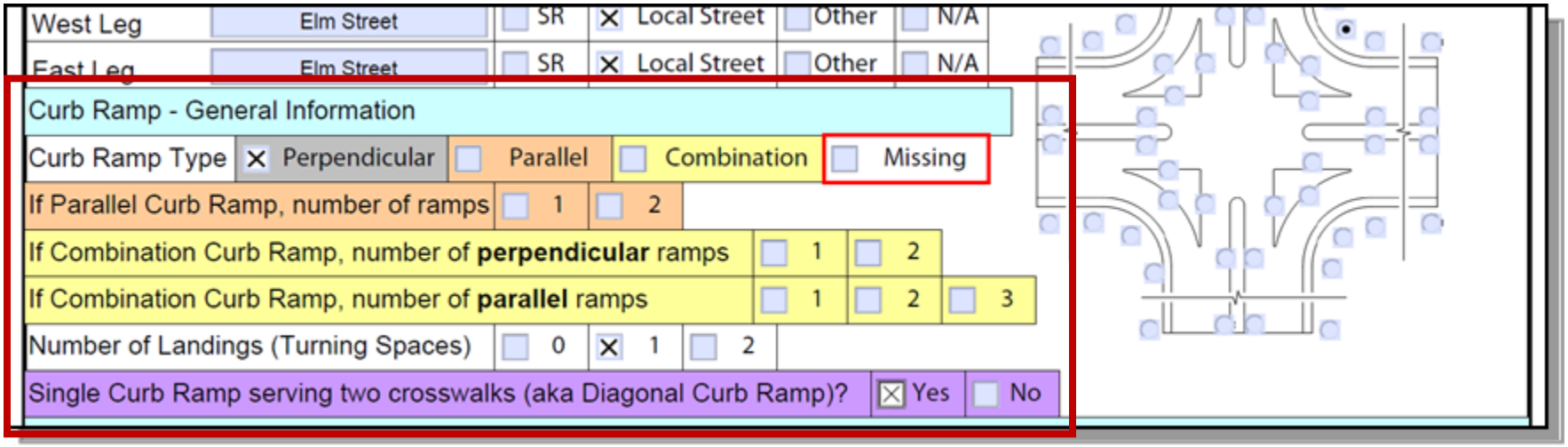


Location centered on radius indicates either a single curb ramp serving two crosswalks (aka “diagonal curb ramp”) – OR – a Combination style curb ramp serving two crosswalks

Locations on traffic islands or medians

Areas beyond the break lines indicate locations at midblock crossings

Data Entry and Form Function



The Curb Ramp General Information section is used to indicate the type of curb ramp at the location, which in turn sets the expectation of how many ramps/landings need to be evaluated and thus how many total sheets should be included in the CREF (1 sheet per each ramp or landing + the last sheet {page 8} in the form file).

Perpendicular

Parallel

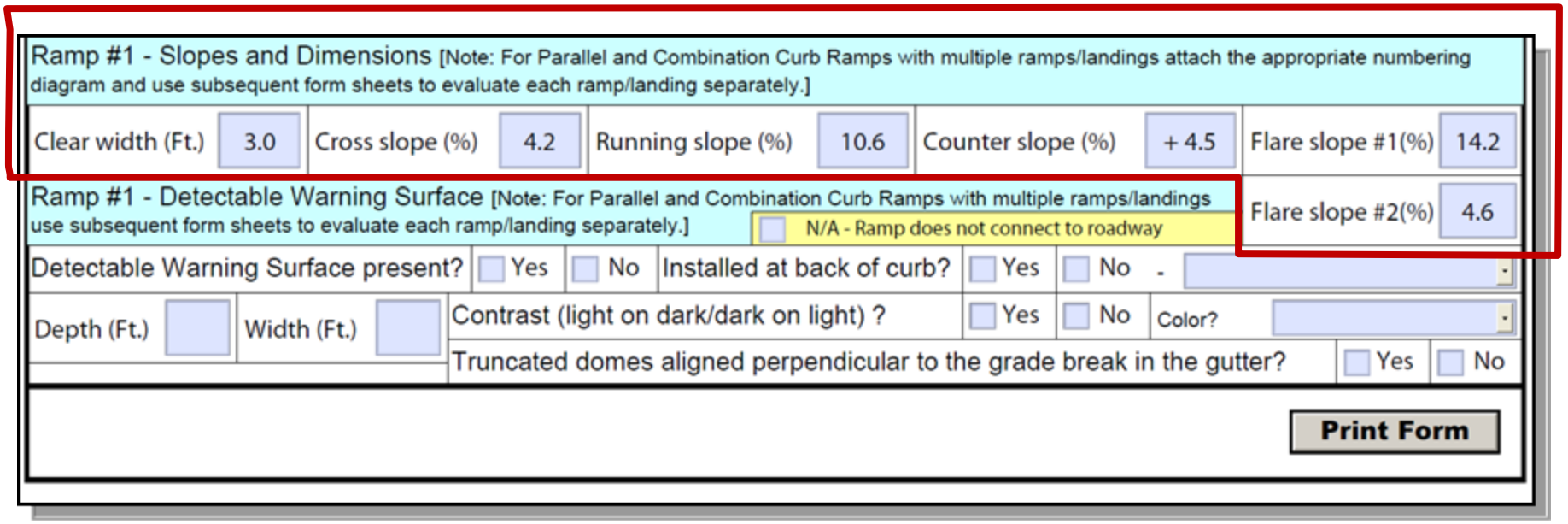
Combination

Data Entry and Form Function

Ramp #1 - General Accessibility Criteria [Note: For Parallel and Combination Curb Ramps with multiple ramps/landings attach the appropriate numbering diagram and use subsequent form sheets to evaluate each ramp/landing separately.]				
Curb ramp connection to the roadway completely within crosswalk markings?	☐ Yes	☐ No	☒ N/A -	Unmarked Crossing
Matched by another curb ramp/landing at the other end of the crosswalk?	☒ Yes	☐ No	☐ N/A -	
Ramp alignment meets the gutter grade break at a right angle?	☒ Yes	☐ No	☐ N/A - Ramp does not connect to roadway	
Does a Pedestrian Circulation Path intersect the ramp at a right angle?	☒ Yes, from both sides	☐ Yes, from one side	☐ No	
If "Yes," is a flare present on each intersected side of the ramp?	☒ Yes	☐ No (e.g.; vertical curb present)	☐ N/A	
Grade breaks at top and bottom of the ramp are perpendicular to the direction of wheeled mobility device travel?	☒ Yes	☐ No		
Beyond the curb face, Clear Space is provided (4 ft. x 4 ft. min.) entirely within the crosswalk markings (at marked crossings) and wholly outside of the parallel vehicle travel lane(s)?	☒ Yes	☐ No	☐ N/A - Ramp does not connect to roadway	
Is the ramp's vertical alignment planar [i.e.; its vertical profile does not contain angle point(s)]?	☒ Yes	☐ No		
Is the connection between the curb ramp and gutter flush?	☒ Yes	☐ No	☐ N/A - Ramp does not connect to roadway	
Are the grade breaks where the curb ramp connects to its landing and/or the walkway flush?	☒ Yes	☐ No		
Is there a grating, access cover, or utility object located on the ramp?	☐ Yes	☒ No	If "Yes," Describe	
Grating, access cover, or utility object located in gutter at base of ramp?	☒ Yes	☐ No	If "Yes," Describe	Catch Basin
Standing water at base of ramp?	☐ Yes	☐ Unknown (i.e.; observed in dry conditions)	☒ No - Verified during precipitation event	

The General Accessibility Criteria section for each ramp/landing is used to gather information needed to determine compliance with state and federal accessibility standards. **Each question asked of the evaluator in this section is directly related to an ADA/WSDOT Design Manual requirement.** Contact either the Statewide ADA Trainer or your Regional ADA Coordinator if you have questions.

Data Entry and Form Function

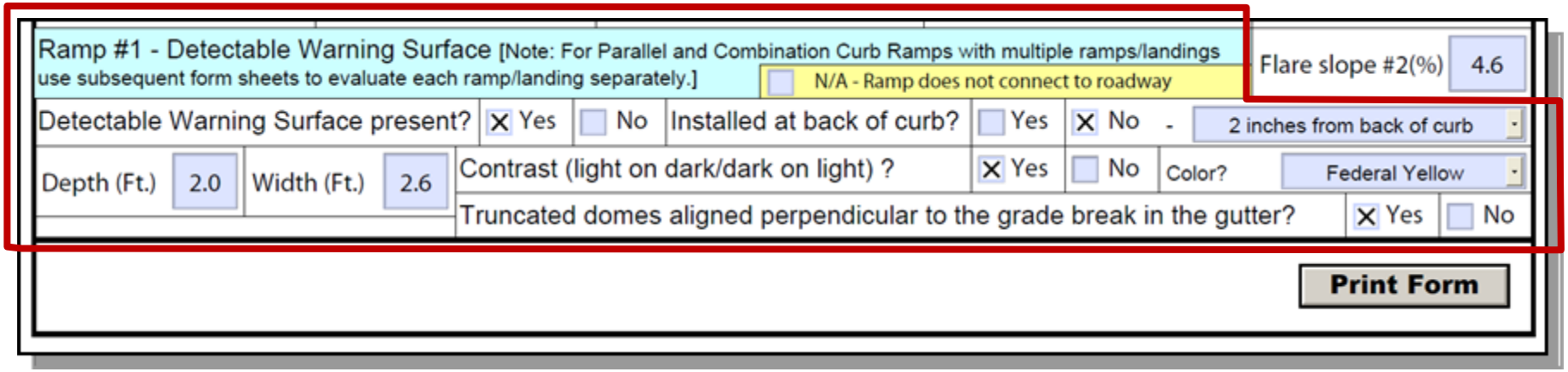


The Slopes and Dimensions section for each ramp/landing is used to input the physical measurements of the ramp/landing that are needed to determine compliance with state and federal accessibility standards.

