

ADA Project Design Guide

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INTRODUCTION

The purpose of this document is to provide direction to designers and project staff involved in the development and design of ADA improvements and projects. This document will help eliminate confusion about the level of plan detail required for ADA facilities in project plans, as well as provide a comprehensive look at the potential impacts ADA elements have on design in other functional areas.

SCOPING

It is MnDOT's goal to meet the needs of all disabled users throughout its system. Every project that impacts pedestrian facilities should be considered an opportunity to achieve this goal and further the completion of the ADA Transition Plan. To ensure that a project is able to meet accessibility requirements a thorough scoping of accessibility needs is required. If a Pedestrian Scoping Process has not been performed, project staff must walk the project and complete the evaluation.

During the field walk project staff should determine what upgrades need to occur to meet all users' needs without regard to the project scope. Once all upgrades have been identified, the project staff will need to determine which features to include. Per MnDOT policy, all projects must provide curb ramps if they are needed and improve existing curb ramps that do not meet current minimum requirements. If there other accessibility needs that can be addressed by a slightly expanded project scope, MnDOT should take the opportunity to do so, considering that any unmet needs or substandard installations must be addressed by a future project. Accessibility needs beyond curb ramps include but are not limited to APS upgrades, sidewalk improvements, and barrier removals.

While ADA doesn't require the presence of facilities, at times the lack of facilities can present a true barrier for people with disabilities. Projects should note the presence of pedestrian activity (goat paths) as well as identify gaps in sidewalk connectivity and discuss the overall plans for these areas with the local governments.

If the District determines that either the project scope or timeline is insufficient to design and construct compliant curb ramps that meet the ADA needs, the District should confer with the ADA Office to determine if a Phased ADA Improvement Project will achieve a more accessible end product. This future project will need to be programmed independently or incorporated into a district wide stand-a-lone ADA project and provide the following information in the current Project Submittal Memo:

- 1.) New SP Number, Project Schedule, and Letting Date
- 2.) Cost Estimate with Clearly Documented Project Scope for next Project Manager
- 3.) PM Identified
- 4.) Funding Source Identified
- 5.) District Keeps list of Phased ADA Improvement Projects

It is important to remember Tech Memo No. 10-02-TR-01 *Public Rights-of-Way Accessibility Guidance* establishes the minimum threshold for when and what type of accessibility improvements must be made as part of projects that are constructed within MnDOT's rights-of-way. Any improvements that are minimally required, but will not be made at the time of the initiating project, will require a follow up project that will accommodate MnDOT's project development process and be delivered as soon as is feasible.

PRE-DESIGN: DETERMINING THE LEVEL OF PLAN DETAIL & SURVEY NEEDS

Curb Ramp Retrofits

Depending on the project site characteristics and the mapping already available before the project begins, surveys may not need to collect a large amount of field data for a project, or they may create mapping from field surveys for the entire project. If mapping is available, design/surveys should make sure it is up to date and free from errors or omissions. It is important to remember that the accuracy and precision of the data collected by surveys isn't necessarily the level of output that is needed in the plan. In many cases the level of information that surveys provides will be greater than the level of information that is provided in the plan, especially with regard to elevations. Use the table below as a guide when determining the level of data needed in a curb ramp upgrade plan.

- 3 Levels of plan detail:
 1. Standard Plans
 2. Custom Design with X,Y location
 3. Custom Design in vertically constrained areas
- Different levels of plan detail can be used at different intersections/quadrants in the same plan
- Don't be over prescriptive or claim more accuracy than your data provides

| Plan Level | Design Data | Plan Locations (X,Y) | Plan Elevations (Z) |
|------------|---------------------------|----------------------|---------------------|
| 1 | DTM/Eye Level/Smart Level | No | No |
| 2 | Field Surveys | Yes | No |
| 3 | Field Surveys | Yes | Yes |

Note: For Plan Level 1, the field data is only needed to provide estimated quantities within 20% accuracy. DTM assumes that a DTM is already available for the area, it does not mean surveys should create a new DTM. If a DTM is not available the designer can estimate the quantities by making a field visit and using a standard level, eye level, or smart level.

1.) Standard Plans – Standard plans can be used on ADA retrofit projects and mill & overlay projects. Signalized intersections and regrade projects should not use standard plans.

- The designer should determine if one of the standard plan designs can be easily applied to the quadrant in question.
- The grade breaks and ramp locations must line up with the in-place edge of the sidewalk or ROW limits
- If this is the case, the designer should estimate and tabulate the appropriate pay items (see ADA pay item guidance) by quadrant and include the proposed ramp type in the tabulation. The alternative to listing the curb ramp type in the tabulation is to note the different curb ramp types at their locations on the construction plan.
- Appropriate pay items include all pay items necessary to adjust all surface utilities affected in the construction area.
- Link to Level 1 Sample Plan: <http://www.dot.state.mn.us/ada/pdf/level1.pdf>

2.) Custom Designs with X,Y location – When a standard design cannot be easily applied to a quadrant or the intersection is signalized, then a custom design must be provided. This design is usually a 20 scale detail of the intersection and shows where the ramps are located, including ramp ranges, landings, grade breaks, and X,Y coordinates of the curb cuts. It would also show the location of the signal system components as well as any other surface features/utilities. If a topographic map is already available in Microstation, then no surveying is needed unless the mapping is outdated. The designer should make field visits to determine the accuracy of the existing topographic mapping as well as to determine/check the proposed ramp designs.

