Streamlined Curb Ramp Replacements for Pavement Rehabilitation Projects

Gabe Crop, PE | Murray, Smith & Associates, Inc.

MSA

Presentation Outline

- The ADA problem
- Design approach options
- Streamlined approach
- Mix in some case studies
- Before and after photos

Background “technical stuff”

- 1990 Title II of the Americans with Disabilities Act (ADAAG)
- 2010 Regulations Update
- 2011 PROWAG
- 2013 Joint DOJ/DOT Guidance and FAQ for “Alterations”
- http://www.ada.gov/ta-pubs-pg2.htm

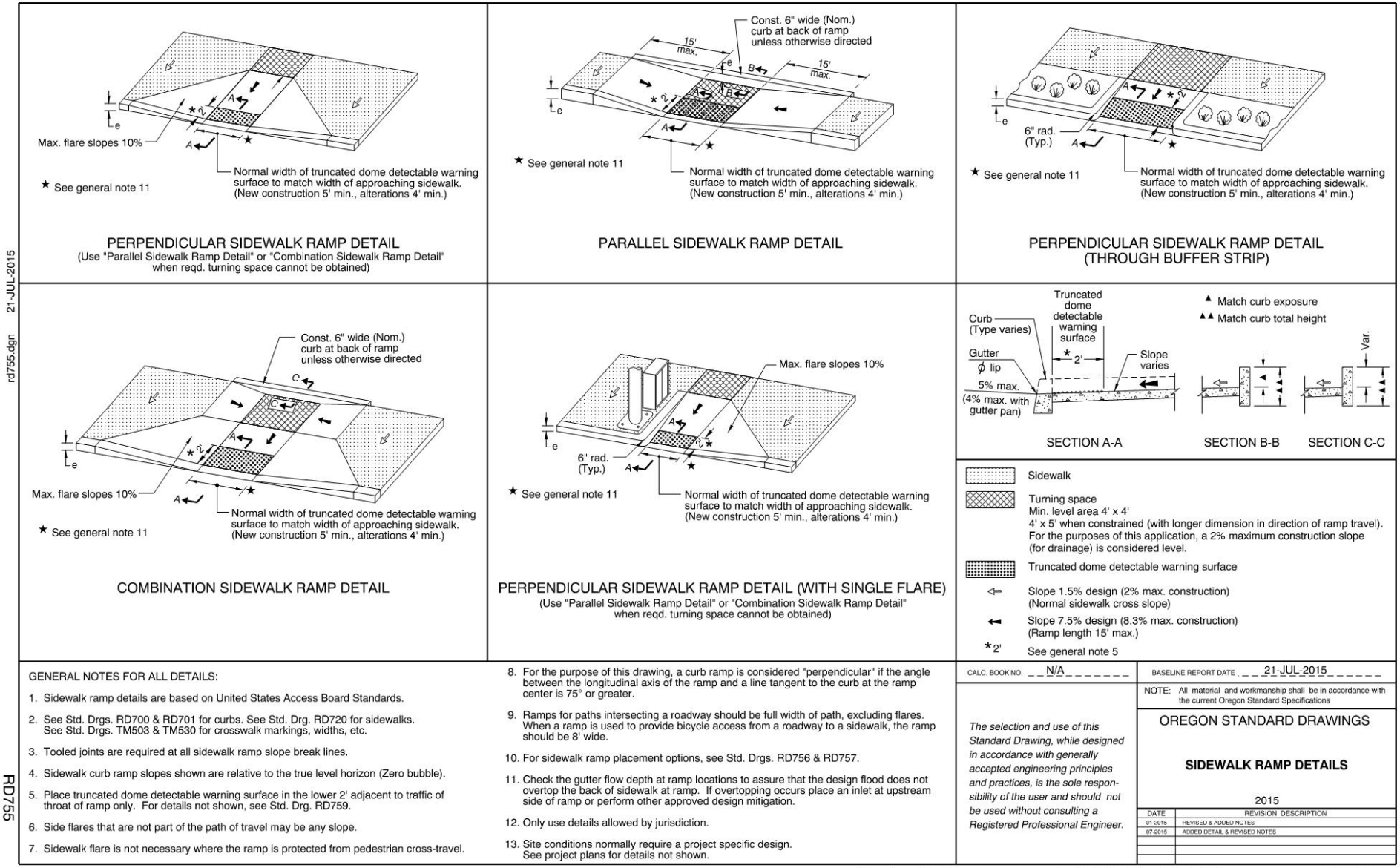
ODOT suit for ADA Compliance

- Detailed Design Requirements
- Design Exceptions
- Construction
  - Field Verification
  - Working Drawings
  - Pre-Placement Meeting
  - ADA Inspection Form
- Permits
- An evolving process…

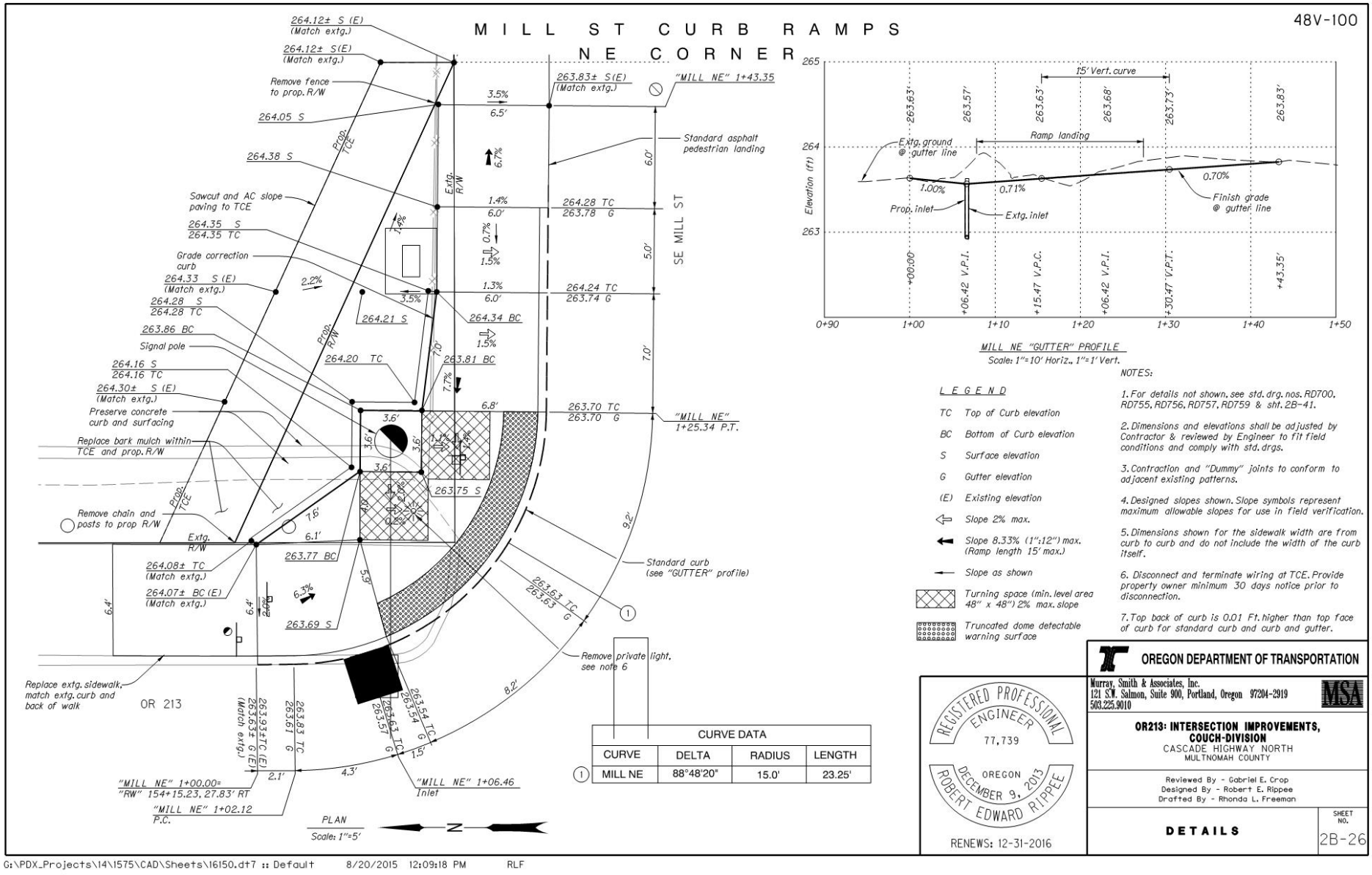
Effect of including curb ramps with resurfacing projects