Enter "**Counter slope**" data with either a (+) or a (-) sign depending on whether the crosswalk slopes up away from the connection to the gutter (+) or rather down away from the connection to the gutter (-).

If flares are not present, or if counter slope evaluation is not applicable because the feature does not connect to the crosswalk, then **"N/A"** can be entered into these boxes.

Data Entry and Form Function



The Detectable Warning Surface section for each ramp/landing is used to evaluate the placement and other criteria for the DWS if the ramp/landing is connected to the roadway.

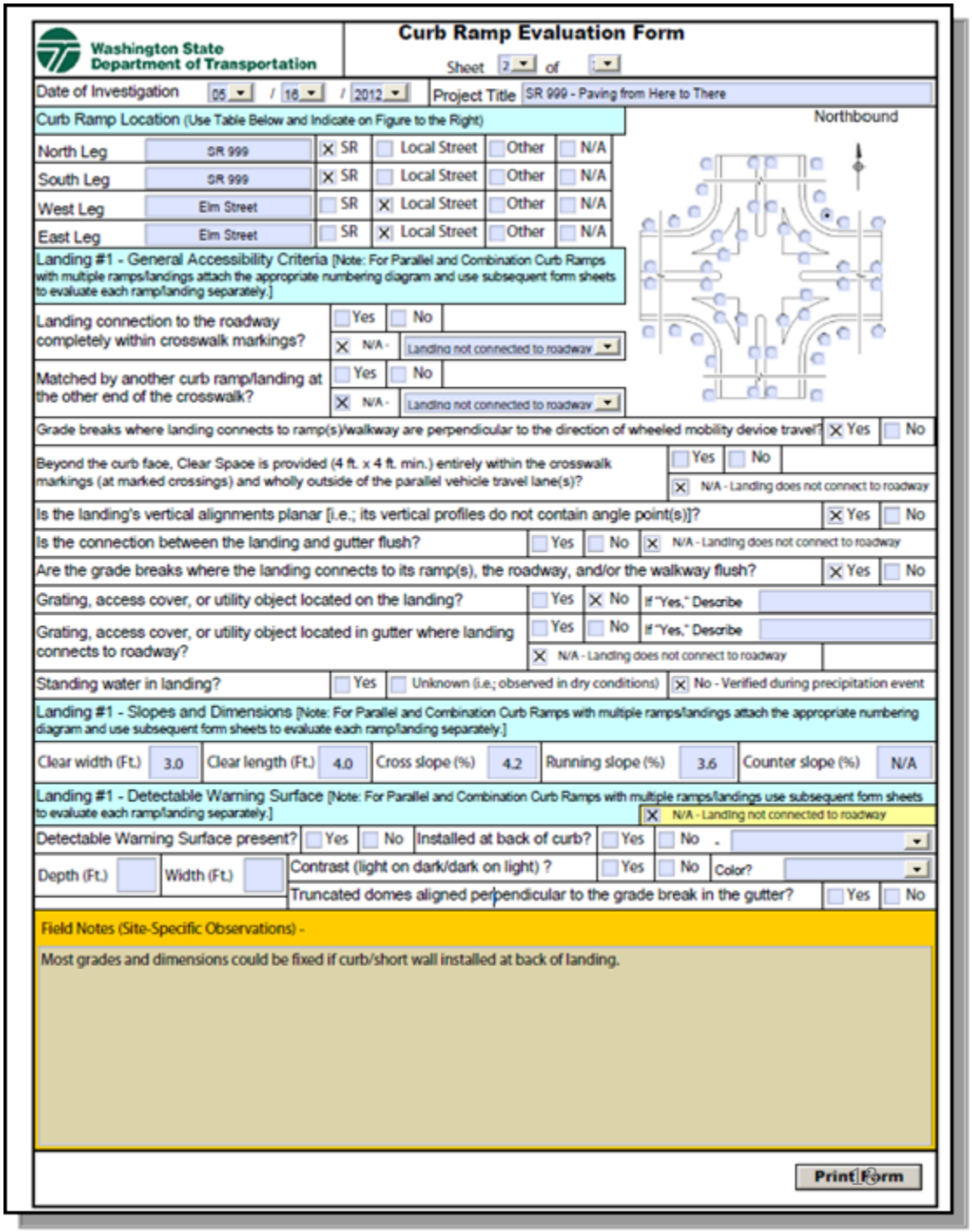
Note: For DWS evaluation, it is important that the correct Curb Ramp Numbering Diagram is used and that measurements for ramp/landing width are taken in the directions shown on the diagram.

Data Entry and Form Function

In this example, the perpendicular curb ramp's landing is then evaluated on sheet 2.

Data entry is similar to sheet 1.

The project and location data from sheet 1 is automatically transferred to all sheets upon input, and if the data is changed on any sheet then it will automatically update on all sheets.



Washington State Department of Transportation

Curb Ramp Evaluation Form

Sheet 2 of 3

Date of Investigation 05 / 16 / 2012 | Project Title: SR 999 - Paving from Here to There

Curb Ramp Location (Use Table Below and Indicate on Figure to the Right)

North Leg	SR 999	X SR	Local Street	Other	N/A
South Leg	SR 999	X SR	Local Street	Other	N/A
West Leg	Elm Street	SR	X Local Street	Other	N/A
East Leg	Elm Street	SR	X Local Street	Other	N/A

Northbound

Landing #1 - General Accessibility Criteria [Note: For Parallel and Combination Curb Ramps with multiple ramps/landings attach the appropriate numbering diagram and use subsequent form sheets to evaluate each ramp/landing separately.]

- Landing connection to the roadway completely within crosswalk markings? — Yes / No / X N/A - Landing not connected to roadway
- Matched by another curb ramp/landing at the other end of the crosswalk? — Yes / No / X N/A - Landing not connected to roadway
- Grade breaks where landing connects to ramp(s)/walkway are perpendicular to the direction of wheeled mobility device travel? — X Yes / No
- Beyond the curb face, Clear Space is provided (4 ft. x 4 ft. min.) entirely within the crosswalk markings (at marked crossings) and wholly outside of the parallel vehicle travel lane(s)? — Yes / No / X N/A - Landing does not connect to roadway
- Is the landing's vertical alignments planar [i.e.; its vertical profiles do not contain angle point(s)]? — X Yes / No
- Is the connection between the landing and gutter flush? — Yes / No / X N/A - Landing does not connect to roadway
- Are the grade breaks where the landing connects to its ramp(s), the roadway, and/or the walkway flush? — X Yes / No
- Grating, access cover, or utility object located on the landing? — Yes / X No / If "Yes," Describe
- Grating, access cover, or utility object located in gutter where landing connects to roadway? — Yes / No / If "Yes," Describe / X N/A - Landing does not connect to roadway
- Standing water in landing? — Yes / Unknown (i.e.; observed in dry conditions) / X No - Verified during precipitation event

Landing #1 - Slopes and Dimensions [Note: For Parallel and Combination Curb Ramps with multiple ramps/landings attach the appropriate numbering diagram and use subsequent form sheets to evaluate each ramp/landing separately.]

Clear width (Ft.)	Clear length (Ft.)	Cross slope (%)	Running slope (%)	Counter slope (%)
3.0	4.0	4.2	3.6	N/A

Landing #1 - Detectable Warning Surface [Note: For Parallel and Combination Curb Ramps with multiple ramps/landings use subsequent form sheets to evaluate each ramp/landing separately.] — X N/A - Landing not connected to roadway

- Detectable Warning Surface present? — Yes / No | Installed at back of curb? — Yes / No
- Depth (Ft.) | Width (Ft.) | Contrast (light on dark/dark on light) ? — Yes / No | Color?
- Truncated domes aligned perpendicular to the grade break in the gutter? — Yes / No

Field Notes (Site-Specific Observations) -

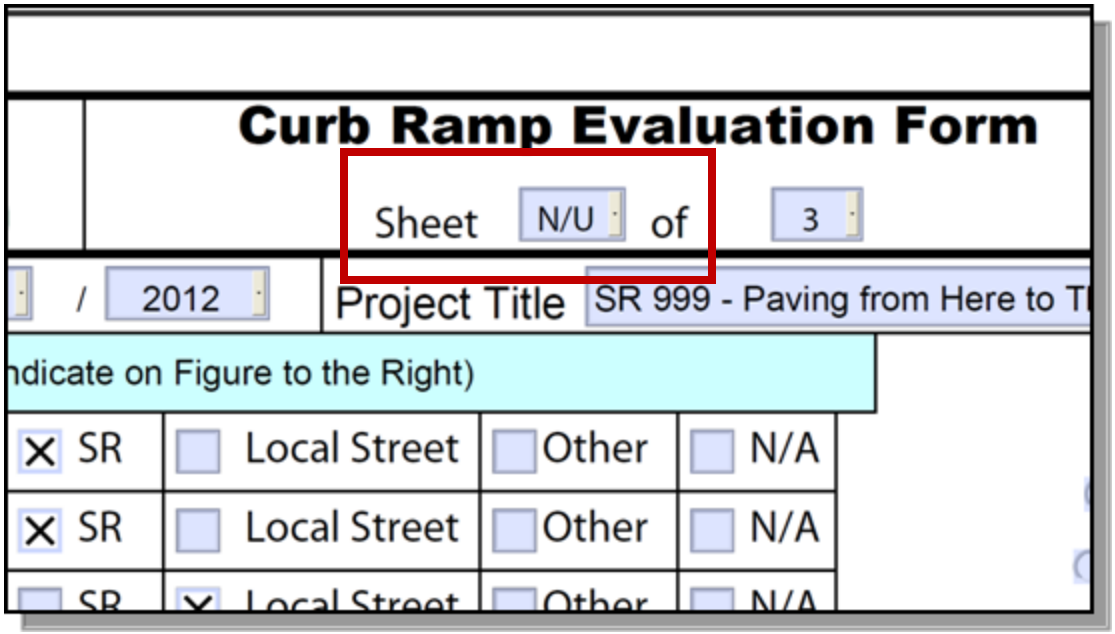
Most grades and dimensions could be fixed if curb/short wall installed at back of landing.