3.) Custom Design in vertically constrained areas/Curb Line Changes on Mill & Overlay – This type of design should be used in areas where there are vertical constraints that must be met such as doorways, steps, private sidewalks/driveways (when we don't have ROW access to change the elevations of the private sidewalks/driveways). In this case the designer should create a custom curb ramp design that shows the grades and dimensions of the proposed ramps and landings and show how they will tie into the constrained area. By providing the exact proposed ramp grades and dimensions of the curb ramps along with a note describing what existing surface should be tied into, the plan is clear and contractor friendly. Surveys will be needed at quadrants that have these vertical constraints to help the designer establish these ramp grades and dimensions but exact elevations should not be listed in the plans.

Link to Level 2/3 Sample Plan: <http://www.dot.state.mn.us/ada/pdf/levels2and3adaintersection.pdf>

When the proposed curb ramp work requires changing the horizontal and vertical alignments of curb lines as part of a pavement preservation project, the designer should provide the same curb alignments and profiles that would typically be provided in roadway construction plans. This C&G alignment and profile information is needed to ensure the new curb matches the in place street surface and drainage is maintained. By only showing proposed curb line changes in the plans the field staff/contractor will more readily recognize the proposed changes in C&G placement and focus their efforts in these areas. In lieu of C&G information in the plan, the contractor is required to maintain existing flows patterns so simple drainage arrows should be provided on custom designs. X,Y,Z coordinates beyond the new curb line aren't needed to build the curb ramp and shouldn't be provided in the plans.

New Construction / Major Reconstruct

As projects get larger than a typical mill & overlay project, the curb ramp plans will become more integrated into the larger plan set. Custom curb ramp designs will generally be shown on the intersection detail sheets. These intersection sheets already contain curb line alignments and elevations so X,Y,Z coordinates (or gutter profiles) should be placed at each edge of each proposed curb ramp. If gutter profiles are used they should wrap around each radius and continue to the side street tie down point. Both PROWAG and MnDOT's road design manual require all cross walks to be constructed at a 2% maximum cross slope so this criteria should be achieved on intersection regrades and shown on the curb flow lines at all curb cuts to ensure the cross slope requirements are met for both the roadway and the pedestrian ramps.

The curb ramp designs should follow the same guidelines as level 2 and Level 3 designs described above showing landings, grade breaks, surface utilities, signal components if applicable and elevations in ranges or specific slopes based on the surrounding vertical tie in points (Doorways, stairways, etc.). Surveyors will have shot every adjacent tie-in point, such as doorways, so designers will need to verify curb ramps designs meet requirements but should not include excessive elevations in the plan. Generally an X,Y,Z point at the ramp landings and/or at the top of

secondary ramps will be sufficient control for contractors to construct the designs properly. In areas with no critical vertical tie in points curb ramp should be designed to the point where the typical sidewalk section governs.

Designers should be aware this document is based on curb ramp construction. On major reconstruction/regrade projects many other pedestrian considerations occur with new sidewalk construction, such as matching into existing doorways and driveways while providing a Pedestrian Access Route throughout each block. Considerations need to be given to adjusting curb alignments, profiles, and curb heights to achieve a compliant, user friendly pedestrian design. In slow speed areas roadways should be designed from the outside in using adjacent off ROW vertical tie in points as the starting point for the design. Vertical roadway control should be based on gutter profiles and variable roadway cross slopes rather than centerline profiles and constant roadway cross slopes as has been the recent typical highway design practice - that has commonly resulted in excessive sidewalk cross slopes.

Once gutter profiles and curb heights have been set based on existing adjacent off ROW vertical tie in points, sidewalk cross slope break lines in wider sections of sidewalk can be created to provide a sloped boulevard area. If a cross slope break line is used other project aspects such as sidewalk width in front of doorways, sidewalk jointing patterns, along with locations of lighting bases, street furniture, etc. must be considered. To ensure the sloped boulevards are amenable to both parallel parking and pedestrians walking outside of the PAR, it is recommended to keep walkable boulevard slopes ranging from a preferred 8% to a maximum 12% cross slope. When utilizing a cross slope break line in the sidewalk, cross sections should be provided at doorway tie in points and a sidewalk profile should be generated to tie in these match points while ensuring sidewalk running slopes don't exceed 5%.

Driveways need to be surveyed and specific designs must be developed in vertically constrained areas which depict driveway running slopes as well as construction limits needed to acquire temporary access beyond the permanent ROW limits. It is strongly recommended to talk with the ADA office a minimum 2 years prior to letting to discuss project specifics (survey and ROW needs, typical sidewalk section, curb profiles, etc.).

DESIGN CONSIDERATIONS

The level of detail that should be provided in the plan is dependent upon each site. In some cases the Contractor may need precise elevations to bid/construct the facility correctly and in some cases they may only need a standard plan and estimated quantities. The designer's goal should be to provide enough detail to construct the most user and maintenance friendly compliant facility that fits the site, but not so much detail that excessive time and effort is wasted designing a facility that can be easily constructed with a standard plan/detail. Also, including too much detail in the plan may overly constrain the Contractor. In many cases the adjacent terrain dictates how a ramp blends in better than a detailed design. Another negative is when the plan is too prescriptive and some details are wrong, then MnDOT owns the mistake. Various levels of detail will exist within a plan and will be dependent on the specific site conditions. The plan should be easy to read and in a field friendly format so that it is easy to use in construction. The designer should also consider what the area will look like once the removals have been completed and then ask themselves if the level of information in the plan is sufficient to construct the facility.

Non-Signalized Intersections

- Use District curb ramp inventory and perform field walk to determine which curb ramps are non-compliant and need to be reconstructed with the project. If any failing sidewalks or other barriers are

identified, the District should address these as part of the project. The ADA Office is available for field walks to assist in addressing unique situations.

