EXCAVATION PROCEDURE CHECKLIST

1  NOTIFY City Engineering of Proposed Excavation
   Drawings required if more than spot excavation. Drawing to include full detailed plan of
   proposed work, scope, dimensions, other utilities in the proposed work area. Review of
   drawings may take up to two weeks.

2  Submit Certificate of Insurance meeting City Insurance Requirements and submit Consent
   Decree if required

3  One-Call locations complete -. A joint meet, after all locates complete, with all utilities affected
   may be required prior to the start of any work or permit issuance.

4  Private utility locations

5  Information to affected property owners to include company name, reason for work, contact
   name/number. This can be done via mailings, door tags/fliers. Must be distributed prior to the
   start of any work and a copy given to the Office of City Engineering.

6  Permission must be obtained from abutting property owner to set equipment, pedestals, vaults
   in front of their properties. All amenities must be clearly identified of who is the provider of
   equipment and contact number.

7  Permission must be obtained from abutting owner for contractor to work in/from/on a private
   property.

8  Obtain permit from any other federal, state or local agencies where applicable or required; i.e. IDOT, Railroads, DNR.

9  OBTAIN PERMIT – City Hall or on site - project specific – Contractor doing the actual
   excavating MUST have insurance filed with the City meeting required coverage PRIOR to the
   start of any work.

10 Insure proper barricading and traffic control per MUTCD.

11 "Do Not Close" street without permission from City Engineer

12 Notify Police Department, Fire Department and Dubuque Community School District of street
   closure

13 Submit results of Standard Proctor Density for approved backfill material to be used

14 Use proper backfilling & compaction procedures

15 Install erosion control devices, i.e. filter socks, silt fence, etc.

16 Concrete replacements must meet dowel and joint standards

17 Saw back all excavations at least 6" where paved or as indicated by City Engineer; if there are
   more than one excavation or a series of continuous excavations there must at least 10' feet
   between the excavations; streets require a minimum 4' width of surface restoration in paved
   areas; if undermining is observed by the inspector, additional areas may be required for sawing,
   removal, compaction and resurfacing to match existing.
Street or alley replacement must match existing paving subject to minimum requirements.

Inform Engineering Inspector of who will be performing surface replacement and completion time of final surfacing. The excavation contractor will be liable for completion of all finish surfaces.

Permit holder is liable for all backfill, construction, pavement restoration for five (5) years.

Non compliance with any of the above may result in project shut-downs.

Date: March 26, 2012
PURPOSE: The purpose of this policy is to establish consistent standards and procedures for the excavation, backfill, maintenance and administration of work performed in the public right-of-way to protect the health, safety and welfare of those working and traveling the rights-of-way.

DEFINITIONS:

Certified Competent Person for Excavation Safety
A competent person is defined as one who is capable of identifying existing or predictable hazards in the surroundings or working conditions which are hazardous to employees, and who has authorization to take prompt corrective measures to eliminate them. When applied to trenching or excavation operations, the “Competent Person” must have specific training in, and be knowledgeable about, soil analysis, the use of protective systems, and the requirements of OSHA standards. In addition, the “Competent Person” must have the authority to take immediate action if a hazard exists.

Closure
A temporary prohibition of traffic across public right-of-way.

Excavation
Excavation means an operation in which a structure or earth, rock, or other material in or on the ground is moved, removed, or compressed, or otherwise displaced by means of any tools, equipment or explosives and includes, but is not limited to grading, trenching, tiling, digging, ditching, drilling, augering, tunneling, scraping, cable or pipe plowing, driving, and demolition of structures.

HMA
Hot Mix Asphalt

MUTCD
Manual on Uniform Traffic Control Devices

NATIVE PAVING BRICK
Brick removed from the excavated area, salvaged for the restoration.

OSHA
Occupational Safety & Health Administration

Right-of-Way
Area shown on the official plat which is dedicated for use by the public. This may include but not be limited to any street, alley, park lawn area, sidewalk, easement, lot or parcel.

SUDAS
Statewide Urban Design & Specifications
SECTION I. REQUEST FOR EXCAVATION PERMIT

1.1 No person, company or corporation shall make any excavation, cut into or remove any portion of the public right-of-way, or improvements thereon, which includes streets, pavement, curbs, alleys, sidewalks, park lawn areas, retaining walls or public place, without first obtaining a permit from the Engineering Department. The permit holder shall be responsible for compliance with this policy, SUDAS, as well as all City Ordinances, with special attention to Title 10, Chapter 2 Excavations, all applicable City of Dubuque SUDAS 2014 Supplemental Specifications, City of Dubuque Street Tree & Landscaping Policy, and Erosion Control Policy & Illicit Discharge Ordinance.

1.2 Request for permit shall be filed at the Office of the City Engineer, City Hall, 50 W. 13th, Dubuque, between the hours of 8:00 a.m. and 5:00 p.m., Monday through Friday, at (563) 589-4270 and shall be filed at least 48 hours in advance of the anticipated start of construction. Notification information must indicate the location and estimated dimension of the proposed excavation, permit holder name and address, purpose of excavation, owner of property for which work is being performed, time and date the excavation will be initiated, traffic controls, and such other information as the City Manager shall require to determine whether a permit should be issued. Notification to the City by the excavator DOES NOT authorize approval or permit any work to be performed in the public right-of-way. City Engineering will notify the requesting party when all pertinent information has been received and reviewed as to the status of approval. Permit and approval is site specific and does not carry over to any associated projects, phases or work.