- 10% to 30% increase in construction cost
- Additional:
  - design effort
  - concrete and general contractors
  - inspection/CM
  - headaches

Design Approach – Standard Drawing



Design Approach – Detailed Layout



Curb ramp design spectrum

Standard Drawing Approach

- Least design cost
- High risk of not meeting ADA
- High risk of unknown impacts and construction change orders

Detailed Design Approach

- High design cost
- Relies on precise survey
- Can it be constructed?
- Trap of a “fool-proof” design

A Results-oriented Approach

- Targeted field measurements (no survey!)
- Basic detail for quantities and construction layout
- ***Enhanced construction management***

Agencies Using This Approach

- Tigard, OR
- Lake Oswego, OR
- Oregon City, OR
- Roseburg, OR (sort of)
- Vancouver, WA
- Arlington, WA

Scoping

Street	From	To	ADT	Heavy Vehicles	Length (ft)	Area (ft^2)	Curb Ramp Corners to Reconstruct
Dartmouth St[1]	99W	Atlanta	8000	250	310	14880	2
78th Ave*	Pfaffle	99W	8000	200	330	13200	3
72nd Ave	99W	McD's Dwy	10000	400	400	20000	4
72nd Ave	217 Ramps	Beveland	13000	650	900	32400	10
Hunziker St	72nd Ave	7585 SW Hunziker	6500	250	1000	36000	3
72nd Ave	Fir St	Varns Rd	14500	400	500	22000	7
72nd Ave	City Limits	Upper Boones Ferry	10000	500	2600	104000	10
Walnut St[2]	116th	122nd	9500	200	1300	52000	9
121st Ave[2]	Tippitt	Ann Pl	8000	150	1000	42000	6
Royalty Pkwy	Naeve	99W	4000	80	1000	34000	6
Locust St[2]	Greenburg	Hall	4000	80	2700	86400	14
Ventura Ct[3]	Barbara	Alfred	800	10	1450	46400	2
74th[3]	Barbara	Taylors Ferry	700	10	1500	42000	5
Oak St	69th	71st	600	10	820	21320	0
Sandburg St[3]	72nd Ave	End	2000	60	1500	54000	2
96th Ave[3]	Murdock	Sattler	800	30	900	24300	3
Kable[3]	98th	100th	1200	15	700	23800	4
109th Ave[3]	Highland	Naeve	800	10	300	9600	9
Oak St	Hall	90th	2000	30	1400	42000	2
Sub-Total							101

Desktop Review

Field measurements

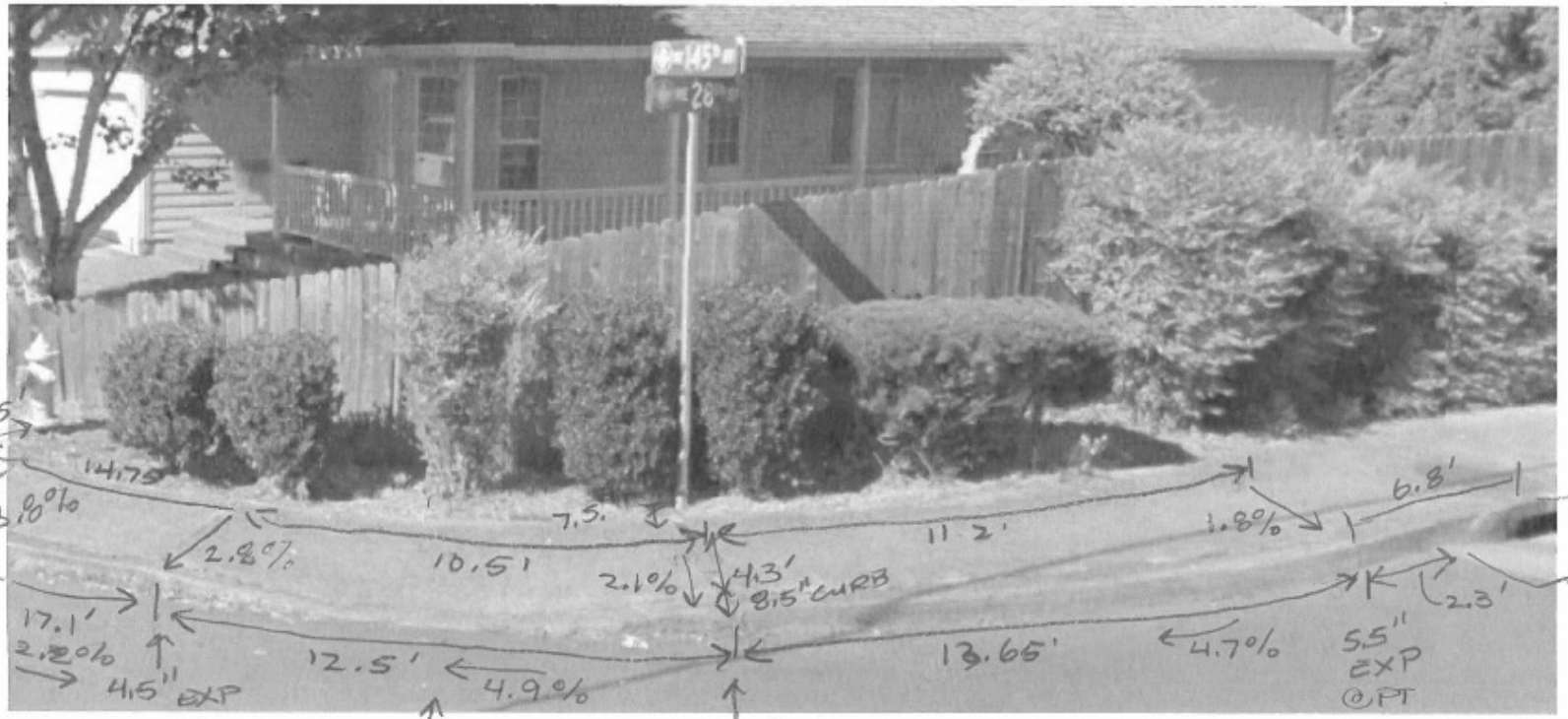
- No survey
- Use streetview images
- Dimensions
- Slopes
- Use available landmarks
- Take photos