- Determine whether surveying is needed or if a site visit is adequate to choose appropriate ramp types and determine necessary pay items. In urban areas with multiple surface utilities, buildings, and doorways, surveys will probably be necessary.
- Talk to local agencies/District Traffic staff/bike ped/ADA unit to determine whether pedestrian crossings should be added, removed, or kept in place and to determine if any future pedestrian facilities are planned or if the local government has a pedestrian master plan.
- Ask local agencies if there is a color of truncated dome they would prefer to be installed on the curb ramps and coordinate the replacement of any special surfaces (pavers, colored concrete, etc.). If the local agency wants these features put back, the designer should locate all pavers and heavily jointed walk outside of the Pedestrian Access Route. In lieu of a strong local preference, MnDOT should use non-colored truncated domes for system uniformity, better availability, reduced costs, and better durability because the paint doesn't wear off.
- As a rule, if a sidewalk approaches a trunk highway from a cross street, a curb ramp should be provided that provides access across the trunk highway unless there is a documented safety problem or adequate stopping sight distance cannot be achieved. See Minnesota Statute 169.011 Subd. 20 - Definition of "Crosswalk" <https://www.revisor.leg.state.mn.us/statutes/?id=169.011>
- Select appropriate curb ramp types that are constructible at the chosen quadrant. If standard ramp types will not work at a particular quadrant, then a custom ramp must be designed. Use sample plans as a guide when creating a custom design.
- Sample Plans Level 1: <http://www.dot.state.mn.us/ada/pdf/level1.pdf>
- Sample Plans Level 2: <http://www.dot.state.mn.us/ada/pdf/levels2and3adaintersection.pdf>
- The designer should provide the length and slope of the curb ramp [run] wherever that length is critical to the curb ramp's design. Critical areas may include proposed non-compliant ramps and areas where doorways are being matched.
- When designing parallel ramps and depressed corners with the sidewalk adjacent to the back of curb design ramp slopes at a 5-8 percent grade to minimize the length of curb height tapers from zero to full height curb.
- Typically designers should try to keep the arc length of depressed corner and fan designs to 20 feet or less whenever possible to avoid vehicle overturning.
- When creating Type 2 designs that use radial domes only provide one working point on the TH side of the curb ramp. The reason for this is because radial domes don't come in even arc lengths so it is best to require the contractor to determine the exact length of the curb cut.

- If existing sidewalk width is greater than 7 feet, depressed corners and parallel ramps should not be used. More user/maintenance friendly ramps can often be designed/constructed.
- Limit the amount of V curb in the plans to areas where V curb will certainly be needed or ROW has talked with the adjacent property owner and V curb is the preferred option. V curb is a great tool when needed but grading/sloping is generally the preferred option. Flush/flat areas beyond the sidewalk are more maintenance friendly for snow clearing operations. These same flush/flat areas also allow mobility impaired users an escape route from over turning/errant vehicles on the sidewalk. Contracts provide for a fixed price for extra V curb for construction personnel to use as needed so there is no need to guess where V curb should be utilized in the design process.
- Send plans to the ADA office for review once ramp types have been selected/designed and street crossings have been chosen.
- Truncated domes width is 4' minimum. When designing curb ramps call for the truncated dome width to be 0.5' less than the width of the sidewalk the ramp is serving. For example, a 5' sidewalk should have 4.5' of truncated domes.
- If the project is a mill and overlay extend mill & overlay limits on side streets as necessary to replace the pavement in front of all curb ramps and the crosswalk pavement between the curb ramps.
- As a final check of all the intersections turn on all the files in Microstation: Construction plans, drainage plans, signal plan, utility plan, lighting plan, etc. and check for potential conflicts. Also, it is a good idea to take the proposed designs into the field and look at them to determine what the potential impacts will be during and after construction.
- Document all the decisions made regarding the addition or removal of pedestrian crossings, as well as any areas that do not meet ADA requirements and the actions taken by this project and/or future projects to help improve situations that do not meet ADA requirements. Take pictures of all in place curb ramps and adjacent buildings and keep in project file for a record of the preconstruction condition.

Additional Considerations for Signalized Intersections

- Complete topographic surveys should be obtained at all signalized intersections.
- If crosswalks are moving it is important to know what the loop detector impacts will be, so it is helpful if the surveyor can work with Traffic to determine the location of the loops closest to the existing crosswalk. Considerations should be made for sight lines and locations where vehicles are stopping/anticipated stopping location when proposing crosswalk locations. Confer with the District Traffic office when proposing changes to crosswalk locations.
- The road designer and the signal designer should work together to produce a 20 scale intersection detail showing:

- All signal system components (inplace and proposed) including signal poles, pedestal poles, cabinets, handholes, push button stations, and all surface utilities.
 - Proposed curb ramp construction including truncated domes, ramps, landings, grade breaks, curb heights if applicable
 - The detail should also provide X, Y coordinates for the curb ramp locations, signal poles, pedestals, and push button stations so that these locations can be staked by the surveyor in the field.
- When producing the 20 scale intersection detail, scale down the existing topo symbols so that they fit the sheet and aren't unusually large.
 - If the municipality regularly removes snow from the pedestrian facilities at the intersection, send the proposed design to municipal staff so they can comment on impacts to maintenance. The designer should also send the design to MnDOT Maintenance for their comments. The designer should strive to meet their needs without violating the ADA criteria.
 - There are three proven designs for quadrants with two APS locations:
 1. 2 – 6' wide 4' long perpendicular ramps
 2. Depressed corners
 3. Fans when crosswalks can't be separated and there are elevation concerns

Directional ramps create inherent difficulties and should rarely be used when there are 2 push buttons at a quadrant.