1.3 Projects that are not at one specific location, but are larger in scope, must be submitted a minimum two weeks (2) in advance to allow for proper review and investigation.

1.4 IOWA ONE CALL: The Iowa Underground Utility Facilities Damage Prevention Act, Chapter 480, Iowa Code is made a part of this policy. The law requires persons excavating to contact the one call system at least 48 hours prior to any excavation. Iowa One Call contact is 1-800-292-8989 or 811. Common Ground Alliance Best Practices are supported and recommended as part of this policy.

1.5 City of Dubuque Code of Ordinance Section 6-5-1(G) states: Pile Drivers, Hammers: The operation of any pile driver, pneumatic hammer, derrick, power hoist or other construction equipment, except between the hours of eight o’clock (8:00) A.M. and six o’clock (6:00) P.M., Monday through Friday, and nine o’clock (9:00) A.M. and six o’clock (6:00) P.M., Saturday and Sunday, and when so permitted, only if equipped with an effective muffling device.

1.6 No work shall commence until the permit has been authorized by the Engineering Department and Iowa One Call and all utilities have been marked or have notified the permit holder. The permit will be valid only for the location, date and time specified. The permit holder shall give at least 48 hours notice prior to the start of any excavation activity, along with a tentative schedule for backfilling operations and pavement replacements to allow sufficient time for the City to schedule compaction testing, inspect the excavation prior to, and for, pavement replacement for conformance to City specifications.

1.7 If an emergency excavation is necessary after normal working hours, the permit holder shall notify Police Dispatch (563) 589-4415 and give the location and nature of the emergency prior to starting work. The excavator must contact the Engineering Department by noon on the next business day to apply for the required permit.
1.8 FAILURE TO OBTAIN PROPER PERMITS or comply with provisions of this policy may result in double permit charges plus removal from the approved excavation contractor list; and could lead to the issuance of a municipal infraction with a $750 charge per day in accordance with City of Dubuque Code of Ordinances Section 10-2-1 Permit Requirements and Section 1-4-2 Civil Penalty.

1.9 FAILURE TO COMPLETE WORK, may result in the City, after written notice to the permit holder, and no response from the permit holder, performing the necessary work to complete the excavation, including surface restoration, and assessing all costs associated to the permit holder in accordance with City of Dubuque Code of Ordinances Section 10-2-1 Permit Requirements.

SECTION 2. INSURANCE/SECURITIES

2.1 No permit will be issued to any person, company or corporation without an approved policy of insurance that complies with the current City of Dubuque Insurance Schedule. Proper insurance is required for contractors performing work in the public right-of-way. This includes but is not limited to excavators, plumbers, electricians, surface restoration, drillers, directional boring or trenching contractors. Any other insurance required by federal, state or local agencies are the responsibility of the contractor, unless otherwise indicated by the City Engineer.

2.2 A Certificate of Insurance must be updated, renewed and submitted each year. For more information contact the City of Dubuque Finance Department, Finance Director, at (563) 589-4130, or the City of Dubuque Engineering Department, Project Manager, (563) 589-4270. Contractors undertaking work on behalf of the City must comply with the federal Consent Decree, a copy of which can be found at on the City’s website.

SECTION 3. PERMIT FEE

3.1 The permit holder shall be responsible for the payment of the permit fee and any pavement restoration fees if the Public Works Department performs the final street patch. These fees are subject to change depending upon the City’s cost of providing the service.

3.2 Current Excavation Permit and Street Division fees are as follows:

<table>
<thead>
<tr>
<th>INSPECTION PERMIT FEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>RATE: $0.75/S.F.</td>
</tr>
<tr>
<td>MINIMUM: $50.00</td>
</tr>
<tr>
<td>MAXIMUM: $1,000.00</td>
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</tbody>
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<table>
<thead>
<tr>
<th>SURFACE &amp; PUBLIC WORKS DEPT. RESTORATION FEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMA $0.75/S.F. plus $6.55/S.F.*</td>
</tr>
<tr>
<td>HMA OVER CONCRETE $0.75/S.F. plus $8.55/S.F.*</td>
</tr>
<tr>
<td>CONCRETE $0.75/S.F. plus $8.00/S.F.*</td>
</tr>
<tr>
<td>BRICK $0.75/S.F. plus $12.00/S.F.*</td>
</tr>
</tbody>
</table>

*(Add’t Traffic Control $ may be added)

<table>
<thead>
<tr>
<th>DIRECTIONAL BORING/TRENCHING</th>
</tr>
</thead>
<tbody>
<tr>
<td>RATE: $0.75/S.F. entrance/exit excavation areas + $0.50/L.F. trench/boring</td>
</tr>
<tr>
<td>CORING: $50.00 per core</td>
</tr>
<tr>
<td>MINIMUM: $50.00</td>
</tr>
<tr>
<td>MAXIMUM: $1,000 + entrance/exit excavation areas</td>
</tr>
</tbody>
</table>

Record Drawings Required (Autocad Compatible; pdf or as-built paper copy)
SECTION 4. DAMAGE TO UTILITIES; EMERGENCY RESPONSE

4.1 If a hazardous damage occurs:
   • Call 911 immediately,
   • Contact the utility company whose property has been hit.
   • Any person excavating and causing damage to any underground utility may be charged with a municipal infraction or face a civil penalty, from either the City of Dubuque or the Iowa Attorney General's Office.