Print Form

Data Entry and Form Function

Sheets that are not used in the form file (due to the type of curb ramp being evaluated and its Curb Ramp Numbering Diagram) can be marked "**N/U**."

This is recommended both as a reminder not to print the sheet and, if the sheet is accidentally printed, as a reminder that the sheet does not belong in the final product.

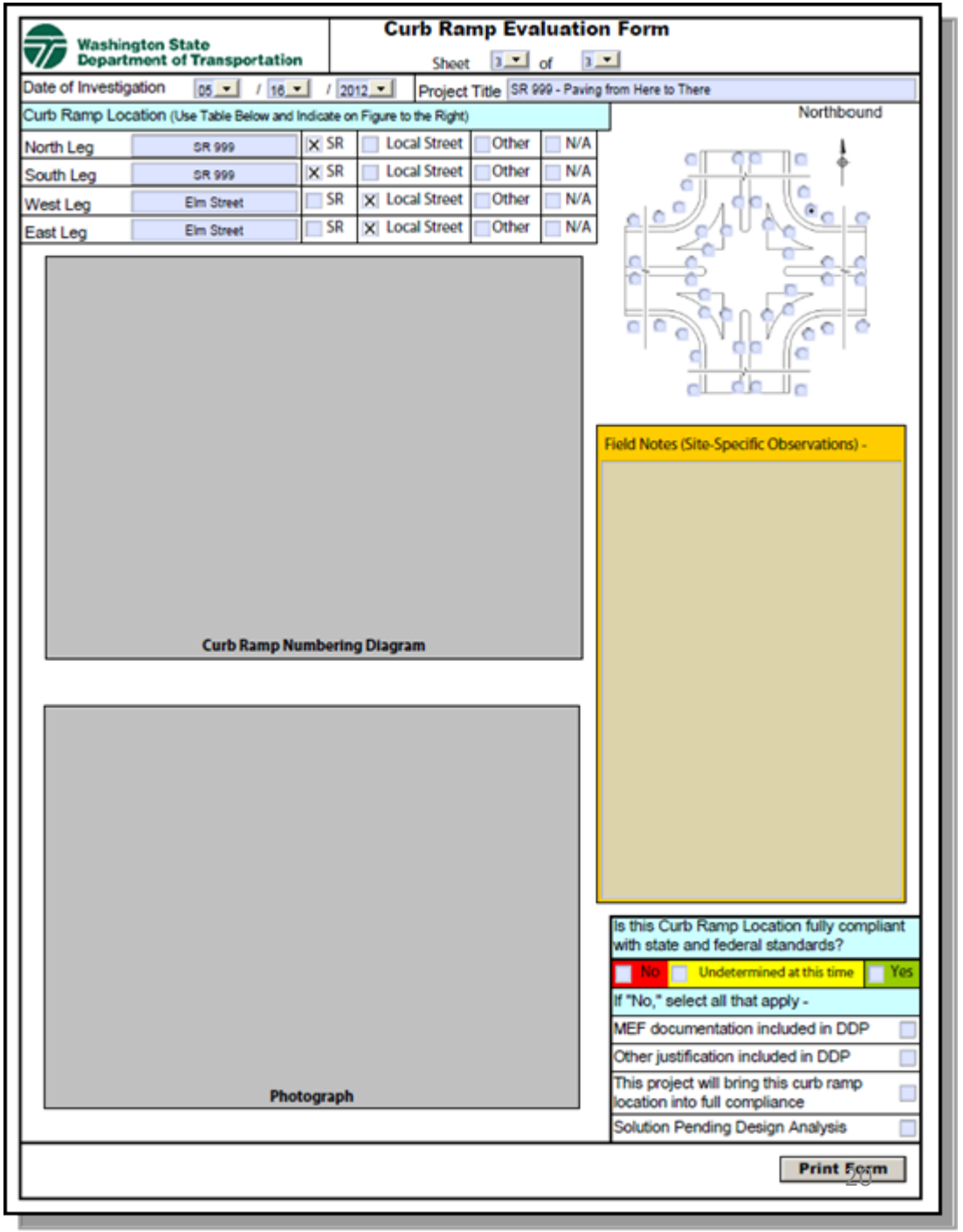


Data Entry and Form Function

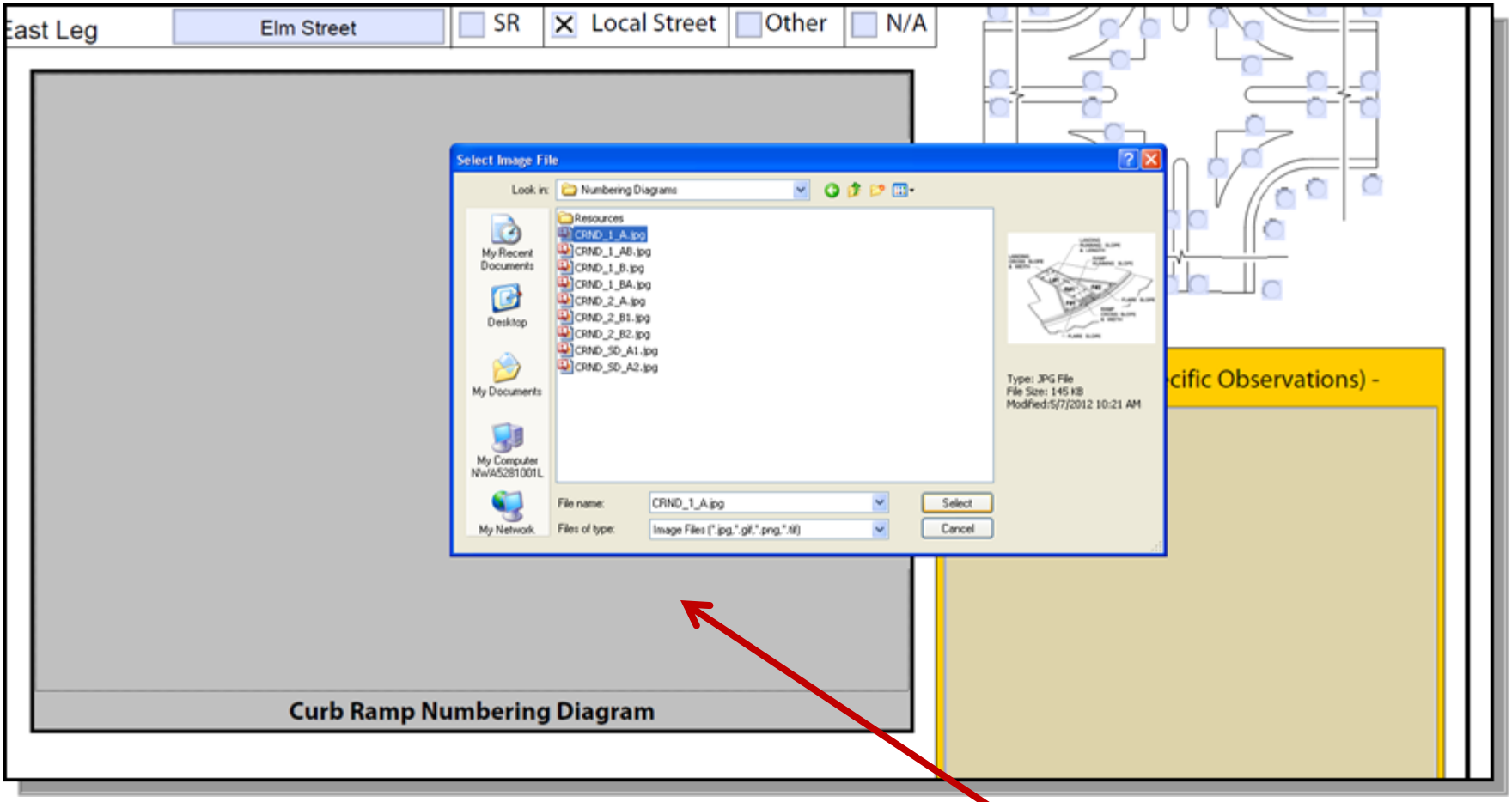
After filling out the necessary form pages based on the number of ramps/landings at the curb ramp location, it is then time to fill out page 8 of the form file.

As explained earlier, **page 8 of the form file is to be included as the last sheet of each evaluation package**.

Thus in our perpendicular curb ramp example walkthrough (since our curb ramp has 1 ramp and 1 landing that we evaluated) page 8 becomes "**Sheet 3 of 3**" in our final product.



Data Entry and Form Function



Left click anywhere on the Curb Ramp Numbering Diagram box on the form sheet.