- Some best practices when placing APS push buttons are:
 - Place buttons outside of truck turning radii;
 - Place buttons so that they don't obstruct the sidewalk/trail;
 - Maintain a 6' MAR (Maintenance Access Route) between obstructions;
 - Center the button on the landing;
 - Make use of existing signal poles located in the vicinity if intersection isn't skewed and their locations meet the APS requirements.

Designers should optimize the push button locations to meet all the above criteria working in conjunction with MUTCD push button placement criteria.

- All signal components that are being installed on the job including poles and pedestals as well as push button stations must have XY coordinates provided so that the surveyor can stake their proposed locations in the field.
- When upgrading existing signals to APS and proposing to place a push button on an existing pole, the designer must verify that the push button will meet the height and direction requirements once the new curb ramp is constructed.

- As a final check of all the intersections turn on all the files in Microstation: Construction plans, drainage plans, signal plan, utility plan, lighting plan, etc. and check for potential conflicts. Also, it is a good idea to take the proposed designs into the field and look at them to determine what the potential impacts will be during and after construction.
- Document all the decisions made regarding the addition or removal of pedestrian crossings, as well as any areas that do not meet ADA requirements and the actions taken by this project and/or future projects to help improve situations that do not meet ADA requirements. Take pictures of all in-place curb ramps and adjacent buildings and keep in project file for a record of the preconstruction condition.

SIGNALS

- If project is a standalone signal project (either new or replacement), utilize the design guidance listed above for signalized intersections.
- Visit the intersection to observe how traffic and pedestrians move/interact through the intersection and to see where vehicles commonly stop at the intersection. This is critical to placing crosswalks and APS push buttons in the proper locations. Also watch for pedestrians or evidence of pedestrian activity and note areas where pedestrian activity occurs.
- ~~If there is pedestrian activity at an intersection, install pedestrian crossings. Crossings should connect all existing and proposed pedestrian facilities (sidewalks and trails), all areas with pedestrian generators (i.e., gas stations, multiple residences, other destinations), and existing evidence of pedestrian activity (goat paths, pedestrian observations, push button counts, etc.). Crossings may also be required to provide a pedestrian phase when the vehicle crossing time (usually a pedestrian attempting to cross the main line) is insufficient to meet pedestrian crossing timing needs. If all else is equal and it is deemed only a single main line crossing is appropriate, it is generally preferred to choose the crossing with the least conflicting vehicle movements. The following groups should provide input on crossing location needs: District Traffic Office (Signal designer & TSAM in Metro), Project Manager/Designer, CO ADA, Bike and Ped, Local Agencies.~~
- Connect all existing and proposed pedestrian facilities (i.e. sidewalks and trails); quadrants with pedestrian activity (i.e. goat paths, pedestrian observations, push button counts, shoulder routes, or other identifiers); and existing destinations/generators. Pursue cooperation with LGU/property owner(s) to connect perceived crossings to nowhere. Crossings may also be required to provide a pedestrian phase when the vehicle crossing time is insufficient for a pedestrian to cross a leg. If only a single main line crossing is appropriate, it is generally preferred to choose the crossing with the least conflicting vehicle movements unless ADA-compliance and/or specific destinations/generators should be considered. The following groups should provide input on crossing location needs: District Traffic Office (Signal designer & TSAM in Metro), Project Manager/Designer, CO ADA, Bike and Ped, and Local Agencies.
- If a signal has pedestrian push buttons these buttons need to be readily accessible. On rural roadway sections this can generally be accomplished with a flat landing/pad with truncated domes delineating the edge of the roadway. On urban roadway designs with curb ramps this often means the button placement needs to be coordinated with the ramp design/construction so the buttons are adjacent to a landing that is connected to the PAR. To achieve the best ramp designs and allow for phased accessibility

improvements, push button stations will likely need to be relocated with conduits placed beneath the walk so the push buttons will work in conjunction with the ped ramps. (See Interim APS Policy below)

- Consult the ADA office no later than 30% plans to verify crossing needs and APS potential, and prepare a list of steps taken/information gathered prior to consulting with the ADA office.
- New Signal and Signal Replacement Installations should be sent into the ADA Office a minimum of two years before letting to ensure a successful installation that will meet pedestrian needs for the 30+ years of the signal's life. Potential project needs such as ROW, Agreements, curb locations, and trail alignments among other factors must be considered.
- Note*** Refer to Scoping Section and Meeting Pedestrian Needs. If a Mill and Overlay project cannot meet the pedestrian needs due to problematic signal locations, ROW, or similar obstacles consider moving up signal replacement in the District Program.

Interim APS Policy

- APS installations are required on all pedestrian crossings on new signal system installations, signal system replacements, and major signal system renovations.
- Upgrading to APS is much more cost effective with a Mill & Overlay project versus a stand alone APS upgrade project. This is due to the fact that the curb ramps and any cross walk location modifications are already included in the project budget. In order to strategically complete MnDOT's ADA Transition Plan, all signals that have pedestrian facilities will be upgraded on mill and overlay projects to either full APS or APS "ready" if feasible.
- "APS Ready" is defined as all underground work necessary to upgrade the traffic signal to a fully compliant APS install without redoing the curb ramps or cross walk locations. In urban areas with existing pedestrian facilities this generally means relocating the solid state push buttons to new locations coordinated with the pedestrian ramp upgrades. In rural areas with flat landings this can mean simply ensuring conduits can easily be run to future compliant APS push button stations without regrading/reconstructing the pedestrian ramps.
- If a signal is not being upgraded to APS or APS "ready", the District must document in the Project Memo why APS or APS "ready" improvements are not being included. Some feasibility considerations are the availability of existing spare wires for APS, ability of conduits beneath roadway to accommodate additional wires, compatibility of existing hardware, etc. or the signal is already scheduled for upgrade in the STIP. District Traffic Offices need to make this feasibility assessment for all signals with pedestrian facilities within the project limits. If these upgrades are deemed infeasible on the current signal system and there are significant pedestrian needs, evaluate replacement of the signal in relation to the District's signal replacement plan.