SECTION 5. CONSTRUCTION NOTES AND REQUIREMENTS

5.1 Reference and compliance is required of, but not limited to, City Code of Ordinance Title 10, Chapter 2, Excavations, SUDAS, and all applicable City of Dubuque SUDAS 2014 Supplemental Specifications, City of Dubuque Street Tree & Landscaping Policy, and Erosion Control Policy & Illicit Discharge Ordinance.

5.2 The permit holder shall adhere to all rules and regulations of OSHA.

5.2.1 The Permit holder will be required to have a Certified Competent Person For Excavation Safety available to make sure that all trenching and excavations are performed in a safe manner when working within the City rights-of-way.

5.2.2 City staff is required by City of Dubuque Administrative Policy 5.03, relative to observation of a potential OSHA excavation safety violation, to advise the permit holder's representative at the site that a city employee is required to report such observations to the City inspector's supervisor for possible further action.

5.3 The methods, equipment and tools used shall produce a satisfactory quality of work to comply with SUDAS and the City of Dubuque SUDAS 2014 Supplemental Specifications and shall be adequate to maintain the schedule of progress specified in the permit. The City Engineer may require the permit holder to demonstrate that the permit holder has sufficient equipment and manpower available to perform the work.

5.4 If over one (1) acre is disturbed during any activity (including stockpile areas) a general permit through Department of Natural Resources along with the City's Erosion & Sediment Control Permit (ESC) shall be required. For other instances, the City of Dubuque Illicit Discharge ordinance states that material storage is to be placed and protected in such a manner as to not be washed or run off into the street, drainage ditch, or any part of a stormwater system. No concrete material or any other non-stormwater substance is to be washed into any part of the stormwater system. Protection of the stormwater system is required and the method must follow best management practices. Penalty and fines will be levied for such violations as provided in the Illicit Discharge Ordinance.

5.5 HMA surface replacement larger than a 9 sq. ft. of area shall have the base course compacted with a plate compactor. The final course shall be rolled with an HMA roller with the minimum centrifugal force of 5,500 pounds per drum. Areas larger than 500 s.f. the HMA shall be placed with a paver.

5.6 The permit holder shall notify IOWA ONE CALL and all utility companies and other parties affected by the work, and shall be wholly responsible for damage to adjacent utilities and other public or private property. Door tags or letter notifications with all pertinent information must be placed at all affected properties.
5.7 The permit holder shall comply with all applicable laws, rules, regulations and ordinances governing safety, health, pollution and sanitation, and shall make available such additional safeguards, safety devices, protective equipment, and take such actions as are reasonably necessary to protect the life and health of the permit holder’s employees and the public.

5.8 When more than one excavation or a series of continuous excavations is required to complete the project within a City block, there must be at least 10’ feet between the excavations, without undermining, or a continuous cut will be required unless otherwise approved by the City Engineer. City Engineer may require re-sawing of any existing pavement prior to any new pavement replacement.

5.9 Paved areas require a minimum 4’ width of surface restoration. If undermining is observed by the inspector, additional areas may be required for sawing, removal, compaction and resurfacing. All excavations must be squared or cut to follow the permanent restoration requirements.

5.10 Material for backfilling shall be approved by the City Engineer prior to backfill operations. See Section 6 - Backfilling

5.11 Concrete pavement street excavation surface replacements are covered in Section 9 – Permanent Restoration.

5.12 Core drilling (potholing) for utility locations are permitted only after approval of the City Engineer. Restoration of core holes shall be in accordance with current publications of SUDAS and any applicable City of Dubuque SUDAS 2014 Supplemental Specifications. When more than one core is required, a continuous cut with a minimum of 3’ x 3’ will be required if in asphalt, possibly full slab replacement if in concrete, or a charge per each location, unless otherwise approved by the City Engineer.

SECTION 6. TRAFFIC/PEDESTRIANS

6.1 All traffic control must be provided by the permit holder and comply with the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD). The City Engineer must approve any special and unique traffic control prior to issuance of a permit.

6.2 Under no circumstances may a street or alleyway be closed either partially or completely, without prior approval of the City Engineer. The permit holder shall be responsible for notifications of the closing to the Police (563) 589-589-4415; Fire Department (563) 589-4160 and Dubuque Community School District (563) 552-3275. The City Engineer may require that closures of streets and public rights-of-way have an approved marked detour route to minimize disruption to normal traffic flow. On main thoroughfares, there shall be at all times sufficient traffic lanes open to permit a substantially normal traffic flow; otherwise the work shall be confined to the hours between nine o’clock (9:00) a.m. and four o’clock (4:00) p.m. or between twelve o’clock (12:00) midnight and seven o’clock (7:00) a.m. In the event the work is of an emergency nature, the city manager may authorize work during other hours under such conditions as the city manager shall determine appropriate. On arterial and collector streets, no restrictions of traffic flow will be allowed from 6:00 a.m. to 9:00 a.m. or from 3:00 p.m. to 6:00 p.m. without the prior approval of the City Engineer.

6.3 The permit holder shall perform the work with as little interference with the normal traffic flow as possible, and two-way traffic shall be maintained wherever possible. Temporary “No Parking” signs are available from the Engineering Department when a parking area is required for the channelization of traffic or if the excavation is located in the parking area. Only “No Parking”
signs, which have been signed and dated by a representative of the Engineering Department, shall be used for such purpose.

6.4 "No Parking" signs shall not be used for the purpose of reserving parking for the permit holder's vehicles or equipment. Any vehicle parked in an area posted as "No Parking" may be cited.