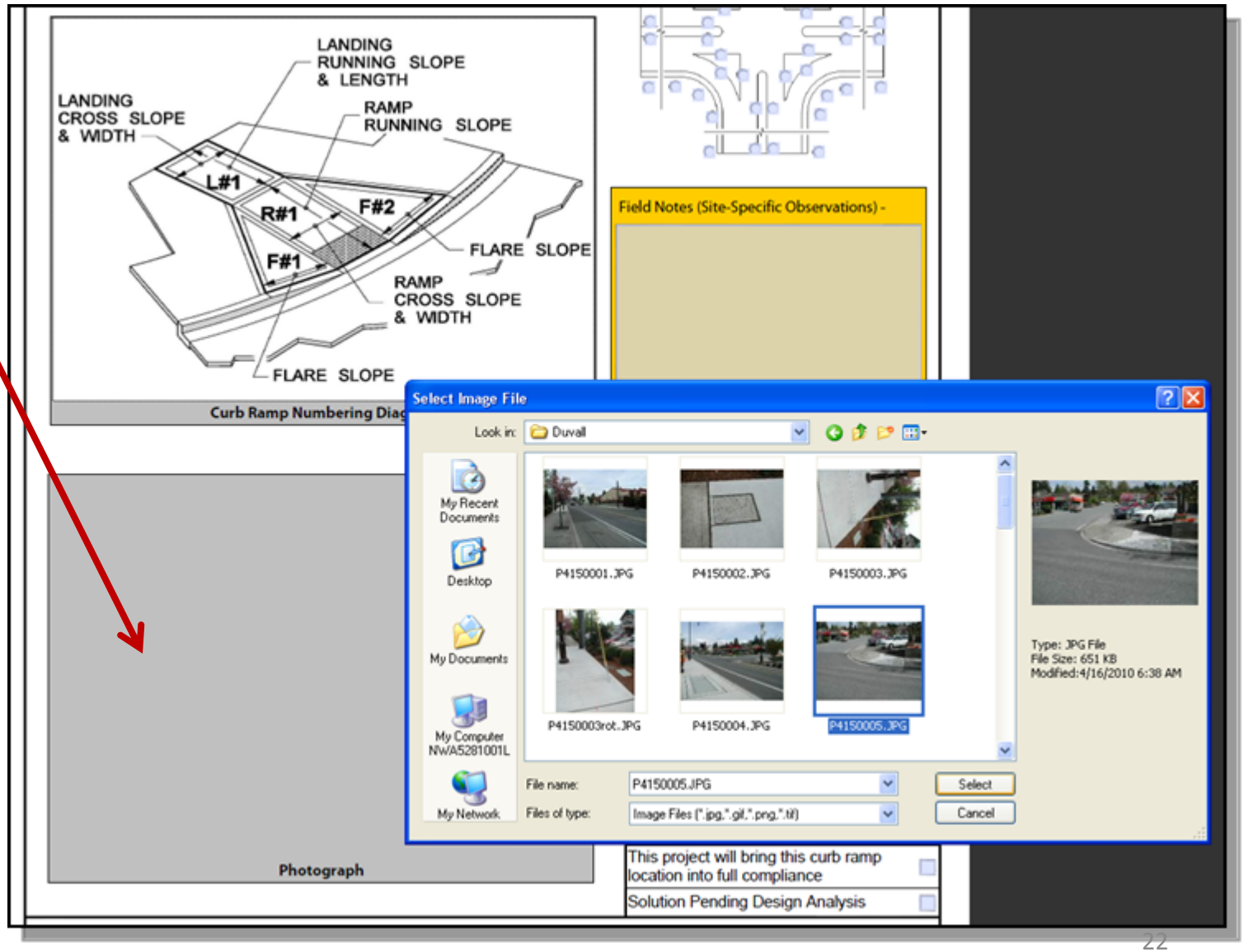
Navigate to where you saved the jpeg photo file and select it.

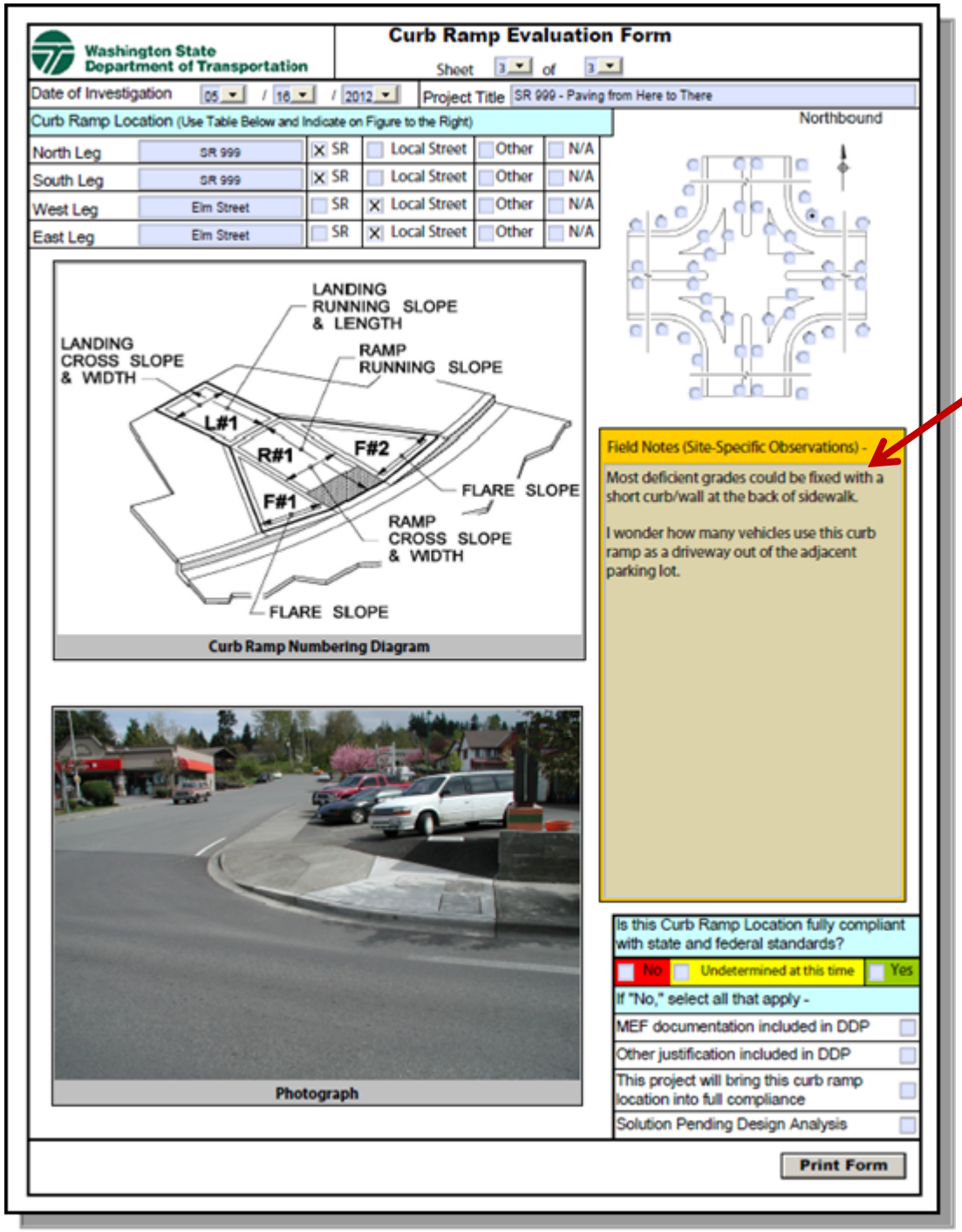
Data Entry and Form Function

Then left click anywhere on the Photograph box.

Navigate to a photograph of the curb ramp location that is being evaluated and select it.

[Note: Try to choose a photo that shows all the elements evaluated in the form.]

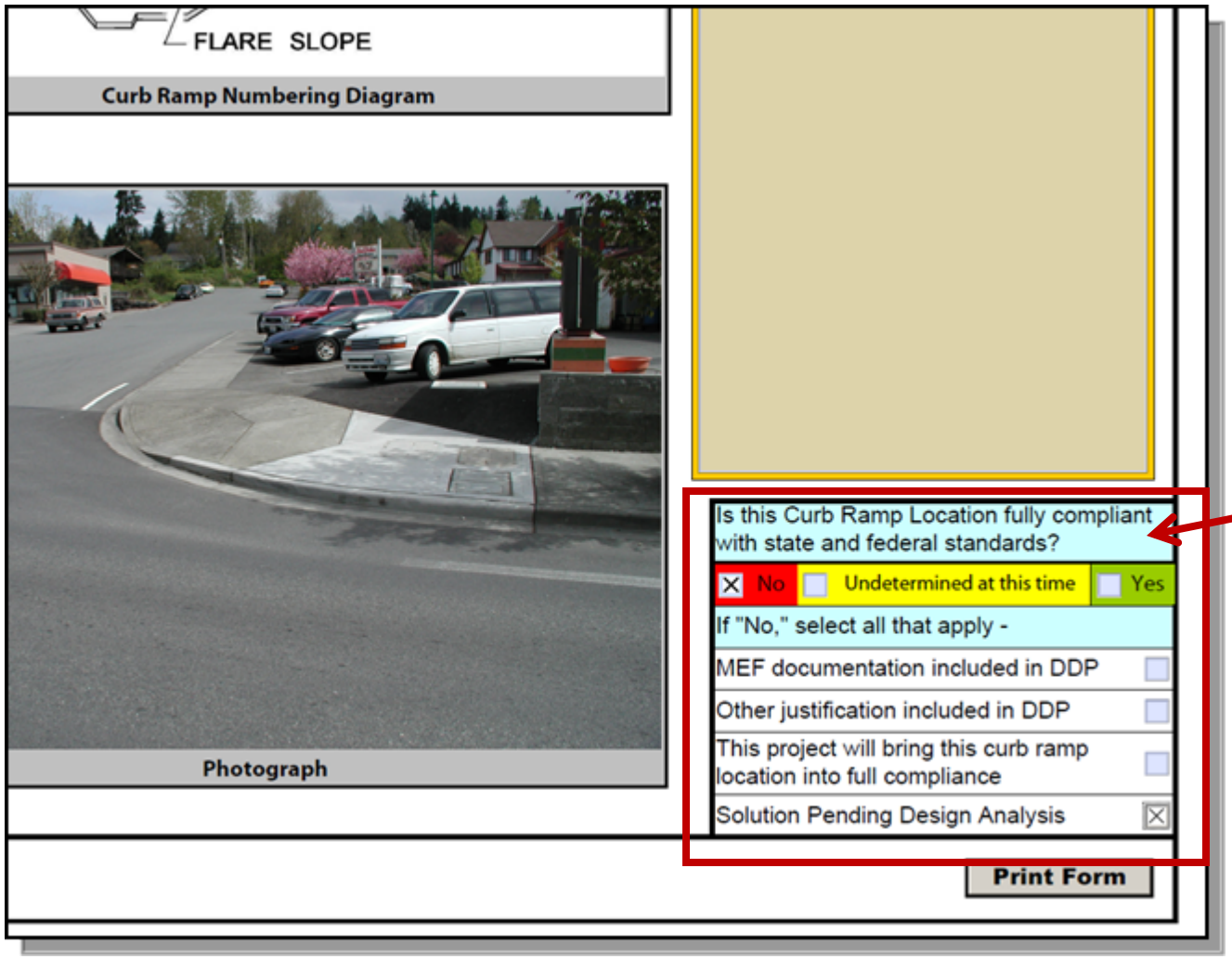




Data Entry and Form Function

Add any field notes you want displayed on the form sheet.