SURVEYS

- During the initial field walk, the designer should determine what the survey needs are for the project.

- All Level 2 & Level 3 Designs should be surveyed. This entails all signalized intersections, as well as any intersections that will require custom designs, such as intersections with multiple buildings, doorways, surface utilities, and other obstructions.
- Any areas with drainage problems or possible curb line movements (horizontal or vertical) will also need to be surveyed. Potential bump out areas and other curb line realignments into the roadway surface should be identified in the field walk and on the survey request so surveys personnel perform a more detailed topo in these critical roadway quadrants in front of the changed C&G. A TIN file generated from field surveys is very beneficial for these areas to ensure drainage is maintained and the proposed curb and gutter will match the in-place roadway surface.
- Surveys should locate: all surface utilities that may be impacted by pedestrian facility construction, including but not limited to handholes, manholes, hydrants, gate valves, drainage structures, signal system components (poles, push button stations, pedestals, cabinets, loop detectors), light poles, telephone/cable boxes, fiber optic vaults, and irrigation/sprinkler heads or services if visible near the sidewalk. Survey shots should be taken on the opposite sides of signal foundations so that the true size/location of the feature is shown in the plan. Also locate: buildings and doorways, other permanent features in or near the sidewalk area such as landscaping, retaining walls, planters, benches, sign posts, etc., existing crosswalk striping, and medians.
- On all sidewalk/curb ramp projects surveys should locate any existing lot corners/property irons that could be disturbed as a result of construction. This has nothing to do with ADA, but it is a courtesy MnDOT should provide to the property owners and future owners/surveyors to restore any existing monumentation that will potentially be obliterated as a result of the project.

DRAINAGE

- Field walk/drive the project after a rain event to determine if any water is ponding in the curb ramp areas. Any ponding issues in front of curb ramps should be remedied as part of the project. Request surveys to profile any areas that are ponding and provide new curb line profiles in the plan. Also call for casting elevation adjustments as necessary.
- If catch basin grates are located in the pedestrian access route, the grate needs to be replaced with an ADA compliant grate, or the structure needs to be relocated. Ideally the structures would be located 5-10 feet outside the pedestrian access route, but if this is not feasible a special grate that meets ADA requirements may be used. PROWAG section R302.7 states the requirements for a compliant grate. The horizontal openings shall not permit the passage of a sphere more than 0.5" in diameter and the elongated openings shall be placed so that the long dimension is perpendicular to the dominant direction of travel.
- In new construction, if curb flowlines are designed so that water is intended to flow around the curb radius and continue down the street, it is recommended that a structure be placed on the upstream side of the curb ramps to keep water and debris from flowing across curb ramps.
- Determine drainage impacts created by any proposed curb line movements. Curb bump-outs and radius reductions are often part of ADA upgrades, and drainage will have to be addressed as part of these

modifications. When curb lines are changing, the designer must provide both a horizontal alignment and a vertical profile. The designer shall also verify the proposed curb lines will match the in-place road elevations.

- Curb Box removals may be needed to properly construct curb ramps. Curb box removal is OK for structures on grade. At sag points analyze whether curb box is needed early in design process and if it is needed expand the scope of the project to relocate the drainage structure.
- Add flow arrows to intersection details on Level 2 & Level 3 designs so construction knows which way water is flowing.
- Installing curb and gutter through the new curb ramp area is preferred to provide better drainage and a longer lasting product. In overlaid gutter areas, this entails pouring new concrete curb and gutter to match into existing bituminous flowlines. The only place curb and gutter should not be installed is rural roadway sections with no adjacent curb and gutter. In rural areas where we are not installing curb and gutter call for the truncated domes to be placed 1 foot back from the edge of the roadway to provide an adequate contrasting concrete border in front of the truncated domes as shown in a detail on the curb ramp standard plans.

MATERIALS

- If curb ramps are not part of a mill and overlay project, some sort of pavement treatment must be called for in front of the curb and gutter. Typically the gutter inslope will be reduced at the curb ramps which will result in the gutter face being lowered $\frac{1}{4}$ " to $\frac{3}{4}$ ". Thus a new pavement treatment must be provided in front of the curb and gutter to tie the new gutter face into the existing pavement.
 - If the pavement is concrete, the designer should work with the District materials office, concrete office, and CO ADA to determine an appropriate design.
 - If the pavement is bituminous, three different treatment options exist:
 1. If the pavement is in good condition, the designer should call for a 2' wide 2" deep mill and patch.
 2. If the pavement is in poor condition, the designer should call for full depth removal of the bituminous pavement 2' beyond the curb line using a radial sawcut. The patch can consist of either:
 - a. Full depth bituminous or
 - b. Concrete poured up to a height 2" below finish grade, with a bituminous patch placed over the concrete. The designer should work with the materials engineer to determine a mix design that is locally available and meets the ESAL requirements of the roadway. Specify the design mix in the plan SEQ or soils and construction notes.
- The Project Engineer should work with Materials and Design to determine the appropriate pavement treatments associated with curb ramp work on mill and overlay projects. The ADA Office recommends making any bituminous removal and patching necessary to properly construct curb and gutter and provide TPAR on mill and overlay projects incidental unless there are multiple curb line changes which require removal of large areas of pavement.