Field measurements

Field sketches - Vancouver

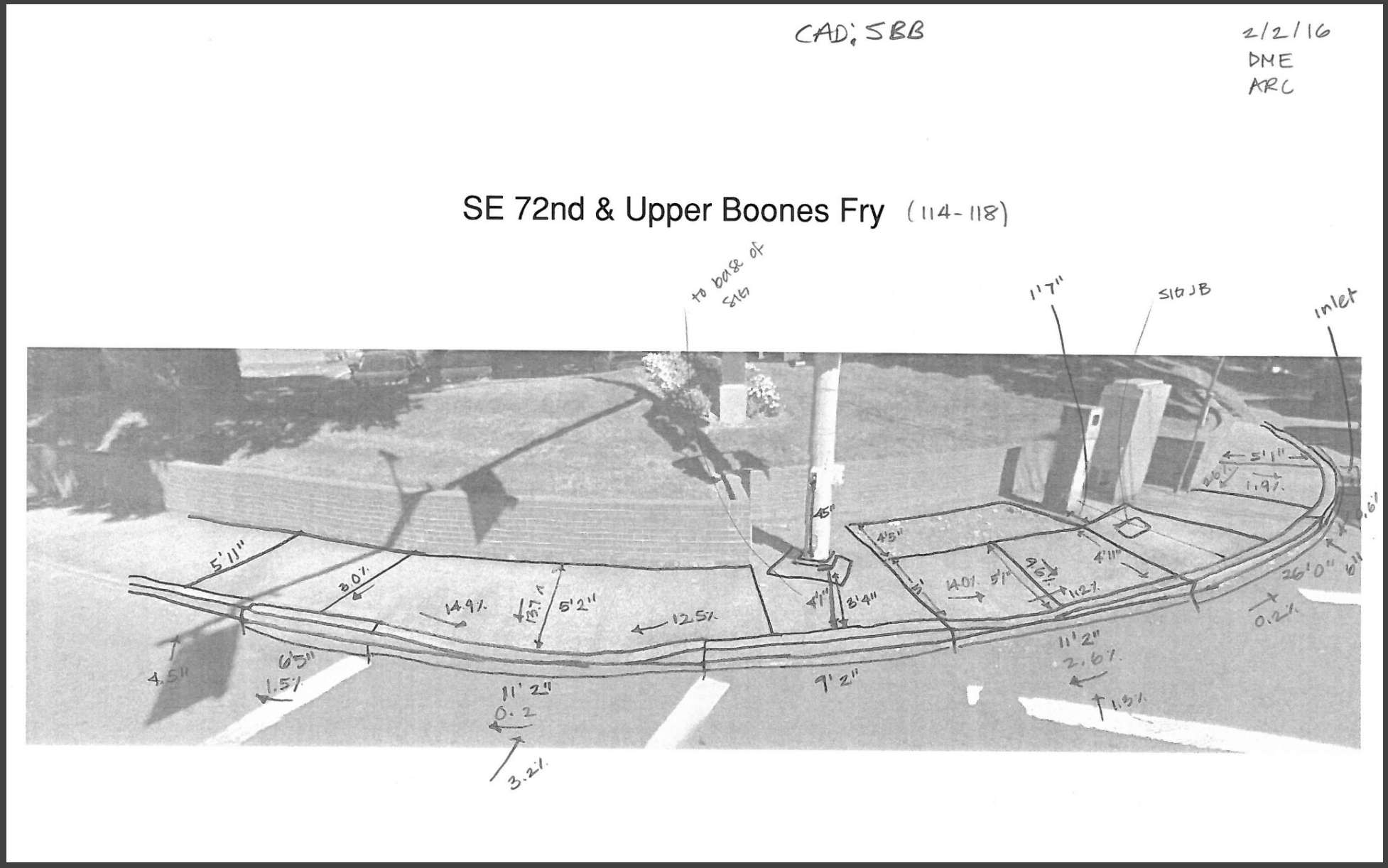
Curb Ramp Evaluation				
Date: 12/14/15	Client: City of Vancouver	Project: 2016 Curb Ramp & Street Striping	Data Collected by: RPS/AHG SBB	MSA Murray, Smith & Associates, Inc.

002 – NE corner of NE 28th Street & 145th Avenue

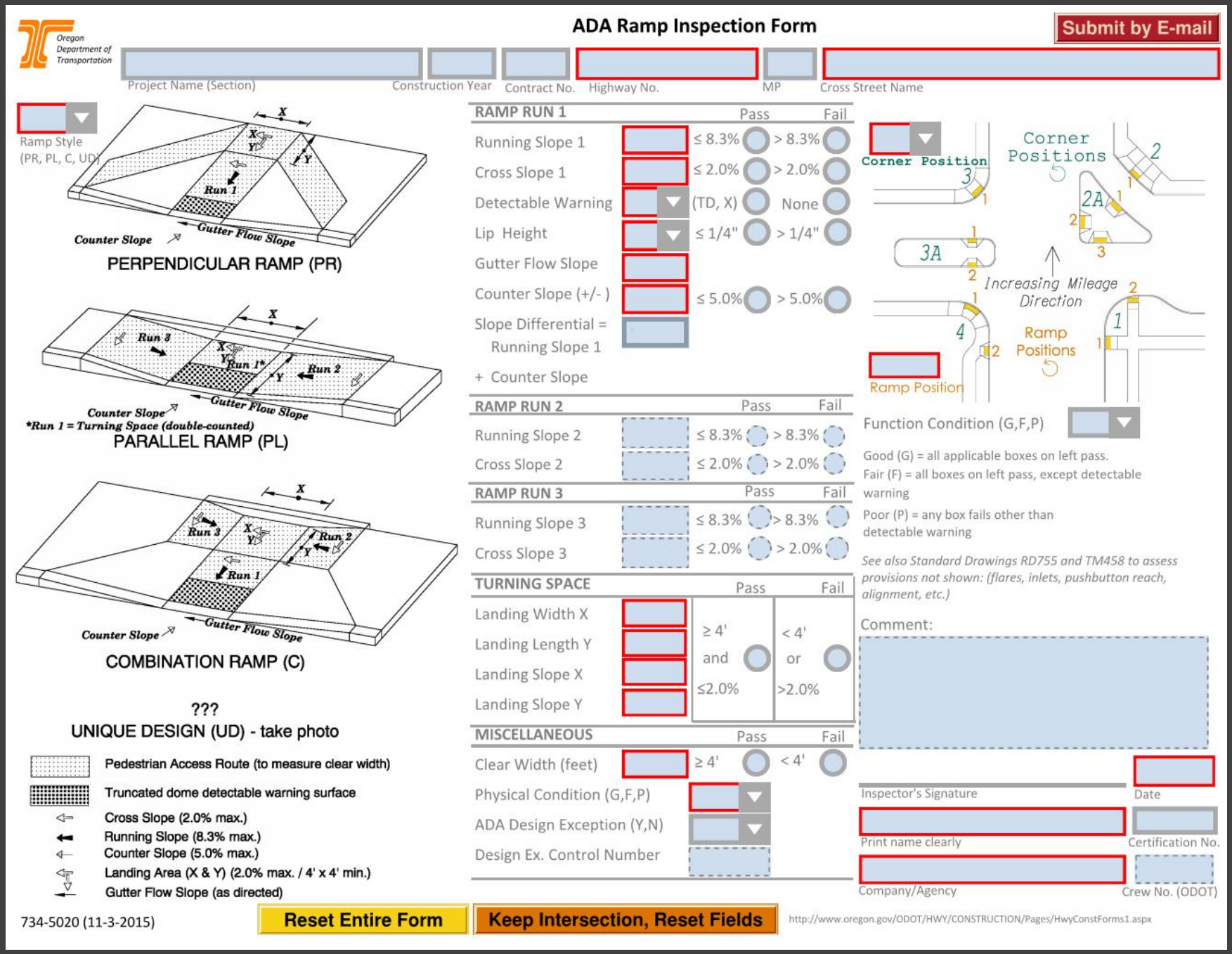


Notes:

Field sketches - Tigard



If a Ramp Meets ADA, Document it



Oregon Department of Transportation

ADA Ramp Inspection Form

Submit by E-mail

Project Name (Section) | Construction Year | Contract No. | Highway No. | MP | Cross Street Name

Ramp Style (PR, PL, C, UD)

PERPENDICULAR RAMP (PR)

*Run 1 = Turning Space (double-counted)

PARALLEL RAMP (PL)

COMBINATION RAMP (C)

???