Data Entry and Form Function



Fill in the Compliance Evaluation box.

Generating Curb Ramp Documentation

The form is now complete and ready to generate documentation of the evaluation.

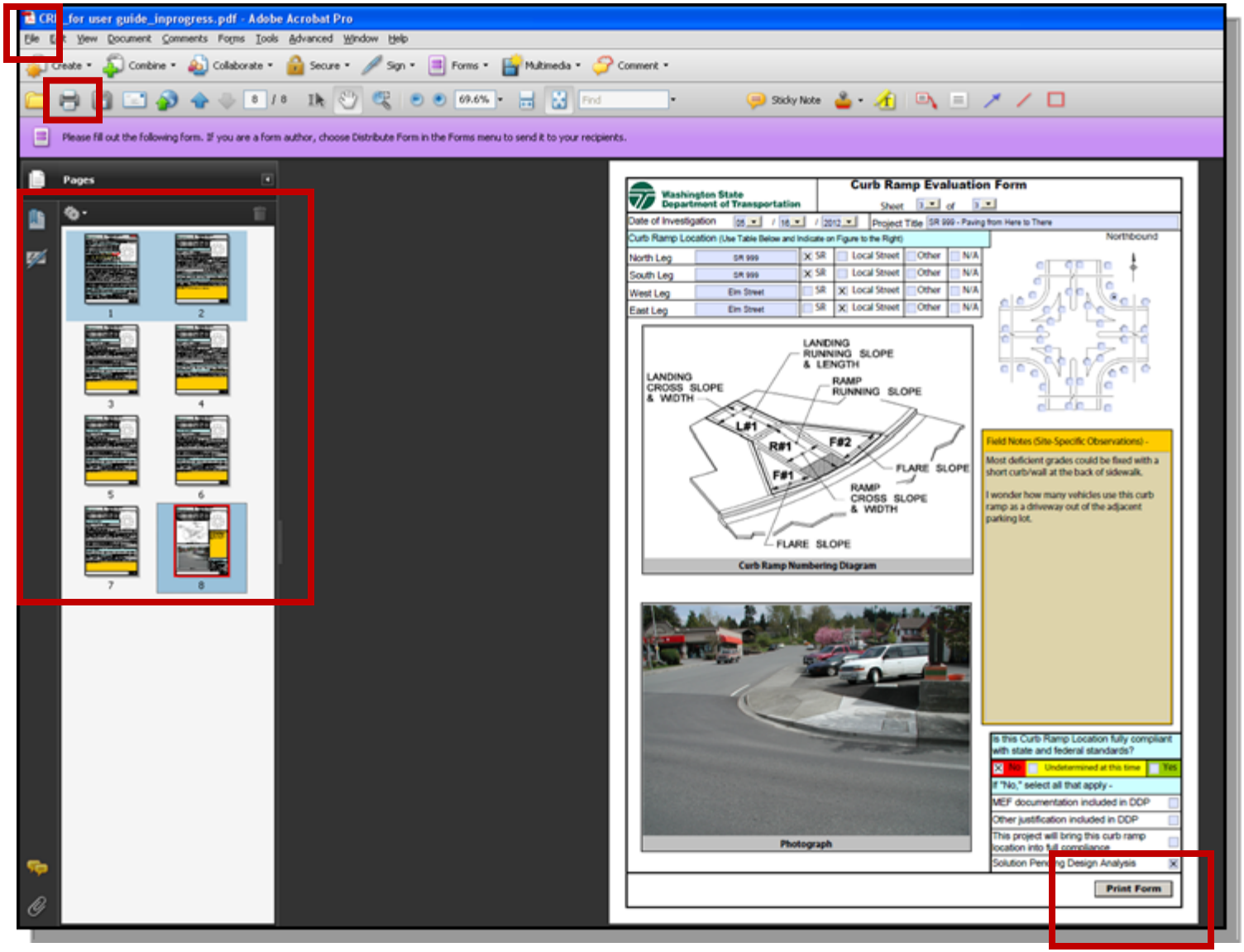
The form can be printed with a number of different commands -

"**Print Form**" button from any form sheet

Print Icon

File>Print command

Ctrl-click sheet selection from pages/bookmarks menu



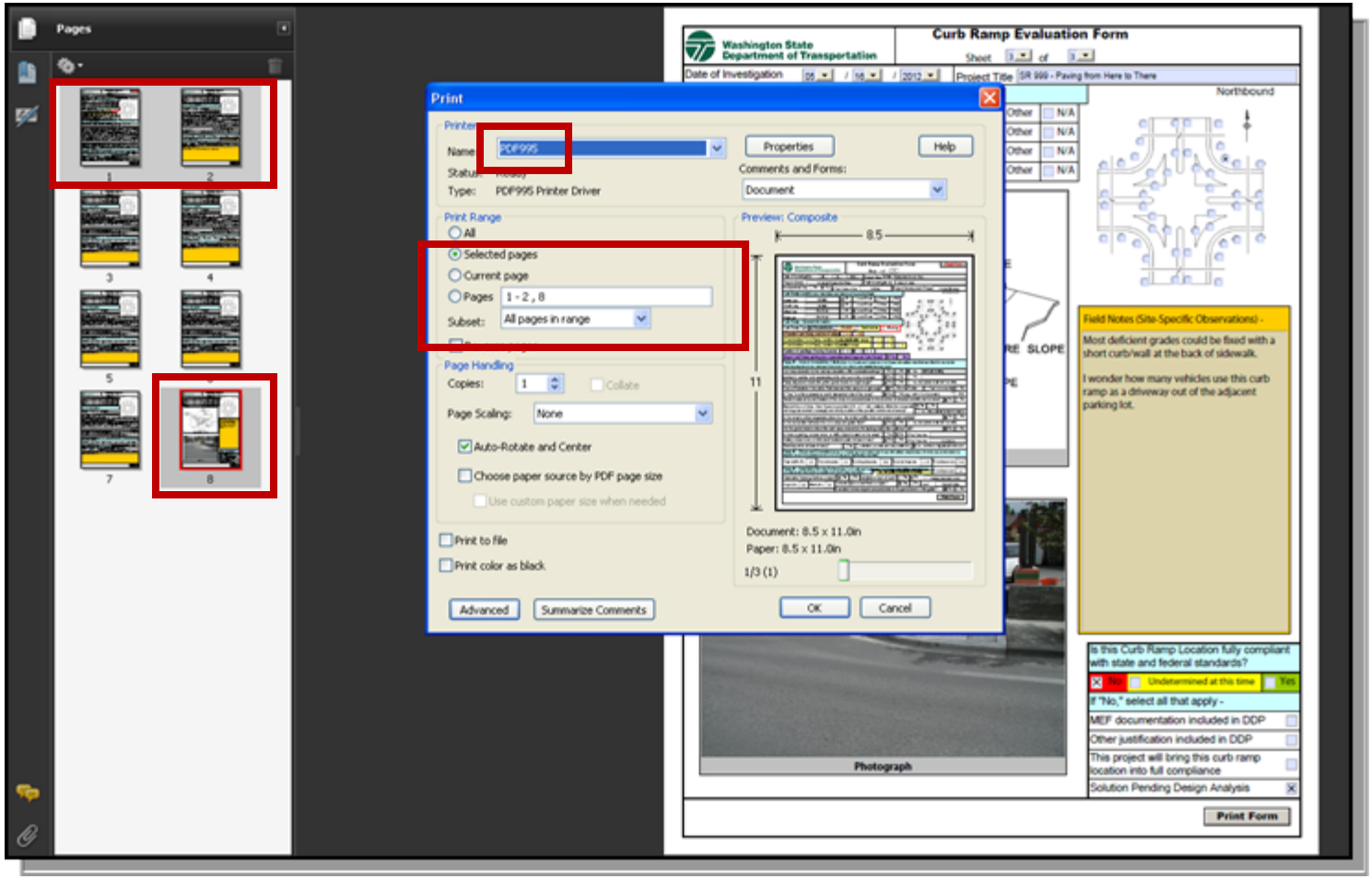
Generating Curb Ramp Documentation

To create electronic file documentation of the evaluation that can be printed to hard-copy as needed –

Select "**PDF995**" as your printer ("**Adobe PDF**" for Adobe Pro users)

Select the pages used in the evaluation (for a typical curb ramp with one ramp and one landing {like this walkthrough example} that will be **pages 1-2, 8**)