UTILITIES

For stand-alone ADA improvement projects:

- Perform Gopher State One Call as specified in the MnDOT utility identification process to determine what utilities are within the project limits and the owners of any impacted utilities.
- The designer should identify all the surface utility impacts during the field walk and include adjustments in the plan.
 - For non-MnDOT owned utilities, the designer must contact all of the utility owners to verify location and ownership and to determine what, if any, impacts the project will have on their facilities. The designer should verify whether the relocation of impacted utilities qualifies for reimbursement or if the relocation cost is the responsibility of the utility owner. Contact the Utility Agreements Unit for questions regarding utility reimbursement. If the utility does qualify for reimbursement, a utility relocation agreement may be required.
 - For impacted utilities, the designer should confer with the utility owner to determine if an adjustment can be included in the plan to be performed by MnDOT's contractor or if the utility owner needs to adjust the utility facility themselves.
- For impacted municipal utilities which would not qualify for reimbursement:
 - If a cooperative agreement with the municipality is required, the cost of the utility adjustments will be incorporated into that agreement.
 - If no cooperative agreement will be executed, the utility work can be incorporated into the project provided the cost of all work on the project for the municipality is less than \$5,000. If the cost is more than \$5,000 a utility relocation agreement will be required.
- For impacted private utilities, any work incorporated into the project requires a utility relocation agreement.
- Utilities that cannot be adjusted/relocated by the Contractor should be addressed using the steps for utility adjustment/relocation in MnDOT's Utility Process.
 - If the project will not affect ANY utilities, the designer includes the following in the plan:
 - The utility quality level note
 - A note stating, "The following utility owners have facilities within the limits of the project but will not be affected by construction"
 - A list of the utility owners with facilities in the project limits.
 - If there are any utility facilities within the project limits that are not affected and do not show up on the plan sheets, the designer also includes a note stating, "The following utility owners have facilities within the limits of the project but will not be affected by construction" and a list of those utility owners.
 - If the project will affect utilities, the designer includes the following in the plan:
 - The utility quality level note

- All impacted utilities shall be shown in the plan and/or be accounted for in the tabs or appropriate notes on the plan sheets. If there are any excavation areas in the project greater than 1 foot in depth or any signal work, the utilities in the excavation area and at the signalized intersections shall be shown in the plan.
 - A note indicating if any transmission lines are 69kV or more
 - If the utility identification was done more than 90 days prior to letting, another utility verification will be required per Minnesota Statutes.
- For projects in which the ADA improvements are included in a larger project, the standard utility coordination and plan requirements will be followed, but curb ramp construction areas would not require showing underground utilities in those areas or tabulation of any unaffected utilities because curb ramp construction should have a minimal impact on underground utilities and the contractor will still be required to use Gopher One Call.

RIGHT OF WAY

- If the existing sidewalk footprint is insufficient to meet the proposed design, verify ROW limits to see if MnDOT owns any ROW beyond the edge of sidewalk.
- If ROW is not known and cannot be determined, follow the streamlined ROW process to acquire 5' of temporary easement based off the edge of the existing sidewalk. Link to streamlined ROW process: <http://www.dot.state.mn.us/ada/pdf/streamlinedacquisitionprocess.pdf>
- There will be cases where a compliant curb ramp cannot be constructed within the available ROW. If this is the case, these curb ramps should be placed in a project where the timeline allows for the purchase of permanent ROW.
- In areas where V curb is proposed due to the lowering of the sidewalk elevation, ROW should consult with the adjacent property owner to inform them of the V curb option and discuss sloping their adjacent property as an alternate. Any agreements made with the property owner affecting the proposed construction should be relayed to the designer in order to incorporate the work in to the plans.
- Obtain Commissioner's Orders as needed to complete work that falls within local ROW
- For Level 1 plans that use details rather than site specific designs, a note should be include in the plan stating the temporary easement limits so that the contractor is aware of the working limits.

TRAFFIC CONTROL/TEMPORARY PEDESTRIAN ACCESS ROUTES

- The traffic engineer and project staff should look at the pedestrian needs on the project and put a concept of how to accommodate the need in the plans.
- Some options to consider are: A) Making use of a roadway lane, shoulder, or parking area if available, B) Crossing peds to the other side of the street and then crossing them back, C) Providing a reasonable detour. If providing a detour a route must be identified in the plans and coordinated with the local road authority.

- When TPAR is not practical pinch the staging timelines to a defined period of time so that pedestrian facilities are interrupted for as little time as possible or constrain work to defined areas. (Get work done quickly in these constrained areas or break project up into phases based on existing pedestrian networks).
- The Project Engineer should work with Materials and Design to determine the appropriate pavement treatments associated with curb ramp work on mill and overlay projects. The ADA Office recommends making any bituminous removal and patching necessary to properly construct curb and gutter and provide TPAR on mill and overlay projects incidental unless there are multiple curb line changes which require removal of large areas of pavement.
- See Office of Traffic, Safety, and Technology website for more information:
<http://www.dot.state.mn.us/trafficeng/workzone/tpar.html>

SIGNING/STRIPING

- Always try to place signs outside of the sidewalk and curb ramp areas. If signs must be placed in the sidewalk area, place them as close to the edge of the sidewalk as possible and try to line them up with other obstructions such as light poles, fire hydrants, power poles, etc.
- Crosswalks should be striped so that they line up with the new curb ramps. The designer should try to design crosswalks which run in a straight line across the entire roadway and are not kinked. If a crosswalk has a kink in it, the kink must point away from the intersection and occur at a median refuge to allow visually impaired users to realign their path of travel.
- If a problem is identified or anticipated with vehicles stopping on the crosswalks a stop bar should be added and possibly a “Stop Here On Red” sign.
- There has been an overuse of the “No Ped Crossing” sign. It should not be used in default of not providing a crossing. It should only be used where crossings are deemed unsafe.