6.5 If deemed necessary by the City Engineer, a "Reserved Parking" sign(s) may be issued to allow the permit holder to park equipment vehicles and/or equipment on the street. The "Reserved Parking" sign(s) must be signed and dated by a representative of the Engineering Department.

6.6 Required signs must be posted 48 hours prior to commencement of any work.

6.7 Any parking meters that are taken out of service must be coordinated and paid for by the permit holder. Contact the City of Dubuque Parking Division, Locust Street Ramp, 830 Bluff Street, or (563) 589-4266, or go to the City's website, www.cityofdubuque.org.

6.8 The permit holder is responsible for placing and maintaining proper barricades, warning signs, lights, and traffic cones so as to protect the public from injury or damage as a result of the excavation.

6.9 City Engineer may require additional traffic control measures if traffic conditions warrant the extra protection. Certified flagmen are mandatory at intersections where equipment is intermittently blocking a traffic lane of an arterial or collector street, or where only one lane is available for two directions of travel on an arterial or collector street.

6.10 Any signage removed or damaged before or during the performance of any work must be replaced at the end of the project. Care must be taken for accurate markings of sign locations when removal is needed, care of condition of post and sign, and immediate replacement at works end. Any signage related to traffic movement must remain or have temporary placements during performance of any work, with permanent replacement at the end of the work performance.

6.11 Any pavement markings eliminated or damaged before or during the performance of any work must be replaced at the end of the project. Any pavement markings related to traffic movement must remain or have temporary measures in place during the performance of any work, with all permanent replacement at the end of the work performance.

6.12 Spoil and material piles shall not infringe on the remaining travel lanes or visibility triangles and if placed on the street, shall be placed on the approaching traffic side of the excavation.

6.13 All excavations are to be backfilled by the end of each working day, if possible. In the event that an excavation must remain open, steel plates may be required to cover the excavation, at the discretion of the City Engineer. The plates shall be of sufficient strength to accommodate all traffic loads. An overlap to undisturbed area should be maintained. Intersections will be required to be plated or temporarily backfilled. Unless approved by the City Engineer in writing, no excavation shall be left open during the weekend. If steel plates are not utilized, temporary fill shall be placed to street grade and barricading is required. Orange safety fence or other similar fence firmly anchored and barricaded shall be required to surround the excavation.

6.14 Accessibility Considerations - When existing pedestrian and/or bike trail facilities are disrupted, closed, or relocated in a temporary traffic control zone, the temporary pedestrian facilities shall be consistent and in accordance with the MUTCD.
SECTION 7. BACKFILLING

7.1 Backfilling shall be done under the supervision of the City Engineer and in accordance with SUDAS and the City of Dubuque SUDAS 2014 Supplemental Specifications for Backfill.

7.2 Compaction Testing - The permit holder performing the backfilling operations shall submit a current proctor of the approved backfill material to the City of Dubuque Engineering Department at least 12 hours in advance of backfill operations. The proctor shall have been performed or supervised by an individual who is IDOT certified in performing proctor tests.

7.3 The City reserves the right to perform, or to require the permit holder to perform, periodic density tests to assure that the compaction requirements are being achieved. The permit holder shall be required to cooperate with the City in this regard and without compensation for any delays which may result by virtue of any additional compaction testing, removal, compaction and retesting.

7.4 Backfill in all excavations within the right-of-way shall be compacted by a mechanical tamper of an approved type in lifts not to exceed eight (8") inches in loose thickness to the final surface elevation or pavement subgrade. Backfill material shall consist of crushed limestone, ¾” basestone, or an approved equivalent, compacted to 95% of Standard Proctor Density. Alternate backfill material may be used only upon approval of the City Engineer.

7.5 The City further reserves the right to require an excavation to be re-opened for the purpose of compaction testing where there is sufficient cause to believe that proper density was not achieved. If the compaction is not of sufficient density, the permit holder shall be required to remove the material and compact the excavation until compaction requirements are achieved.

7.6 Failure to follow backfill procedures as herein outlined shall be considered grounds for denial of future permit issuance.

SECTION 8. TEMPORARY PAVEMENT RESTORATION

8.1 The permit holder shall place and maintain temporary paving to render the excavation safe for traffic until the permanent patch is made. This temporary paving shall consist of placement and compaction of fifteen inches of ¾ inch rolled stone base with three inches HMA, or 4” concrete, at the discretion of the City Engineer on all streets. The crown shall not exceed one inch above the adjoining pavement. No temporary stone surface will be allowed to remain unless pre-approved by the City Engineer. Temporary patch must be hard surfaced within seven (7) days.

8.2 Between the months of November and May, when HMA is not available, all excavations shall be covered with either M-4 concrete with a 4" minimum thickness, or cold mix with a minimum of 3" thickness, or as directed by the City Engineer, until such time as the permanent patch can be made. The permit holder is responsible for the continued maintenance of the temporary patch until such time as a permanent patch is completed by the permit holder or the Public Works Department. All temporary patches must match existing grade and no more than 1” crown above or 1” dip below the adjoining pavement.

8.3 Core holes must be temporarily filled to the surface with cold patch and maintained until such time as the permanent restoration occurs. Temporary measures must be approved by the City Engineer.
SECTION 9. PERMANENT RESTORATION

9.1 Permanent patches shall be made by the permit holder or permit holder may request the City Public Works Department to perform final surface restoration, all in accordance with SUDAS and City of Dubuque SUDAS 2014 Supplemental Specifications. Payment for City performed restorations shall be in accordance with Section 3. Failure by the permittee, after written notice, to complete the final restoration may result in the City performing the work and assessing all associated costs to the permit holder and possible removal from the approved contractor list.