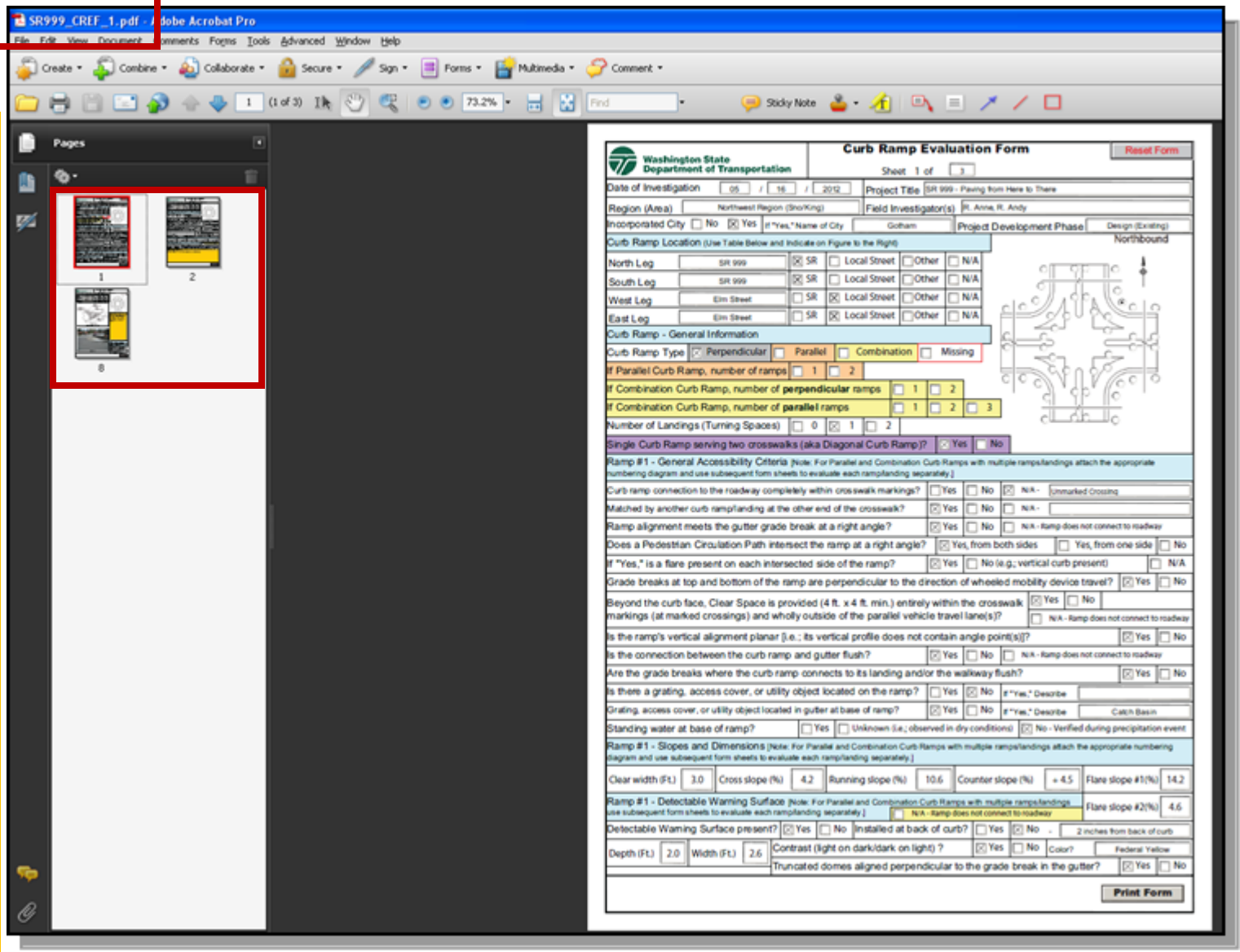
Select "**OK**" to save the file to your hard drive



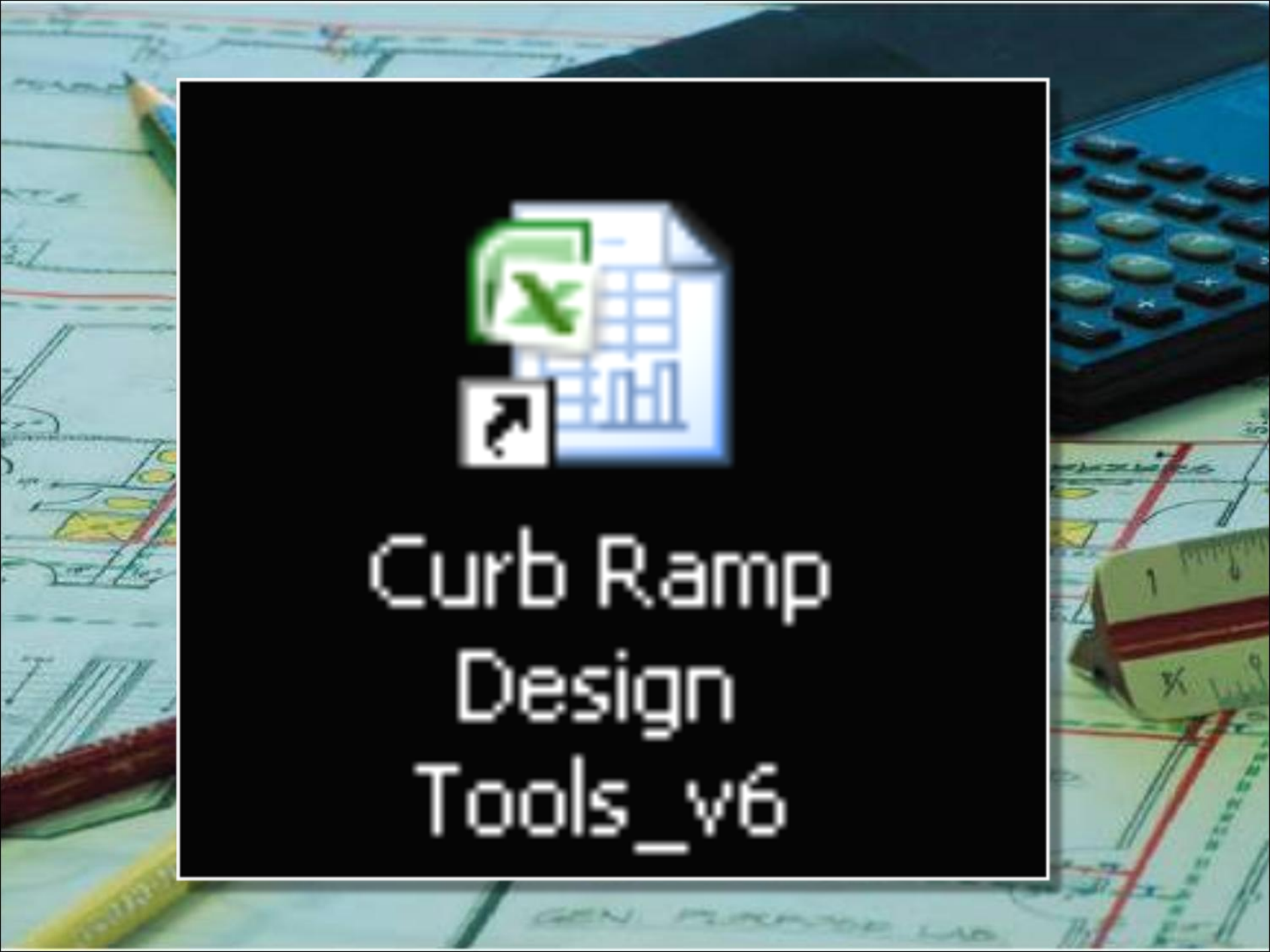
Generating Curb Ramp Documentation

You now have an electronic PDF file documenting the evaluation that consists ONLY of the sheets actually used in the evaluation for that particular curb ramp location (in this case, 3 sheets).

It is recommended that you develop a unique project - specific file naming system for cataloguing the electronic documentation files.



Curb Ramp Accessibility Criteria Challenge


Curb Ramp
Design
Tools_v6

AC = ft.

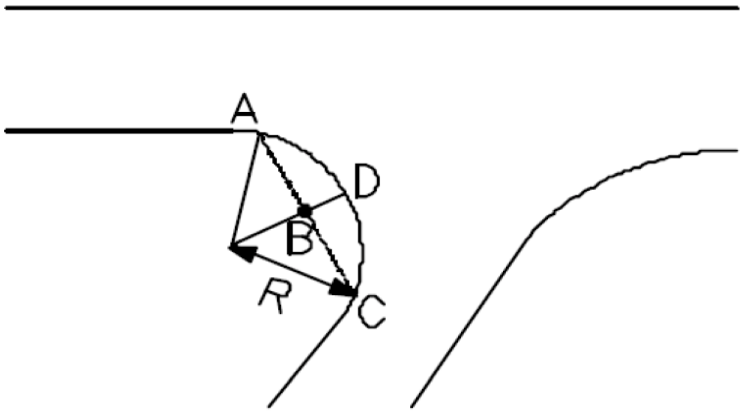
BC = *ft.*

BD = ft.

Radius = ft.

Curb Ramp Design Tools_v6

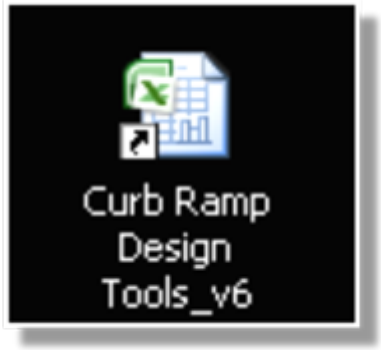
Determining Radii of Sharp Curves by Field Measurements

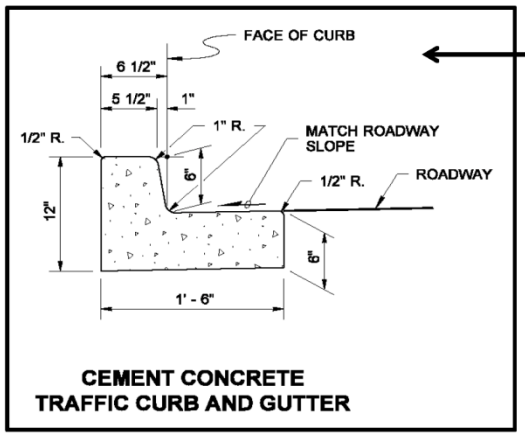


$$R = \frac{BC^2}{2BD} + \frac{BD}{2}$$

$$BC = \frac{AC}{2}$$

Note: Points A and C may be any two points on the curve



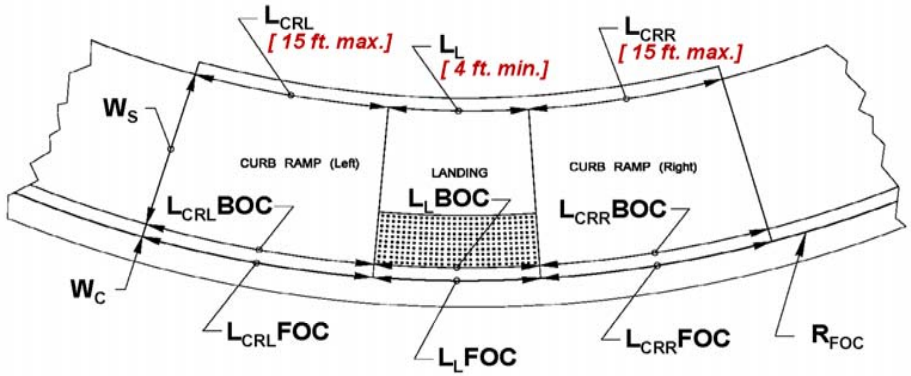


CEMENT CONCRETE TRAFFIC CURB AND GUTTER

*

Back of Curb (BOC) to Face of Curb (FOC)

Horizontal Arc Lengths by Concentric Radii



Radius at Face of Curb R_{FOC} = ____ ft.