PORK CHOP ISLANDS

- Pork chop channelization islands typically require complete reconstruction to achieve ADA compliance unless they are so large that 3 independent ramps can be constructed.
- To properly design pork chop islands, surveys should shoot the gutter flowlines around the island as well as any utilities/signal components and signs located in the island and the roadway surface surrounding the island.
- If the entire island is being rebuilt, it should be rebuilt using 4” curb to help lessen the amount of grade the curb ramp needs to make up. In some cases it may be necessary to have inverse ramp grades to achieve compliant curb ramps in an island.
- Use of output gutter may be needed to achieve compliant curb ramp designs.

- The designer should also analyze the turning movements around the island and increase the size of the island if possible rather than having at grade cut-through ramps in the island. Redesigning islands may seem like a substantial amount of work, but it is one of the best places to spend time to provide a design that is a better pedestrian facility and is also maintenance friendly for snow clearing on the island.
- As an alternative to at grade cut-throughs, rise to the mid height of the curb with a 2.5' to 3' ramp and taper up to the curb height on the sides of the ramp.
- The minimum PAR width in islands is 5 feet.

MEDIANS

- The location of the crosswalk, width of the median, and the section of roadway (urban vs. rural), are the three factors that will determine the design of the pedestrian crossing at a median. If a median is impacting a pedestrian crossing, the plan should show how this impact is being mitigated.
- To properly design urban medians, surveys should shoot the gutter flowlines around the median as well as any utilities/signal components and signs located in the island.
- If the median is 6' wide from back of curb to back of curb, or wider at the crosswalk, it is considered a refuge for pedestrians and truncated domes should be installed. Also, if it is a signalized intersection, a push button should be installed in the median of the major crossings if recommended by District Traffic Office.
- If the crosswalk is located in front of or nearly in front of the median, the median nose should be pulled back to the point where the front of the snowplow nose is at the edge of the crosswalk.
- If the crosswalk runs through the median, the width of the median and section of roadway will determine the pedestrian ramp design.
- Rural Medians – If the median is 6' wide or wider, then the typical treatment is to construct a concrete pad 6' wide truncated domes at the crosswalks placed in a directional manner. In some cases this may require partially cutting into the existing pavement to construct the pad.
- Truck turning movements should be run in order to design the truncated domes in the median to keep trucks from turning over them.
- Urban Medians - If the median is less than 9' in width, then the design will likely be an at-grade cut-through between the flowlines with 1:4 tapers on each side of the PAR. The width of the PAR in medians must be 5' minimum, but 6' is more sensible to match the width of the crosswalk. If the median width is 10' or greater, then curb ramps can be installed with 4' of landing between them. Any remaining grade that cannot be made due to the limitations of curb ramp slope should be made up with 1:4 curb/side tapers. This recommendation assumes flowline elevations are the same on both sides of the median. Actual site elevations will determine the best design and whether or not a landing is achievable.

CONSTRUCTION

- 1803 – (Prosecution of Work) Special Provision along with concrete walk and curb and gutter special provisions spell out what the critical elements are when constructing curb ramps. 1803 also states the responsibilities of the Contractor and the Engineer when constructing curb ramps and signals. This is a collaborative effort. The contractor constructs the project according to the plans and specs and MnDOT verifies the construction meets the plans and specs and is ready and available to help the contractor deal with varying site conditions.
- At a minimum, one inspector should have a smart level for conducting compliance checks and checking grades. A laser or eye level can also be a handy tool for determining elevation differences if available.
- Projects with ADA improvements should be staffed appropriately. It can be taxing to expect one person to handle all the layout issues and questions, while at the same time being responsible for materials testing, inspecting traffic control, quantities tracking, and conducting daily compliance checks. This becomes even more onerous when the project is spread out and the contractor is working multiple crews.
- When problems/questions arise consult with the project designer and the ADA office. Don't feel pressured to make an immediate decision.
- Compliance checks should be performed daily after every concrete pour to ensure the contractor is constructing the facilities properly. Provide constant feedback to the contractor about how they're doing, whether it's good or bad. We will be buying the product so we want to make sure it's right. Turn in the compliance checklists to the ADA office once the job is complete.
- Pay items have been combined so the inspectors can spend less time "bean counting" and more time ensuring that the contractor is producing a quality product.
- Mill and overlay projects should be staged with the curb ramps as an initial separate construction phase.
- Contract time is a very important component of these projects. Either too much or too little time can have detrimental effects on staffing and quality. If there's any questions or concerns contact OCIC and/or ADA unit.
- The Project Engineer should work with Materials and Design to determine the appropriate pavement treatments associated with curb ramp work on mill and overlay projects. The ADA Office recommends making any bituminous removal and patching necessary to properly construct curb and gutter and provide TPAR on mill and overlay projects incidental unless there are multiple curb line changes which require removal of large areas of pavement.