9.2 All pavement must be saw cut back at least 6” beyond where subgrade is disturbed or as indicated by the City Engineer. If there is more than one excavation or a series of continuous excavations, there must be at least 10’ between the excavations. Streets require a minimum 4’ width of surface restoration in paved areas. If undermining is observed by the inspector, additional areas may be required for saw cutting, removal, compaction and resurfacing to match existing surfaces and depth. Larger dimensions for saw cutting prior to final patch may be required by the City Engineer due to edge deterioration, undermining or raveling of adjacent surfaces.

9.3 All pavement restoration shall be consistent with current publications of SUDAS, Section 7040 – Pavement Repair & Restoration and applicable City of Dubuque SUDAS 2014 Supplemental Specifications. This is for HMA, HMA over concrete, concrete and brick surfaces. Any pavement replacement in concrete pavement less than twenty (20) years old is required to have a full slab replacement meeting the specifications of the street design at time of construction or as approved by City Engineer. In areas of high traffic and high visibility, where full concrete slabs are beyond the twenty (20) year time period, the City may participate in cost of a full slab replacement, when the entire area is not required for the initial excavation. Quality and smoothness of pavement patch will be measured in accordance with the Iowa Statewide Design Specifications (SUDAS) Division 7 Sections 7010 and 7020, or as specified by the City Engineer.

9.4 Alleys shall be restored to match existing cross-section with a minimum 8” stone and 4” HMA surface or minimum 7” concrete over 4” aggregate base.

9.5 Sidewalks shall match the surrounding surfaces and depths. Minimum depth of Portland Cement Concrete is 4 inches (4”). In general, complete sections will be replaced. Minimum full depth patch areas may depend upon original size of slab and will be replaced as directed by City Engineer. The edges of the walk shall be saw cut when replacement area does not abut an existing joint. If the abutting sidewalk slabs are not in compliance with sidewalk specifications, it will be the discretion of the City Engineer as to the scope of replacement area.

9.6 Sod, seeding, or compost shall be placed on the entire area disturbed by the excavation, and shall be maintained by the permit holder until the sod or seeding is self-sustaining. Sidewalk and sod replacements shall be done in accordance with SUDAS and the City of Dubuque SUDAS 2014 Supplemental Specifications.

9.7 It is the responsibility of the permit holder to replace any and all signage and pavement markings damaged or destroyed as part of the excavation. See Section 6 Traffic/Pedestrians.

9.8 Brick Street & Alley Excavation & Restoration
It is a goal of the City of Dubuque and the Historic Preservation Commission to preserve the character and history of brick pavements. In order to protect this historic treasure, the City of Dubuque has adopted the following policy concerning excavations in brick streets and alleys:

9.8.1 Excavations performed in any brick streets or alleys shall be repaired using native brick. Care must be used during the removal and excavation process to salvage as many bricks as deemed possible. Any additional bricks required for replacement will be supplied by the City. Pick up of the brick is the responsibility of the permit holder. Method of repair for brick surfaces includes 6” Portland cement concrete, ½” sand bed, brick placement and sand filled joints. Any salvaged unused bricks, in good condition, from the excavation shall be cleaned, palletized, wrapped in plastic and delivered to the City’s storage site.

9.9 Green Alley (Brick or Porous Pavement) Excavation & Restoration

An excavation in a Green Alley (pervious pavement surfaced alley), will require all of the pavement restoration to match the existing pavement base and surface, and be repaired by an approved, qualified contractor. The contractor shall protect the surrounding base stone from fines that may plug the infiltration layer of the pavement. Since the pavement sub-surface layers are porous and highly granular, the contractor or utility is required to use a trench box to protect workers from unstable trenches. All backfill material shall meet the same gradation requirements as the original installation of the pavement and sub-base. All brick removed shall be saved and re-used. Any damaged brick shall be replaced with new brick. The contractor or utility may contact the City to see if replacement brick for the alley is available. If the brick is not available from the City, the contractor or utility shall purchase matching brick in size, color, hardness and material at no cost to the City. Final installation of pavement shall not deviate from surrounding pavement by more than 1/4”. The gradation requirements for the various sub-base materials used in Green Alleys is according to ASTM No. 2, ASTM No. 57 and ASTM No. 8.

9.10 Curb Ramp Installation

In May, 1993 the City of Dubuque adopted a policy relating to construction of curb ramps pursuant to Iowa Code Section 321L and Americans with Disabilities Act of 1990 and amendments. 28 CFR 35.151 (c) (i) requires curb ramps or other sloped areas at pedestrian street crossings on newly constructed or altered streets, roads, highways, and street level pedestrian walkways, therefore:

9.10.1 The design, construction and reconstruction of curb ramps shall be in conformance with the current construction requirements and guidelines as set forth by the Access Board (an independent federal agency responsible for development of accessibility guidelines) and the Iowa Department of Transportation.

9.10.2 Radius areas (curb and/or sidewalk) disturbed during excavation shall be reconstructed to meet current curb ramp standards. For all new and reconstructed intersections, curb ramps shall be installed meeting current standards.

9.10.3 Where reconstruction or maintenance associated with the City sidewalk inspection and repair program, utility construction projects, and routine City maintenance projects disturb a curb ramp, then a curb ramp shall be installed or altered to meet the current standards.

9.10.4 Minor repairs or reconstruction of sidewalk, curb, or pavement in the vicinity of an intersection which does not alter the usability of the pavement and sidewalk at a crosswalk does not require the reconstruction of a curb ramp.