UNIQUE DESIGN (UD) - take photo

- Pedestrian Access Route (to measure clear width)
- Truncated dome detectable warning surface
- Cross Slope (2.0% max.)
- Running Slope (8.3% max.)
- Counter Slope (5.0% max.)
- Landing Area (X & Y) (2.0% max. / 4' x 4' min.)
- Gutter Flow Slope (as directed)

RAMP RUN 1		Pass	Fail
Running Slope 1		≤ 8.3%	> 8.3%
Cross Slope 1		≤ 2.0%	> 2.0%
Detectable Warning		(TD, X)	None
Lip Height		≤ 1/4"	> 1/4"
Gutter Flow Slope			
Counter Slope (+/-)		≤ 5.0%	> 5.0%
Slope Differential = Running Slope 1 + Counter Slope			

RAMP RUN 2		Pass	Fail
Running Slope 2		≤ 8.3%	> 8.3%
Cross Slope 2		≤ 2.0%	> 2.0%

RAMP RUN 3		Pass	Fail
Running Slope 3		≤ 8.3%	> 8.3%
Cross Slope 3		≤ 2.0%	> 2.0%

TURNING SPACE		Pass	Fail
Landing Width X		≥ 4' and ≤2.0%	< 4' or >2.0%
Landing Length Y			
Landing Slope X			
Landing Slope Y			

MISCELLANEOUS		Pass	Fail
Clear Width (feet)		≥ 4'	< 4'
Physical Condition (G,F,P)			
ADA Design Exception (Y,N)			
Design Ex. Control Number			

Corner Position

Ramp Position

Function Condition (G,F,P)

Good (G) = all applicable boxes on left pass.
Fair (F) = all boxes on left pass, except detectable warning
Poor (P) = any box fails other than detectable warning

See also Standard Drawings RD755 and TM458 to assess provisions not shown: (flares, inlets, pushbutton reach, alignment, etc.)

Comment:

Inspector's Signature | Date

Print name clearly | Certification No.

Company/Agency | Crew No. (ODOT)

734-5020 (11-3-2015)

Reset Entire Form | Keep Intersection, Reset Fields

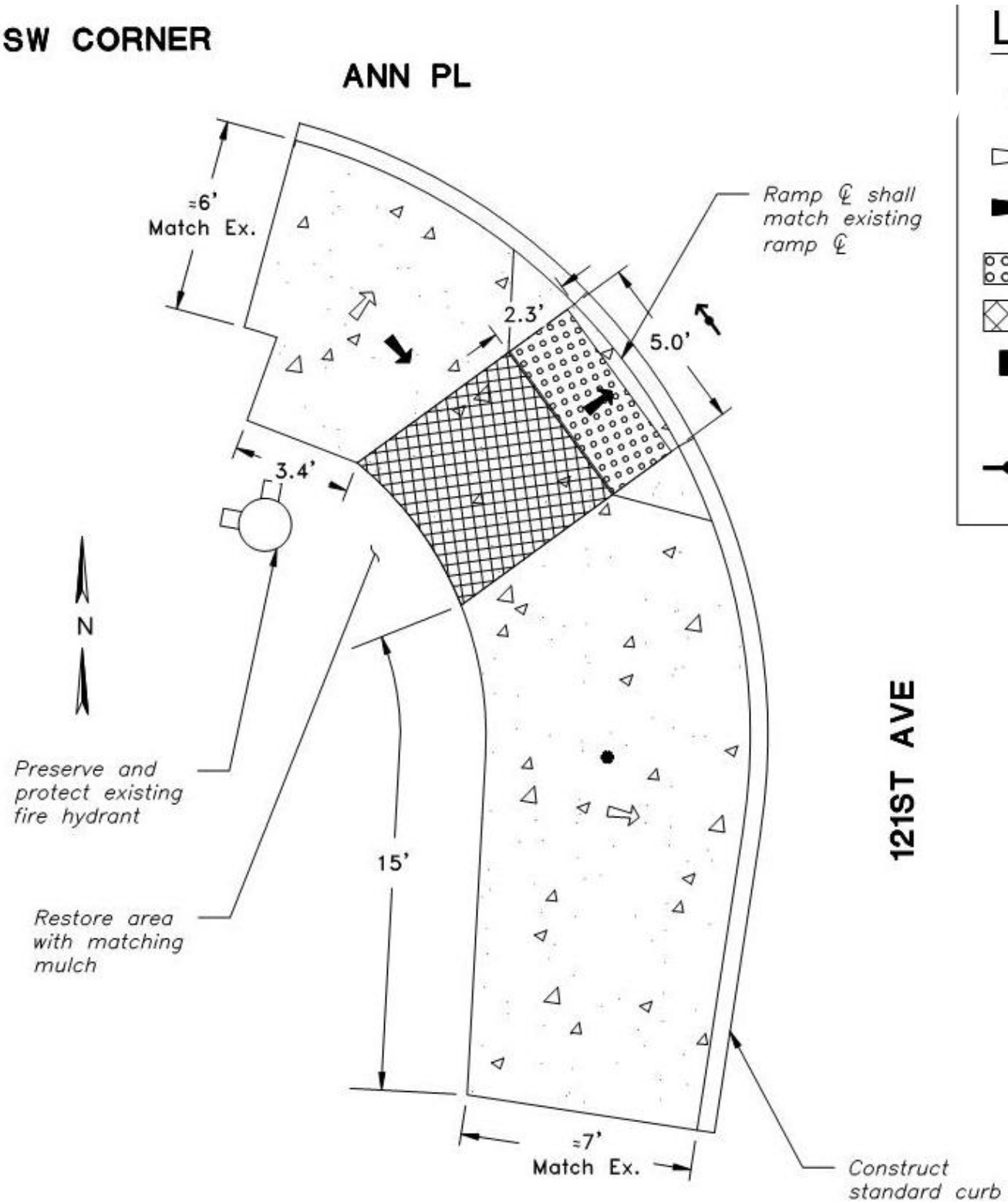
http://www.oregon.gov/ODOT/HWY/CONSTRUCTION/Pages/HwyConstForms1.aspx

Back at the office

- Verify locations and replacement needs
- Determine if extra survey is needed
- Develop CAD sketch of ramp
  - Use field sketch measurements
  - Utilize Agency GIS or aerial photo as base
  - Add pertinent notes

Design process – key elements

- Design cross slope max to 1.5%
- Design running slope max of 7.5%
- Dimensions
- Slopes
- Stay within existing sidewalk limits
- Reference point for new ramp
- Transition panels
- Grade correction curbs
- Grade and utility adjustments
- Restoration requirements