Sidewalk Width (excluding curb) W_S = ____ ft.

Curb Width * W_C = ____ ft.

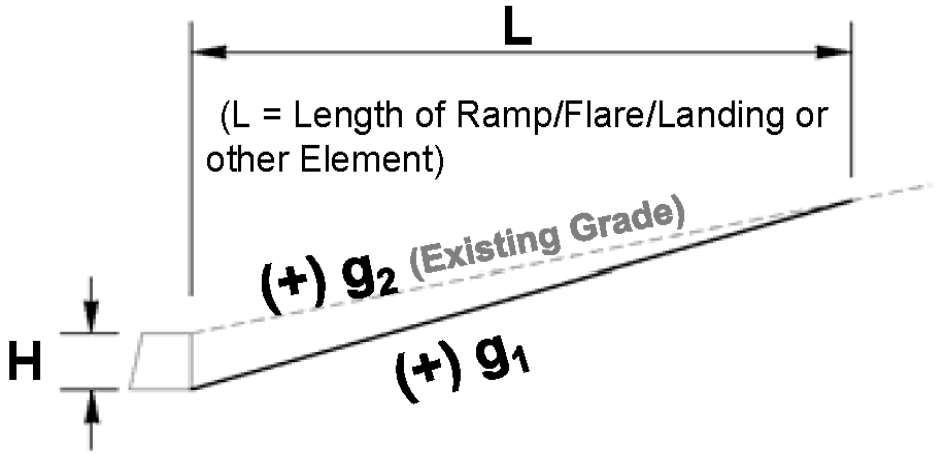
L_{CRL} = ____ ft.	L_L = ____ ft.	L_{CRR} = ____ ft.
R = 0 ft.	R = 0 ft.	R = 0 ft.
Δ = 0 degrees	Δ = 0 degrees	Δ = 0 degrees
$L_{CRL}BOC$ = ____ ft.	L_LBOC = ____ ft.	$L_{CRR}BOC$ = ____ ft.
R = 0 ft.	R = 0 ft.	R = 0 ft.
Δ = 0 degrees	Δ = 0 degrees	Δ = 0 degrees
$L_{CRL}FOC$ = ____ ft.	L_LFOC = ____ ft.	$L_{CRR}FOC$ = ____ ft.
R = 0 ft.	R = 0 ft.	R = 0 ft.
Δ = 0 degrees	Δ = 0 degrees	Δ = 0 degrees

Formulas of note -

$$\Delta = \frac{180^\circ}{\pi} \cdot \frac{L}{R}$$

$$L = \frac{\pi}{180} \cdot R\Delta$$

Intersection of Grades (Chasing)



(H = Height of curb or other initial elevation deficit)

H = _____ ft.

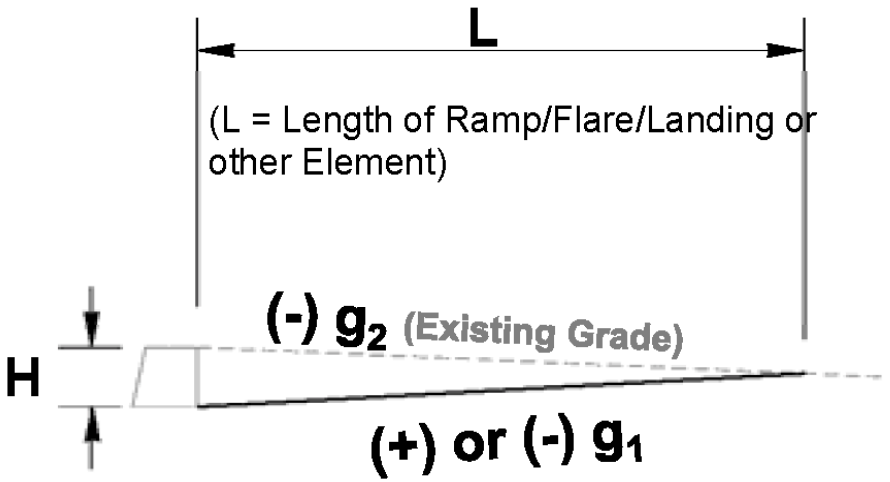
g_1 (%) = _____

g_2 (%) = _____

L = _____ ft.

Curb Ramp Design Tools_v6

Intersection of Grades (Opposing)



(H = Height of curb or other initial elevation deficit)

H = ft.

g_1 (%) =

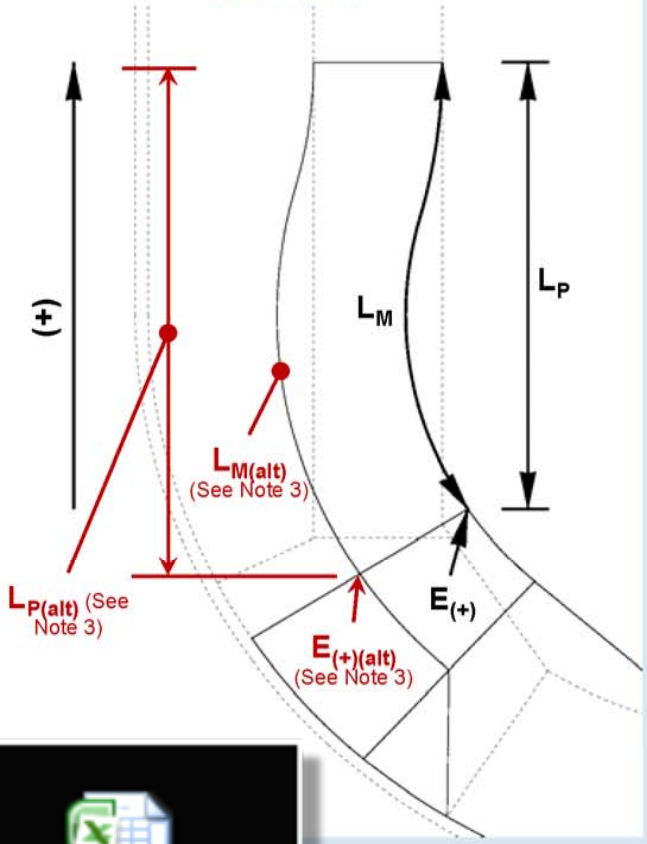
g_2 (%) =

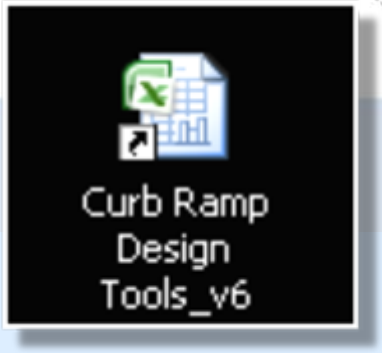
L = ft.

Curb Ramp Design Tools_v6

Intersection of Grades by Sidewalk Meander at Roadway Grade (Chasing)

(See Notes)





$E_{(+)}$ = ft.

g_{rdwy} (%) = Grade must be positive

L_P = ft.

L_M = ft.

Legend:

$E_{(+)}$ = Elevation difference between proposed surface and existing sidewalk surface at corner of grade break [See other tabs in this workbook for tools to assist in determining this value]

g_{rdwy} = General grade of the adjacent roadway

L_P = Linear distance between the origin and the proposed match existing point measured parallel to the roadway

L_M = Linear distance of total meander at roadway grade required to match existing measured along the meander

Notes:

1. On steep roadways where space is available, this design solution can eliminate the potentially hazardous grade break (i.e.; with an algebraic difference >13% and/or skewed) that could result if a 15 ft. long ramp with a running slope steeper than the roadway grade was used. This solution will reduce the algebraic difference of the grade break and enable the grade break to be at a right angle to the path

2. No credit can be taken toward achieving the required L_M distance for any segment of the meander that runs parallel to the roadway.

3. If the $E_{(+)}$ value for the forward point on the landing happens to be greater than at the back of the landing (this will not typically be the case), then the required L_M distance should be evaluated based on the roadway side of the sidewalk.

4. If the corner of the grade break being used to evaluate the $E_{(+)}$ value is slightly offset from the existing sidewalk (such as is shown in the diagram to the left), then use the existing sidewalk elevation extended perpendicular to the roadway to determine $E_{(+)}$ (or extended parallel to the roadway to determine E(+)(alt)).

Grade Calculators and Converters

Grade = ____ Run = ____ ft. Rise = ____ ft.