9.10.5 Given the terrain of the City of Dubuque, it may be impossible to meet the maximum slope requirements for curb ramps at all intersections throughout the City. In such
cases, the least possible slope shall be used in the construction of the curb ramp. Installation of ramp slope in excess of the current guideline requires the prior approval of the City Engineer.

9.10.6 In the event of an extreme grade of the street, or an unusually high curb, every effort shall be made to accommodate the construction of a curb ramp. A request for a determination and justification for not installing the curb ramp, due to impracticality shall be documented and forwarded to the City Engineer for review.

SECTION 10. SETTLEMENT

10.1 The permit holder shall be responsible for maintenance of an excavation for a period of five (5) years after the completion of the permanent restoration. If at any time within such five (5) year period, the excavation becomes deteriorated or settles, the permit holder shall remove the pavement surface and backfill material, compact the trench backfill and replace the surface at the permit holder’s expense.

10.2 After written notice from the City, and without any response from the permit holder to comply, will result in the City performing the necessary work and assessing all costs associated with the work to the permit holder.

SECTION 11. COMPLIANCE

11.1 Failure by the permit holder to comply with this Policy may result in the issuance of a stop work order, double permit charges, issuance of municipal infraction and/or denial of any further excavation permits until a $5000.00 bond or letter of credit is submitted and the City Engineer is satisfied that the permit holder will comply with this Policy.

Referenced:
Insurance Schedule – Contact Finance Department for current schedule

Policy Date April 5, 2012
Rev 2/24/2014 (SUDAS/Supplemental)

F:\JANE SMITH\Masters\MASTERS
General Sidewalk Requirements

A. Introduction

Sidewalks are an integral component of the transportation system. They provide a designated area, separated from the roadway, for pedestrians to use for both travel and recreation. Along roadways where pedestrians are present or anticipated, consideration should be given to constructing sidewalks on both sides of the road to minimize conflicts between vehicles and pedestrians.

Where sidewalks are provided, they must be constructed so they are accessible to all potential users, including those with disabilities. Design standards for pedestrian access routes are provided in Section 12A-2.

B. Sidewalk Classes

SUDAS identifies three classes of sidewalks, which are described below. Class B and C sidewalks provide a grass strip between the back of curb and the sidewalk, often referred to as the “parking.”

1. Class A: Class A sidewalks begin at the back of curb and generally extend to the right-of-way line. These types of sidewalks are typical in downtown areas. Consideration must be given to the location of street signs, street lighting, utilities, mailboxes, snow storage, and other obstacles when utilizing Class A sidewalk.

2. Class B: Class B sidewalks are constructed with the back edge of the sidewalk 1 foot or more off of the right-of-way line.

3. Class C: Class C sidewalks have the back edge of the sidewalk on the right-of-way line.
C. Accessible Sidewalk Design

It has been common practice to place the responsibility for sidewalk ramp layout on the contractor or construction inspector. This has resulted in the sidewalk, curb ramps, driveway crossings, etc. being designed in the field, often with mixed accessibility results. As public right-of-way accessibility comes under greater scrutiny, it is increasingly important that newly constructed or altered sidewalks meet accessibility requirements. Therefore, sidewalks, curb ramps, and street crossings shall be included as part of the design process and the details of those designs shall be included in the contract documents as appropriate. Projects reviewed or let by the Iowa DOT will require use of S sheets according to the Iowa DOT Design Manual Section 1F-18.

D. Construction Requirements

1. Sidewalk Thickness: Sidewalks should be constructed of PCC with a minimum thickness of 4 inches. Where sidewalks cross driveways, the minimum thickness is 6 inches, or the thickness of the driveway, whichever is greater.

2. Obstructions: All obstructions are to be removed or relocated except for those that are impractical to move. In new development areas, these items should never occur, but in older, established areas, they will have to be addressed. In the case where the sidewalk is shifted to avoid an obstacle, use of a minimum 2:1 taper to and from the obstruction with a straight section adjacent to the obstruction should be considered. Flatter tapers may be used if space is available and user volume is high.

3. Construction Tolerances: Dimensions are subject to conventional industry tolerances except where dimensions are stated as a range, minimum, or maximum. Conventional industry tolerances include tolerances for field conditions and tolerances that may be a necessary consequence of a particular manufacturing process. Conventional industry tolerances do not apply to design work; see PROWAG R103.1. Designing features to the target values, rather than the allowable maximum or minimum, allows for appropriate construction tolerances and field adjustment during construction while maintaining compliance with PROWAG.
Chronology of Changes to Design Manual Section:

012A-001 General Sidewalk Requirements

9/20/2012 Revised
Updated header to include SUDAS for joint publication.

4/17/2012 NEW
Accessible Sidewalk Requirements

A. Introduction

SUDAS and Iowa DOT jointly developed this section based on the July 26, 2011 “Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way.” This section was developed in accordance with Federal regulations (23 CFR 652 and 28 CFR 35) and is the standard for use by all governmental entities in the State of Iowa. A local jurisdiction may elect to produce their own standards; however, these will require review and approval by FHWA and/or the United States Department of Justice.