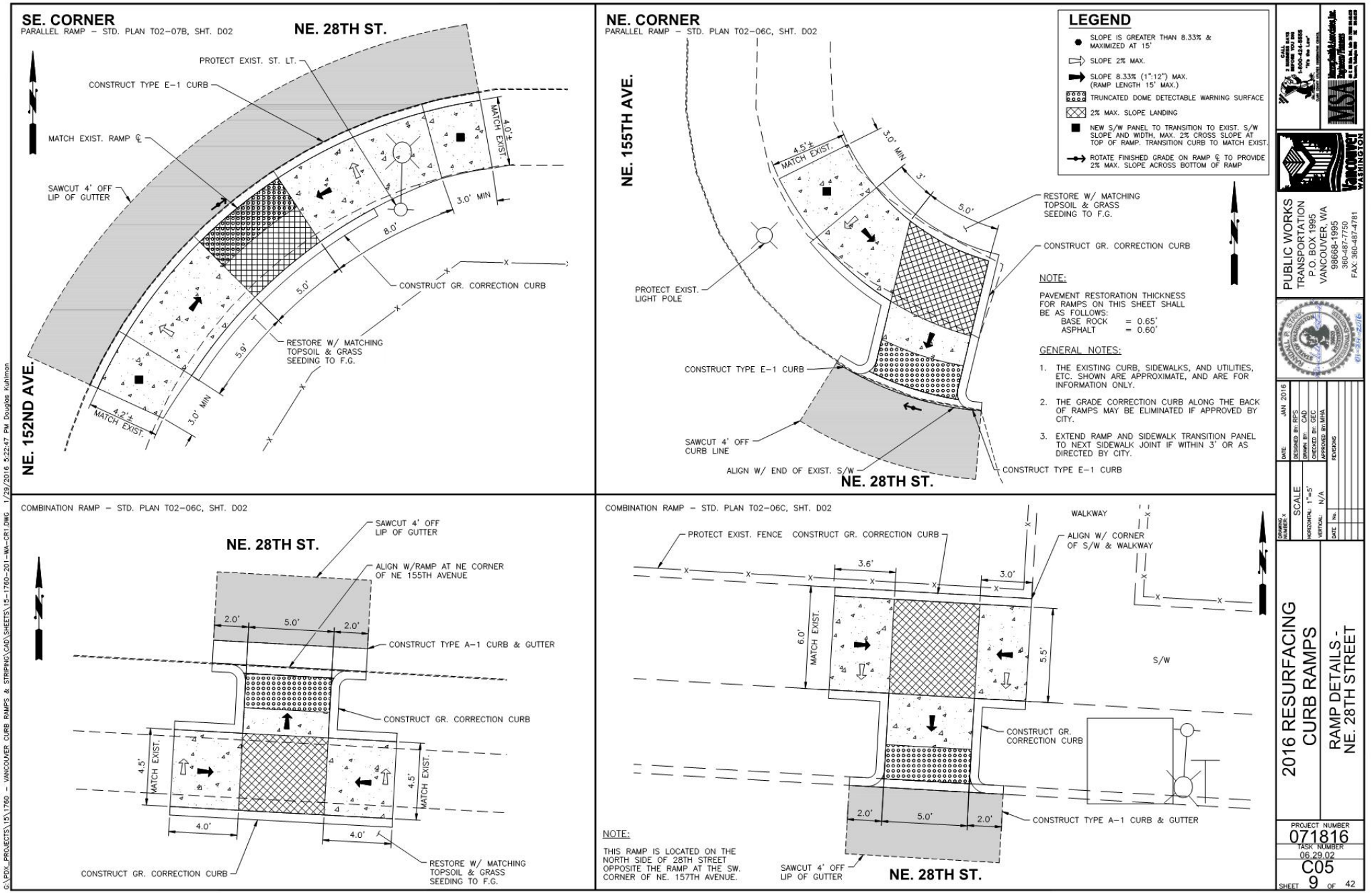
LEGEND

- Slope is greater than 8.33% & maximized at 15'
- Slope 2% max.
- Slope 8.33% (1":12") max. (Ramp length 15' max. or to next sidewalk joint if <18")
- Truncated dome detectable warning surface
- 2% max. slope landing
- New s/w panel to transition to exist. s/w slope and width, max. 2% cross slope at top of ramp transition curb to match exist.
- Rotate finished grade on ramp ℄ to provide 2% max slope across bottom of ramp

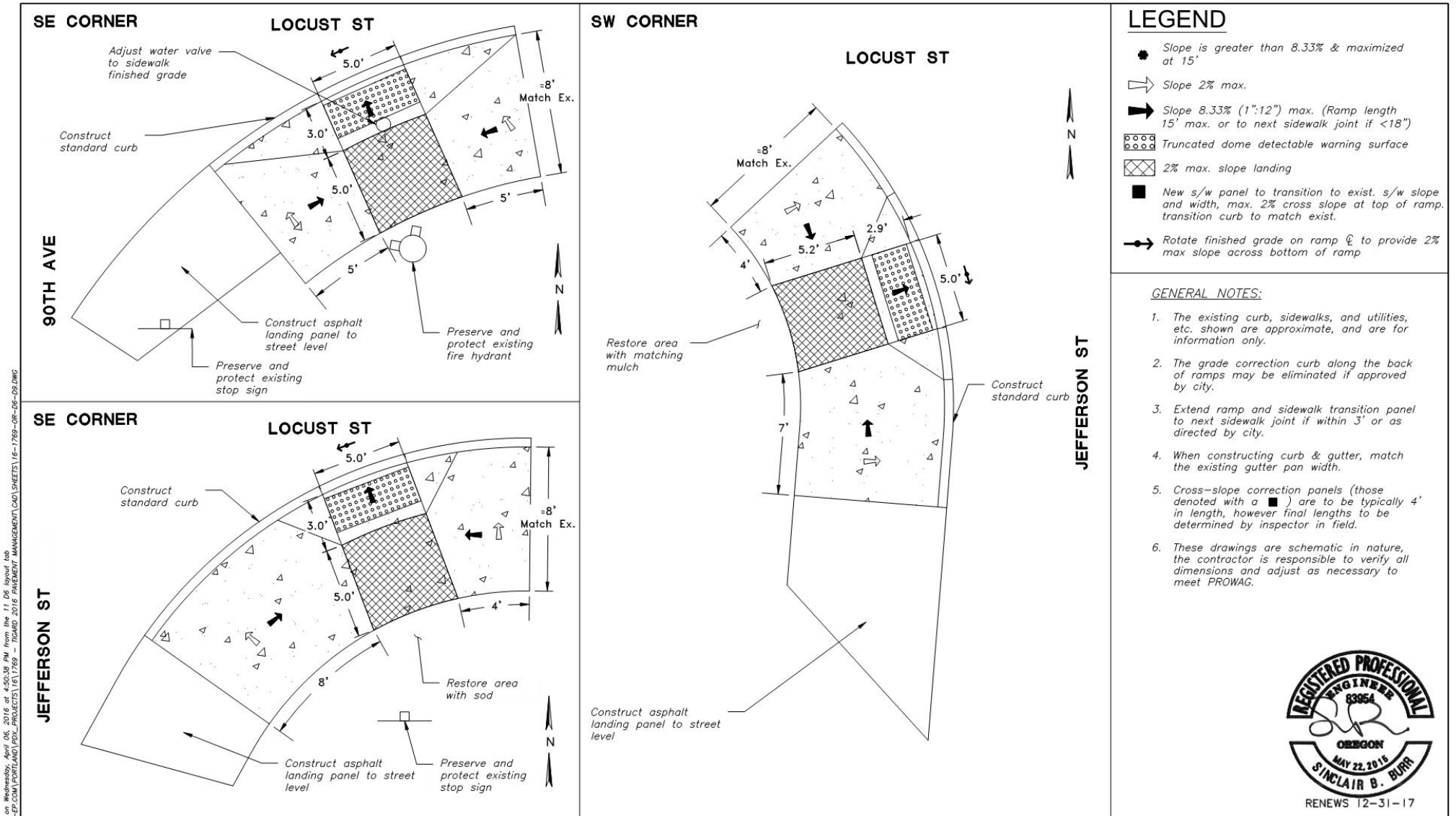
GENERAL NOTES:

1. The existing curb, sidewalks, and utilities, etc. shown are approximate, and are for information only.
2. The grade correction curb along the back of ramps may be eliminated if approved by city.
3. Extend ramp and sidewalk transition panel to next sidewalk joint if within 3' or as directed by city.
4. When constructing curb & gutter, match the existing gutter pan width.
5. Cross–slope correction panels (those denoted with a ■) are to be typically 4' in length, however final lengths to be determined by inspector in field.
6. These drawings are schematic in nature, the contractor is responsible to verify all dimensions and adjust as necessary to meet PROWAG.

Example Sheet – Vancouver 2016



Example Sheet – Tigard 2016



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REGISTERED PROFESSIONAL ENGINEER 83954 OREGON MAY 22, 2015 SINCLAIR B. BURR
RENEWS 12-31-17

Plotted by:SINCLAIR BURR on Wednesday, April 06, 2016 at 4:50:38 PM from the 11 D6 layout tab
File Name/Path: \\AD.MSA-EP.COM\PORTLAND\PDX_PROJECTS\161\1769 – TIGARD 2016 PAVEMENT MANAGEMENT\CAD\SHEETS\16-1769-DR-D6-09.DWG

Revisions and Addendums			
Description	Date	No.	By

SCALE: 1" = 5
5 2.5 0 5

DESIGN: SBB | DRAWN: SBB | CHECK: GEC | PROJECT NO: 2016-95001 OL

TIGARD

ENGINEERING DIVISION
PUBLIC WORKS DEPARTMENT
13125 S.W. HALL BLVD.
TIGARD, OREGON 97223
VOICE: 503-639-4171
FAX: 503-624-0752
WWW.TIGARD-OR.GOV

MSA Murray, Smith & Associates, Inc. Engineers/Planners Portland, Oregon

FY 2016-17 PAVEMENT MANAGEMENT PROGRAM

Pavement Rehabilitation

Sidewalk Ramp Details - Locust Street

SHEET D6
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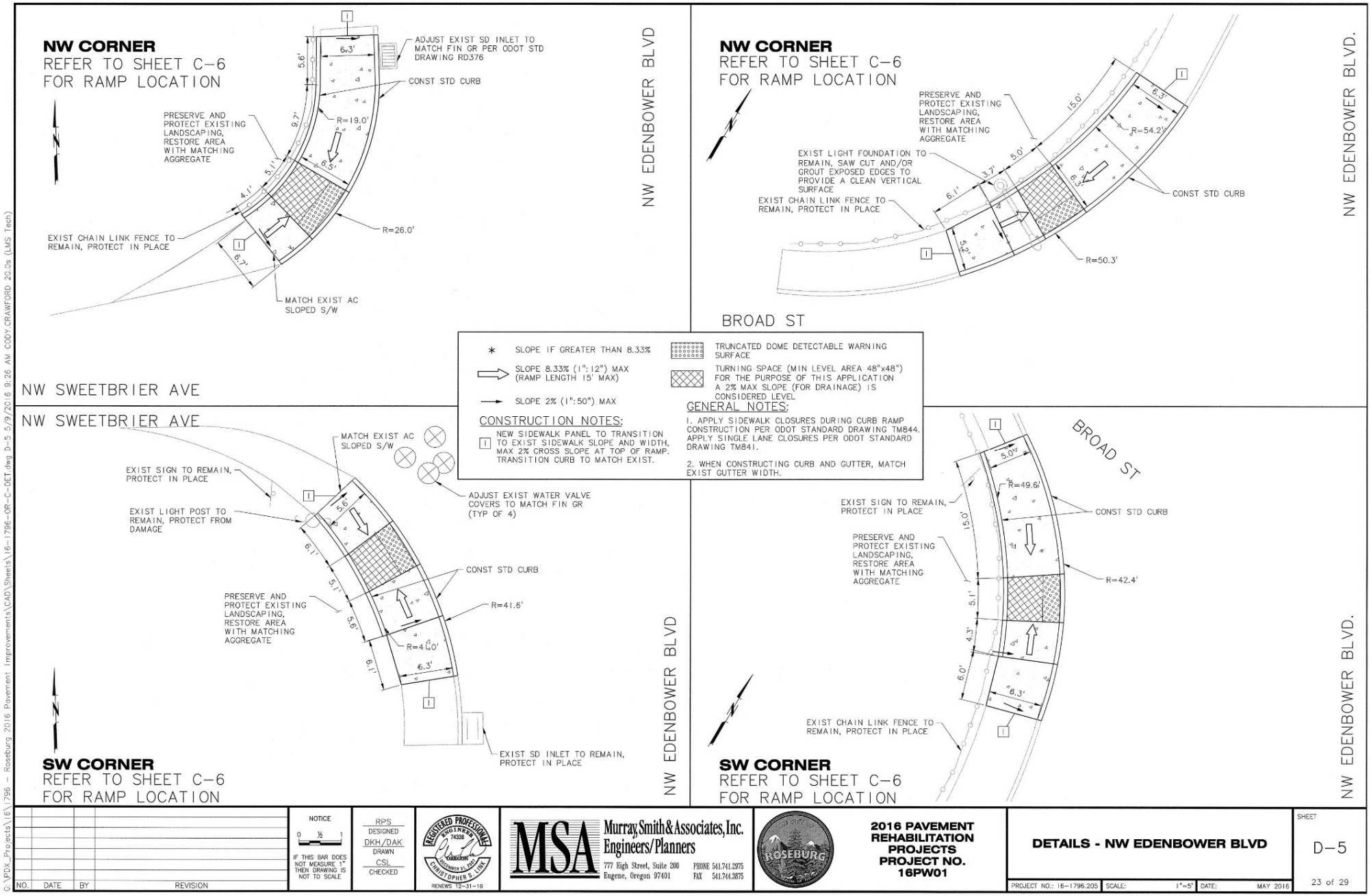
Example Sheet – Roseburg 2016



NO. | DATE | BY | REVISION

NOTICE
0 ½ 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

RPS
DESIGNED
DKH/DAK
DRAWN
CSL
CHECKED

REGISTERED PROFESSIONAL ENGINEER 74338 OREGON DECEMBER 31, 2015 CHRISTOPHER S. LINK RENEWS 12-31-16

MSA Murray, Smith & Associates, Inc. Engineers/Planners
777 High Street, Suite 200 Eugene, Oregon 97401
PHONE 541.741.2975 FAX 541.744.3875