Rise = ____ ft. Run = ____ ft. Grade = ____

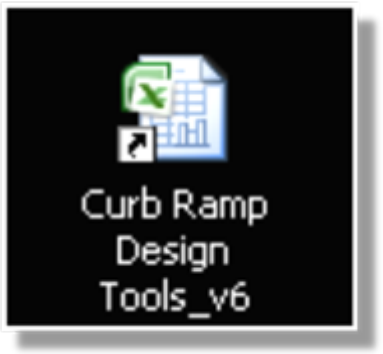
Grade = ____ Rise = ____ ft. Run = ____ ft.

Percentage Grade = ____ Slope Ratio = 1V: ____ H

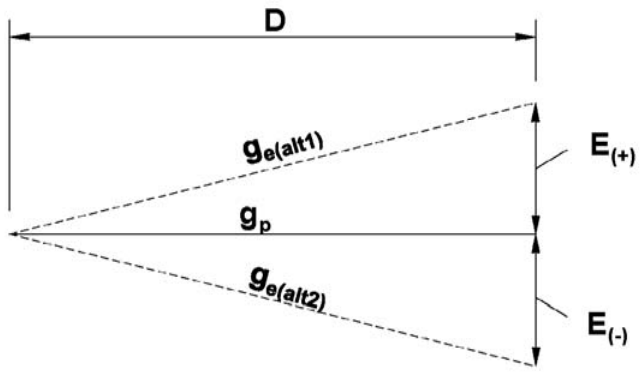
Slope Ratio = 1V: ____ H Percentage Grade = ____

Basic Calculator

____	+	____	0.00
____	-	____	0.00
____	X	____	0.00
____	÷	____	0.00



Elevation Difference Produced on Coincident Differing Gradients



D = ft.

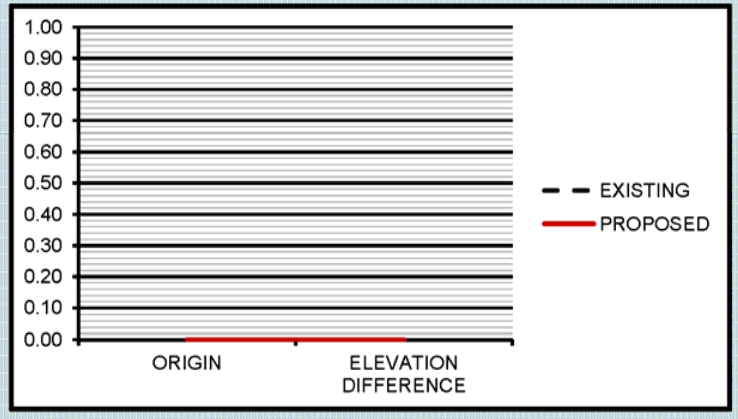
g_e (%) =

g_p (%) =

E = ft.

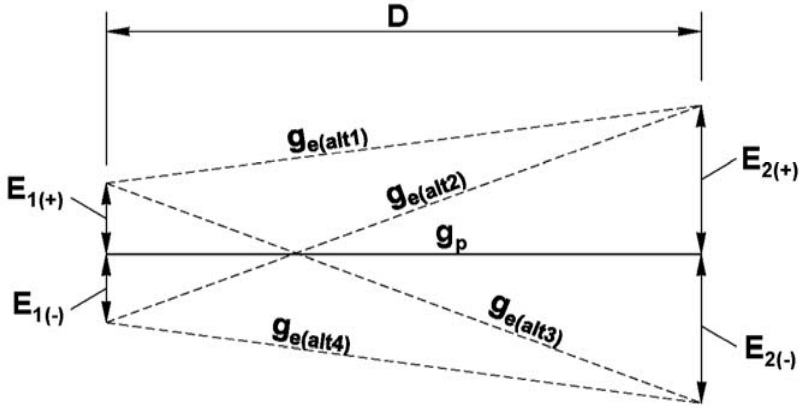
- or -

in.



Curb Ramp Design Tools_v6

Elevation Difference Produced on Coincident Differing Gradients with Initial Vertical Offset



D = ft.

g_e (%) =

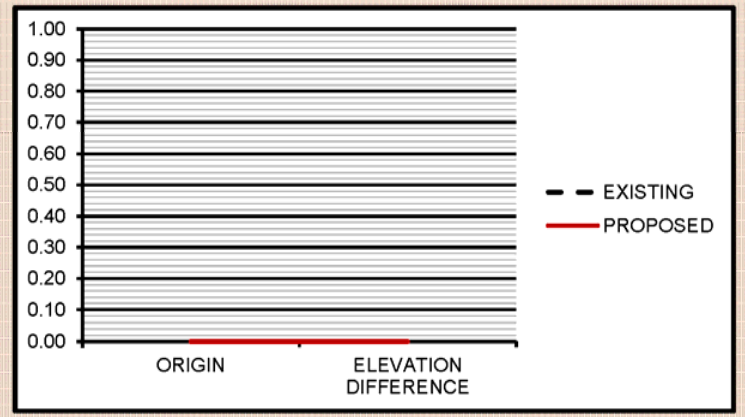
g_p (%) =

E_1 = ft.

E_2 = ft.

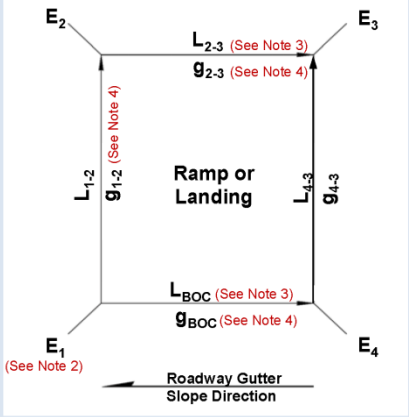
- or -

in.



Curb Ramp Design Tools_v6

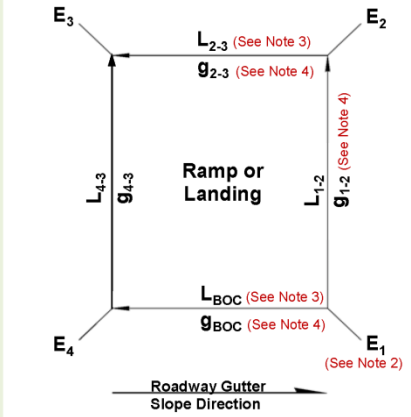
Warped Element - Low Side Left (See Note 1)



Input Order

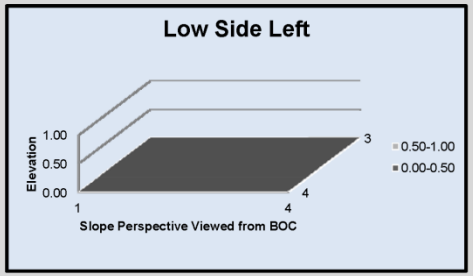
E_1 = _____ ft.
L_{BOC} = _____ ft.
g_{BOC} = _____ E_4 = 0.00 ft.
L_{1-2} = _____ ft.
g_{1-2} = _____ E_2 = 0.00 ft.
L_{2-3} = _____ ft.
g_{2-3} = _____ E_3 = 0.00 ft.
L_{4-3} = _____ ft. g_{4-3} = _____

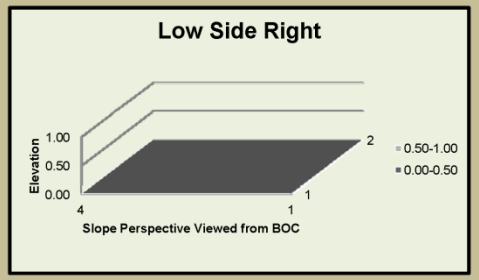
Warped Element - Low Side Right (See Note 1)



Input Order

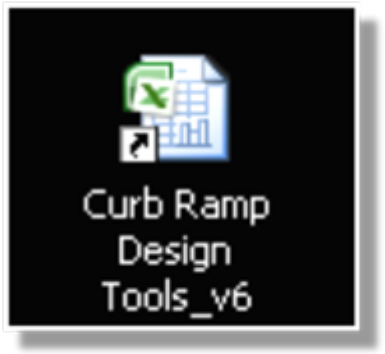
E_1 = _____ ft.
L_{BOC} = _____ ft.
g_{BOC} = _____ E_4 = 0.00 ft.
L_{1-2} = _____ ft.
g_{1-2} = _____ E_2 = 0.00 ft.
L_{2-3} = _____ ft.
g_{2-3} = _____ E_3 = 0.00 ft.
L_{4-3} = _____ ft. g_{4-3} = _____





Notes:

1. As a general rule, warping of pedestrian facility elements should be avoided if at all possible. However, when regrading of the roadway is beyond the scope of a project then warping an element to meet the existing gutter line profile is sometimes necessary. The need for Maximum Extent Feasible documentation is often triggered by this scenario. The purpose of these tools are to evaluate the extent of the warp and provide the ability to play "what if" with the design and tweak the grades to develop the most accessible design possible in these circumstances. As a rule of thumb, grade g_{1-2} (on the downhill side of the element) should be designed as the steeper grade on the element (8.3% max./7.5% or less desirable for ramps and 2% max./1.5% or less desirable for landings), allowing in most cases for flatter grades along the backside of the element (grade g_{2-3}) and the uphill side of the element (grade g_{4-3}).
2. Enter either an assumed (i.e.; 100 ft.) or actual elevation for E_1.
3. If L_{2-3} and L_{BOC} are on concentric radii, see the Radius Tools tab for a tool to assist in calculating the length of L_{BOC}.
4. IF either of grades g_{BOC}, g_{1-2}, or g_{2-3} are downhill in the direction indicated by the arrows on the schematic, then the downhill grade(s) will need to be entered with a negative sign (-). [This will not typically be the case.]
5. An alert message of "TWISTED!" indicates that two opposite sides of the element are sloped in opposite directions. This situation should be carefully analyzed for potential drainage, accessibility, and/or constructability issues.



Training available through Washington State Local Technical Assistance Program (LTAP) Training Program -

"Pedestrian Accommodation Workshop"

– {16 hours}

Washington State Department of Transportation

Questions ?