Where sidewalks are provided, they must be constructed so they are accessible to all potential users, including those with disabilities. This section establishes the criteria necessary to make an element physically accessible to people with disabilities. This section also identifies what features need to be accessible and then provides the specific measurements, dimensions, and other technical information needed to make the feature accessible. The requirements of this section were developed based on the following documents:

1. ADAAG: The “Americans with Disabilities Act Accessibilities Guidelines” (ADAAG) was written by the US Access Board and adopted by the Department of Justice (DOJ) in 2010. This document includes a broad range of accessibility guidelines including businesses, restaurants, public facilities, public transportation, and sidewalks. These standards were originally adopted in 1991 and have been expanded and revised several times.

2. PROWAG: The July 26, 2011 “Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way” was written by the US Access Board and is also known as the Public Right-of-Way Accessibility Guidelines or PROWAG. PROWAG provides more specific information than the ADAAG for transportation facilities within the right-of-way including pedestrian access routes, signals, and parking facilities. The PROWAG requirements are currently in the development and adoption process and have not been officially adopted by the Department of Justice; however, the Federal Highway Administration has issued guidance that the draft version of the PROWAG “are currently recommended best practices, and can be considered the state of the practice that could be followed for areas not fully addressed” in the existing ADAAG requirements.

Due to the widespread acceptance of the PROWAG, and their pending adoption in the future, the standards of this chapter are based upon the PROWAG requirements. The designer is encouraged to reference the complete PROWAG document for additional information (www.access-board.gov). References to the PROWAG in this section are shown in parentheses, e.g. (R302.7). Buildings and other structures not covered by PROWAG must comply with the applicable requirements of the ADAAG. For parks, recreational areas, and shared use paths, refer to other sections within this chapter.
B. Transition Plan

The ADA law passed in 1990 required public entities with more than 50 total employees to develop a formal transition plan identifying the steps necessary to meet ADA accessibility requirements for all pedestrian access routes within their jurisdiction by upgrading all noncompliant features. Recognizing that it would be difficult to upgrade all facilities immediately, the law provided the opportunity to develop a transition plan for the implementation of these improvements. Covered entities had until 1992 to complete a transition plan. In addition, any local public agency that is a recipient of US DOT funds must have a transition plan. For those agencies that have not completed a transition plan, it is critical that this process be completed. Although the transition plan may cover a broader scope, this section will only cover requirements within the public right-of-way.

Key elements of a transition plan include the following:
- Identifying physical obstacles in the public agency’s facilities that limit the accessibility of its programs or activities to individuals with disabilities
- A detailed description of the methods that will be used to make the facilities accessible
- A schedule for taking the steps necessary to upgrade pedestrian access in each year following the transition plan
- Identification of the individual responsible for implementation of the plan


Public entities not required to have a formal transition plan are required to address noncompliant pedestrian access routes.

C. Definitions

**Accessible:** Facilities that comply with the requirements of this section.

**Alteration:** A change to a facility in the public right-of-way that affects or could affect pedestrian access, circulation, or use. Alterations include, but are not limited to resurfacing, rehabilitation, reconstruction, historic restoration, or changes or rearrangement of structural parts or elements of a facility.

**Alternate Pedestrian Access Route:** A route provided when a pedestrian circulation path is temporarily closed by construction, alterations, maintenance operations, or other conditions.

**Curb Line:** A line at the face of the curb that marks the transition between the curb and the gutter, street, or highway.

**Cross Slope:** The grade that is perpendicular to the direction of pedestrian travel.

**Crosswalk:** See pedestrian street crossing.

**Curb Ramp:** A ramp that cuts through or is built up to the curb. Curb ramps can be perpendicular, parallel, or a combination of parallel and perpendicular curb ramps.

**Detectable Warning:** Detectable warnings consist of small, truncated domes built in or applied to a walking surface that are detectable by cane or underfoot. On pedestrian access routes, detectable warning surfaces indicate the boundary between a pedestrian route and a vehicular route for
pedestrians who are blind or have low vision.

**New Construction:** Construction of a roadway where an existing roadway does not currently exist.

**Pedestrian Access Route:** A continuous and unobstructed path of travel provided for pedestrians with disabilities within, or coinciding with, a pedestrian circulation path.

**Pedestrian Circulation Path:** A prepared exterior or interior surface provided for pedestrian travel in the public right-of-way.

**Pedestrian Street Crossing:** A marked or unmarked route, providing an accessible path to travel from one side of the street to the other. Pedestrian street crossings are a component of the pedestrian access route and/or the pedestrian circulation path.

**Running Slope:** The grade that is parallel to the direction of pedestrian travel.

**PROWAG:** The Public Right-of-way Accessibility Guidelines establish the criteria for providing a feature within the public right-of-way that is physically accessible to those with physical disabilities.

**Scope of the Project:** Work that can reasonably be completed within the limits of the project. This is not defined by the written project scope; however, it focuses on whether the alteration project presents an opportunity to design the altered element, space, or facility in an accessible manner.

**Structurally Impracticable:** Something that has little likelihood of being accomplished because of those rare circumstances when the unique characteristics of terrain prevent the incorporation of full and strict compliance with this section. Applies to new construction only.

**Technically Infeasible:** With respect to an alteration of an existing facility, something that has little likelihood of being accomplished because existing structural conditions would require removing or altering a load-bearing member that is an essential part of the structural frame; or because other existing physical or site constraints prohibit modification or addition of elements, spaces, or features that are in full and strict compliance with the requirements of this section. (2010 ADAAG 106.5)

**Turning Space:** An area at the top or bottom of a curb ramp, providing a space for pedestrians to stop, rest, or change direction.