2016 PAVEMENT REHABILITATION PROJECTS PROJECT NO. 16PW01

DETAILS - NW EDENBOWER BLVD

PROJECT NO.: 16-1796.205 | SCALE: 1"=5' | DATE: MAY 2016

SHEET D-5

23 of 29

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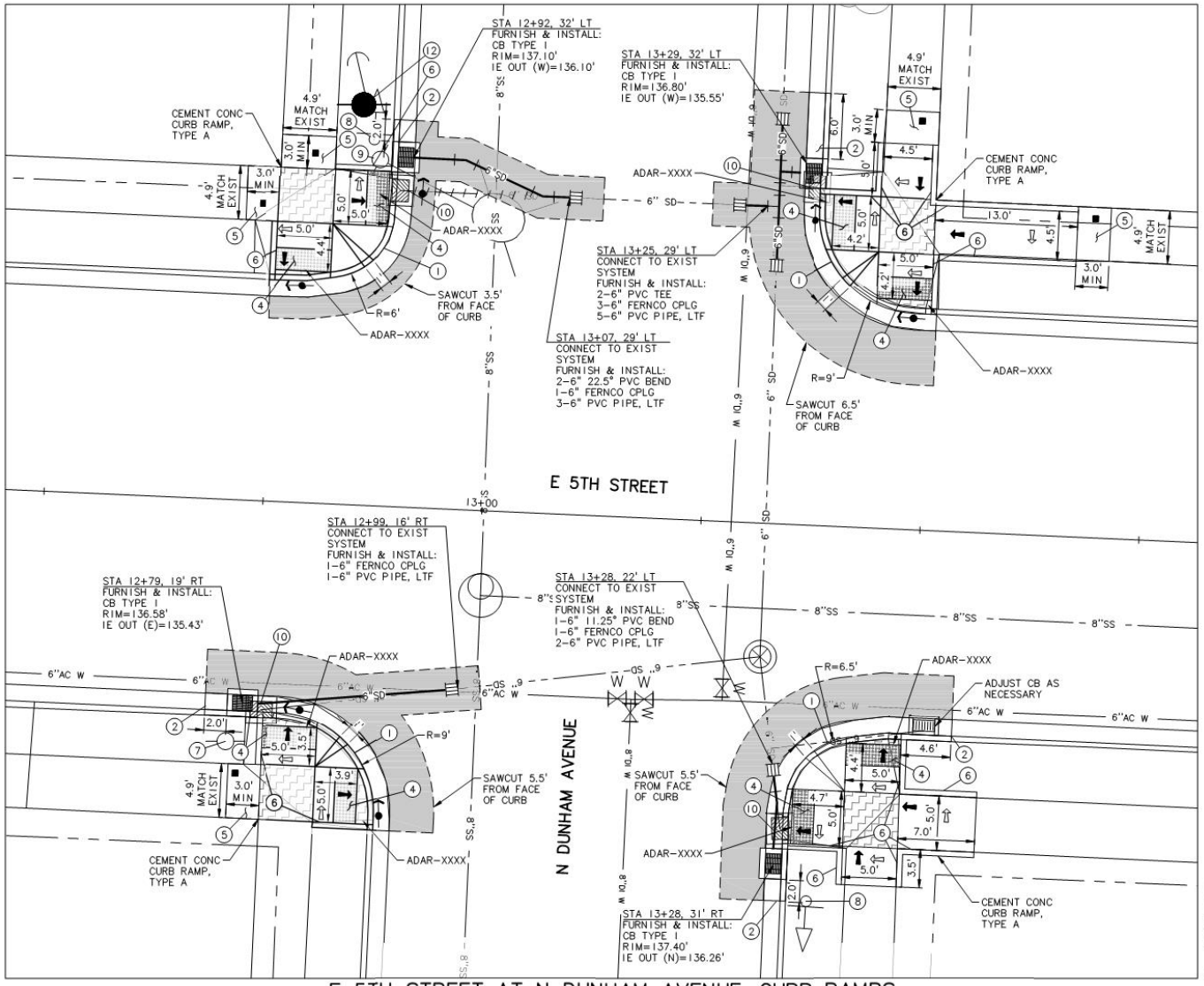
Example Sheet – Arlington 2016



E 5TH STREET AT N DUNHAM AVENUE–CURB RAMPS

SCALE: 1"=5'

KEY NOTES:

1. CONSTRUCT DEPRESSED CURB PER WSDOT STD PLAN F-10.12, MAXIMUM CURB HEIGHT BETWEEN RAMPS OF 0.25-FT
2. CONSTRUCT CEMENT CONCRETE TRAFFIC CURB AND GUTTER PER WSDOT STD PLAN F-10.12, MATCH EXIST GUTTER WIDTH
3. CONSTRUCT CEMENT CONCRETE TRAFFIC CURB PER WSDOT STD PLAN F-10.12
4. FURNISH AND INSTALL DETECTABLE WARNING SURFACE PER WSDOT STD PLAN F-45.10
5. CONSTRUCT CEMENT CONCRETE SIDEWALK PER WSDOT STD PLAN F-30.10
6. CONSTRUCT GRADE CORRECTION CURB PER DETAIL 1, SHEET RD9
7. PROTECT EXIST UTILITY POLE
8. PROTECT EXIST SIGN
9. EXIST UTILITY POLE TO BE REMOVED BY OTHERS
10. REMOVE CATCH BASIN
11. PROTECT FIRE HYDRANT
12. PROPOSED UTILITY POLE TO BE INSTALLED BY OTHERS

LEGEND

- * SLOPE IS GREATER THAN 8.33% & MAXIMIZED AT 15'
- SLOPE 2% MAX
- SLOPE 8.33% (1":12") MAX (RAMP LENGTH 15' MAX)
- 2% MAX SLOPE IN ALL DIRECTIONS
- NEW S/W PANEL TO TRANSITION TO EXIST S/W SLOPE AND WIDTH, MAX 2% CROSS SLOPE AT TOP OF RAMP. ADJUST PANEL LENGTH TO MATCH NEAREST FULL DEPTH EXPANSION JOINT
- ADJUST FINISHED GRADE TO PROVIDE 2% MAX SLOPE ACROSS BOTTOM OF RAMP

NOTES:

1. REFER TO SHEET 2 FOR GENERAL AND ADA NOTES.
2. REFER TO WSDOT STANDARD PLANS F-40.12, F-40.14, F-40.15, AND F-40.16 FOR ADDITIONAL CURB RAMP INFORMATION.
3. EXTEND RAMP AND SIDEWALK TRANSITION PANEL TO NEXT SIDEWALK JOINT IF WITHIN 3' OR AS DIRECTED BY CITY.
4. REFER TO THE TYPICAL CURB RAMP REPLACEMENT, DETAIL 2, SHEET RD9 FOR ADDITIONAL MATERIAL AND CONSTRUCTION INFORMATION.
5. DETECTABLE WARNING SURFACES SHALL BE FIELD FITTED TO CURB RADII TO PROVIDE A CONTINUOUS EDGE ON BOTH THE FRONT AND BACK SIDES.
6. AT EXISTING AND PROPOSED CURB TIE-INS, MATCH THE CURB FACES AND EXISTING TOP OF CURB AND FLOWLINE ELEVATIONS.
7. MATCH PROPOSED RAMP CENTERLINES TO EXISTING RAMP OR SIDEWALK CENTERLINES UNLESS OTHERWISE SHOWN.
8. PLANTING STRIPS BETWEEN THE CURB AND SIDEWALK SHALL BE RESTORED WITH MATCHING TOPSOIL AND GRASS SEEDING TO FINISHED GRADE AT NO ADDITIONAL COST.
9. ALL EXISTING SURFACE FEATURES SUCH AS PLANTERS, LANDSCAPING, STRUCTURES, LOTS, CURBS, SIDEWALKS, FENCES, WALLS, MAILBOXES, SIGNS, GUY WIRES, PIPING, AND UTILITIES DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO EXISTING CONDITION AT NO ADDITIONAL COST, UNLESS OTHERWISE PROPOSED.