TRAILS/PEDESTRIAN FACILITIES

- The maximum allowable profile grade (longitudinal slope) for pedestrian trails that are not adjacent to a road is 5.0%. If adverse impacts to the surrounding landscape require the facility to exceed a 5.0% grade then the design should mitigate the situation by reducing the cross slope of these areas to 0.5% and provide 5' X 5' resting areas on the uphill side of the trail at 200 feet intervals. See the following

document for additional guidance:

<http://www.fhwa.dot.gov/environment/sidewalk2/pdf/15chapter14.pdf>

- Design the cross slope of all pedestrian facilities at 1.5%.
- Avoid placing sidewalks and trails immediately adjacent to the back of curb. Maintaining a 4-6 feet boulevard between the back of curb and the sidewalk has multiple benefits. It improves trail user safety due to separation from vehicular traffic, it allows for better driveway designs, it allows for better curb ramp designs at intersections, and minimizes the changes in direction of the pedestrian access route (PAR), which allows users to travel in a straight line.
- The width of typical shared-use trails typically does not allow a standard curb ramp design, therefore a modified one-way directional ramp design must be used that places the truncated domes at the back of curb.
- Typically, truncated domes and curb cuts should be the full width of the shared use trail. However, this may not always be true at signalized intersections with multiple crossings and APS push buttons.
- At signalized intersections, plan sheets should follow the Plan Level 2 format and trails should be typically be aligned so that they come into the curb line behind the pedestrian push buttons if possible. In certain cases it may be necessary for the push buttons to encroach into the trail to meet push button location requirements. Push buttons may encroach 1 foot into an 8 feet wide trail and 2 feet into a 10 feet wide trail in order to meet ADA compliance.
- To design curb ramps for trails that are not at signalized intersections, the construction plan should show the locations of the truncated domes, grade breaks, and hatched landing locations.

PAY ITEM GUIDANCE

- Remove and Replace Bituminous Pavement pay item should not be used for BOC pavements. Use either the Mill and Patch Bituminous Pavement pay item or traditional pay items.
- All pay items should be tabulated independently for each quadrant. Note: if radial truncated domes are needed, the proposed radius and quantity must be provided for each quadrant. Include a note in the plan: "Sawcuts shall be provided at all curb and gutter and sidewalk removal limits and all sawcutting of curb and gutter and sidewalks is incidental."
- It is possible that some projects will have items which are incidental for curb ramp work and paid for when being used on another part of the project. For example, aggregate base will be incidental for curb ramps but still paid when being used for a pipe replacement. Another example would be in some cases patching material in front of curb ramps may be incidental while patching material for roadway patching would be paid for with a pay item.
- In areas where curb lines are changing and large sections of the road will need to be removed, traditional pavement removal and patching items should be used.

- Link to Pay Item Example Projects: <http://www.dot.state.mn.us/ada/pdf/adaprojectpayitemexamples.pdf>
- Link to Special Provisions for ADA Pay Items: (Note: Use SP2005 Book when preparing project proposals)
<http://www.dot.state.mn.us/ada/pdf/specialprovisionsadapayitems.pdf>

Standalone Signal Projects/ADA Retrofits

- 1) Remove Curb and Gutter – Indicate sawcuts are incidental with a note in the SEQ.
(2104.501 Remove Curb and Gutter – LIN FT)
- 2) Remove Concrete Walk – Indicate sawcuts are incidental with a note in the SEQ.
(2104.503 Remove Concrete Walk – SQ FT)
- 3) Mill and Patch Bituminous Pavement – Use for bituminous pavements in good condition.
(2232.603 Mill and Patch Bituminous Pavement – LIN FT)
- 4) Remove and Replace Bituminous Pavement – Use for bituminous pavements in poor condition.
(2104.603 Remove and Replace Bituminous Pavement – LIN FT)
- 5) Concrete Curb and Gutter
(2531.603 Concrete Curb & Gutter – LIN FT)
- 6) Concrete Walk
(2521.618 Concrete Walk – SQ FT)
- 7) Truncated Domes
(2531.618 Truncated Domes – SQ FT)
- 8) Concrete Curb Design V
(2531.603 Concrete Curb Design V – LIN FT)
- 9) Turf Establishment and Grading
(2575.602 Site Restoration – EACH)
 - The Designer should provide grading quantities for all borrow material expected to be over 8 CY (CV) at a quadrant.
 - If the borrow quantity measured in the field is greater than 8 CY (CV) at any particular quadrant and that quantity is not specifically provided for in the plan, the contractor will receive a fixed price for all borrow in that quadrant.
 - Use 2106 specifications and pay items when paying for grading on curb ramp projects.
 - Excavation/borrow quantities that are expected to be less than 8 CY (CV) at a quadrant are incidental unless specifically provided for in the plan.

Mill & Overlay with Curb Ramps

- 1) Remove Curb and Gutter – Indicate sawcuts are incidental with a note in the SEQ.
(2104.501 Remove Curb and Gutter – LIN FT)
- 2) Remove Concrete Walk – Indicate sawcuts are incidental with a note in the SEQ.
(2104.503 Remove Concrete Walk – SQ FT)
- 3) Concrete Curb and Gutter
(2531.603 Concrete Curb & Gutter – LIN FT)
- 4) Concrete Walk
(2521.618 Concrete Walk – SQ FT)
- 5) Truncated Domes
(2531.618 Truncated Domes – SQ FT)

- 6) Concrete Curb Design V
(2531.603 Concrete Curb Design V – LIN FT)
- 7) Turf Establishment and Grading
(2575.602 Site Restoration – EACH)

Large Grading/Regrading Projects and /or Projects with Large Quantities of Sidewalk

- 1) Use Specific Curb and Gutter types B624, etc.....ADA Standard Plan sheets will be included in all plans.
- 2) Truncated Domes
- 3) 4" Concrete Walk for the sidewalks and 6" Concrete Walk in curb ramp areas
- 4) Concrete Curb Design V (2531.603 Concrete Curb Design V – LIN FT)