BID SET

NO.	DATE	BY	REVISION

NOTICE: IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JLTA DESIGNED | BAW DRAWN | GEC CHECKED

2016.05.05 15:51:56-07'00'

Murray, Smith & Associates, Inc. Engineers/Planners
2707 Colby Avenue, Suite 1110 Everett, Washington 98201-3566 PHONE 425.252.9003 FAX 425.252.8853

CITY OF ARLINGTON
2016 PAVEMENT PRESERVATION PROJECT
PROJECT No. P02.398

ROADWAY DETAILS/CURB RAMPS-1

PROJECT NO.: 15-1754.212 | SCALE: AS SHOWN | DATE: APRIL 2016

SHEET RD1

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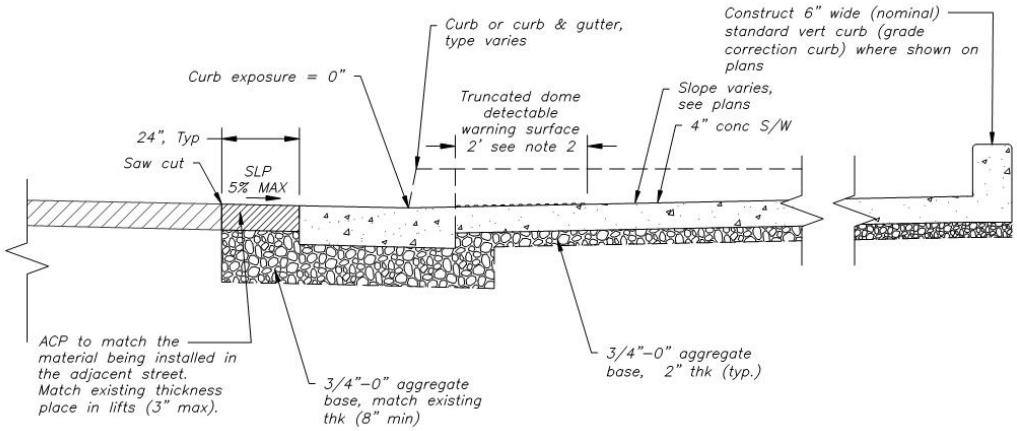
Other Details



Notes:

1. Tooled joints are required at all sidewalk ramp slope break lines.
2. Place truncated dome detectable warning surface in the lower 2 feet adjacent to traffic of throat of ramp only.
3. Adjust curb profile within landing area as needed. Blend with existing street grade to minimize effect of change.

TYPICAL SIDEWALK RAMP REPLACEMENT SECTION

NTS

SIDEWALK RAMP GENERAL NOTES:

1. Contractor shall be responsible for meeting all Americans with Disabilities (ADA) requirements as defined by the public rights–of–way accessibility guidelines (PROWAG). Details and dimensions shown are approximate only and intended as a guide for initial layout purposes only and are not complete. Contractor shall take all necessary field measurements and otherwise verify all dimensions to meet ADA requirements. Should any error or inconsistency exist, the Contractor shall not proceed with the work affected until reported to the Engineer for clarification or correction.

2. No survey has been completed for these ramps. GIS mapping was used to create the project plan sheets and curb ramp details shown. Dimensions are approximate and shall be verified. Reference Oregon Standard Drawings RD700, RD720, RD755, RD756, RD757, RD759 for additional information.

3. All survey and staking necessary for construction shall be provided by the Contractor. The Contractor shall develop and make all detail surveys necessary for layout and construction. Complete all survey staking as needed using information contained in the plans and adjusted as necessary to meet ADA requirements. Additional information or clarification by the engineer may be available upon request, but is not guaranteed. Surveyed field layout shall be reviewed by the Engineer prior to demolition and again prior to concrete placement.

4. The maximum closure time for any single curb ramp shall be one week. Submit traffic control plan and pedestrian detour plan for ramp closures. Plan shall include but is not limited to work area protection, sidewalk closures and detours.

5. Coordinate utility relocations and/or adjustments as needed. See specifications for utility contact information.

6. Replace curbs, sidewalks, and/or driveway aprons that are damaged as a result of construction operations. Replace full sections to the nearest existing construction joint. Replacement will be considered incidental to the work.

7. Protect freshly poured concrete from vandalism or other damage for a minimum of twenty–four (24) hours or until cured enough to support typical use, whichever is longer. Any concrete damaged by vandalism or other causes shall be replaced at no cost to the city.

8. All areas disturbed through the construction of the sidewalk ramps shall be returned to their original condition prior to project completion. This includes, but is not limited to, landscape restoration around new ramps.

9. Contractor shall take extra care to avoid damaging any irrigation, wiring, or other facilities in the area to the new ramp. Any facilities encountered shall be relocated by the contractor without damage to an appropriate location outside the ramp/walk area.

REGISTERED PROFESSIONAL ENGINEER 83954 OREGON MAY 22, 2015 SINCLAIR B. BURR

RENEWS 12–31–17

Revisions and Addendums			
Description	Date	No.	By

NO SCALE

DESIGN: SBB | DRAWN: SBB | CHECK: GEC

ENGINEERING DIVISION
PUBLIC WORKS DEPARTMENT
13125 S.W. HALL BLVD.
TIGARD, OREGON 97223
VOICE: 503–639–4171
FAX: 503–624–0752
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MSA Murray, Smith & Associates, Inc. Engineers/Planners Portland, Oregon

PROJECT NO: 2016–95001 OL

FY 2016-17 PAVEMENT MANAGEMENT PROGRAM

Pavement Rehabilitation

Sidewalk Ramp Details

SHEET D1

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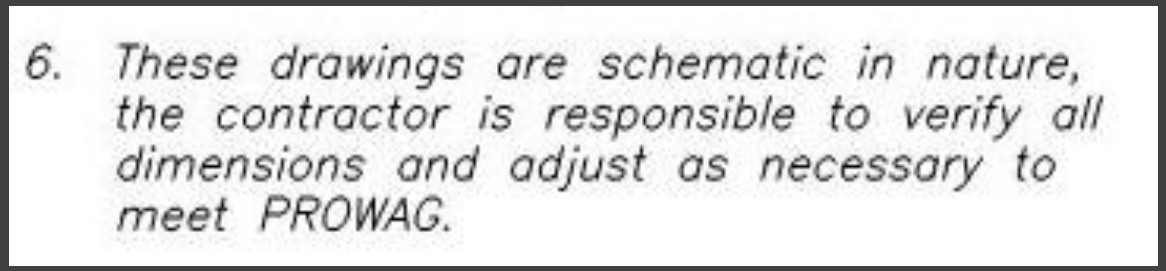
Construction

- Contract documents describe process and require contractor to meet ADA



- Pre-Pour field meeting
- Inspector with ADA training

Construction Process

- Pre-Pour Meeting (prime and concrete sub)
  - Walk through inspection process
  - Reiterate expectations
  - Gauge subcontractor expertise
- Mark demolition limits
- Demo and prep
- Check forms
- Check finished ramp

Demolition Limits

Checking Forms

Checking Forms

Before

After

Before

After

Before

After

Results

- Meet ADA
- Minimize change orders
- Reasonable design cost
- Process transferable between agencies


WARNING
NEIGHBORHOOD WATCH
PROGRAM IN FORCE
SIDEWALK
CLOSED

Questions?