**D. Applicability**

1. **New Construction:** Newly constructed facilities within the scope of the project shall be made accessible to persons with disabilities, except when a public agency can demonstrate it is structurally impracticable to provide full compliance with the requirements of this section. Structural impracticability is limited to only those rare situations when the unique characteristics of terrain make it physically impossible to construct facilities that are fully compliant. If full compliance with this section is structurally impracticable, compliance is required to the extent that it is not structurally impracticable. [2010 ADAAG 28 CFR 35.151(a)]

2. **Alterations:** Whenever alterations are made to the pedestrian circulation path, the pedestrian access route shall be made accessible to the maximum extent feasible within the scope of the project. If full compliance with this section is technically infeasible, compliance is required to the extent that it is not technically infeasible. [2010 ADAAG 28 CFR 35.151(b)] Alterations shall not gap pedestrian circulation paths in order to avoid ADA compliance.
Where elements are altered or added to existing facilities, but the pedestrian circulation path is not altered, the pedestrian circulation path is not required to be modified (R202.1). However, features that are added shall be made accessible to maximum extent feasible. The following are examples of added features:

- Installation of a traffic sign does not require sidewalk improvements; however, the sign cannot violate the protruding objects requirements.
- Installation of a traffic or pedestrian signal does not require sidewalk improvements; however, the signal must be accessible.
- Installation of a bench adjacent to the pedestrian access route would not require sidewalk improvements, but the bench cannot be placed in a manner that would reduce the sidewalk width below the minimum requirement.

3. **Maintenance:** Accessibility improvements are not required for work that is considered maintenance. Examples of work that would be considered maintenance include, but are not limited to, the following items:

   - Application of thin maintenance surfaces; for example, slurry seal, seal coat, chip seal, fog seal, and microsurfacing
   - Minor street patching (less than 50% of the pedestrian street crossing area)
   - Curb and gutter repair or patching outside the pedestrian street crossing
   - Minor sidewalk repair that does not include the turning space and curb ramps
   - Painting pavement markings, excluding parking stall delineations

The DOJ considers resurfacing that goes beyond normal maintenance to be an alteration; however, neither DOJ nor U.S. DOT has provided a specific definition of what level or thickness of resurfacing constitutes an alteration. According to the FHWA Office of Civil Rights’ *Questions and Answers about ADA/Section 504*, maintenance activities include actions that are intended to preserve the system, retard future deterioration, and maintain the functional condition of the roadway without increasing the structural capacity. Iowa’s Administrative Rules (761 IAC 178.3(2)) states, “Repair or maintenance means the preservation of a road, street, bridge or culvert so that it is in sound or proper condition. The work may include minor replacements and additions necessary to restore the road, street, bridge, or culvert to its original built condition with essentially the same design.” Since there is no standard definition for resurfacing, the agency administering the project is responsible for determining if a project should be considered maintenance and documenting the reasons for this determination. If a project is defined as maintenance, federal funding and Farm-to-Market funds cannot be used.

When a maintenance project modifies a crosswalk, installation of curb ramps at the crosswalks is strongly recommended, if none already exists. The other accessibility improvements of this section are also recommended, but not required with such projects.

4. **Technical Infeasibility:** Examples of existing physical or site constraints that may make it technically infeasible to make an altered facility fully compliant include, but are not limited to, the following:

   - Right-of-way availability. Improvements may be limited to the maximum extent practicable within the “available right-of-way.” However, as the pedestrian facility is designed, evaluate options that may include right-of-way agreements and result in full compliance.
     - For projects that do not require additional right-of-way purchase (including permanent easements), available right-of-way is defined as existing right-of-way or property that can be utilized through an agreement to work on private property. The right-of-way acquisition process would cause significant delay in upgrading the deficiency.
For projects that require any additional right-of-way purchase (including permanent easements), for reasons other than accessibility, available right-of-way is defined as right-of-way that can be purchased through normal acquisition and condemnation processes. In these projects, right-of-way availability is not considered an existing physical constraint.

For pedestrian access route projects (i.e. the scope is limited to making improvements to pedestrian facilities only), right-of-way availability is defined the same as for projects that do not require right-of-way purchase.

- Underground structures that cannot be moved without significantly expanding the project scope.
- Adjacent developed facilities, including buildings that would have to be removed or relocated to achieve accessibility.
- Drainage cannot be maintained if the feature is made accessible.
- Notable natural or historic features that would have to be altered in a way that lessens their aesthetic or historic value.
- Underlying terrain that would require a significant expansion of the project scope to achieve accessibility.
- Street grades within the crosswalk exceed the pedestrian access route maximum cross slopes, provided an engineering analysis has concluded that it cannot be done without significantly expanding the project scope (for example, changing from resurfacing an intersection to reconstructing that intersection).

5. **Safety Issues**: When accessibility requirements would cause safety issues, compliance is required to the maximum extent practicable.

6. **Documenting Exceptions**: If the project cannot fully meet accessibility requirements because the accessibility improvements are structurally impracticable, technically infeasible, or safety issues, a document should be developed to describe how the existing physical or site constraints or safety issues limit the extent to which the facilities can be made compliant. This document should identify the specific locations that cannot be made fully compliant and provide specific reasons why full compliance cannot be achieved. It is recommended that this document be retained in the project file. For local agency projects administered through Iowa DOT, a certification with supporting documentation shall be submitted to the Iowa DOT administering office. The certification shall be as prescribed by the Iowa DOT and signed by a registered professional engineer or landscape architect licensed in the State of Iowa. For Iowa DOT projects, contact the Office of Design, Methods Section.

**Note**: Documenting exceptions does not remove an agency's responsibility to consider making accessibility improvements the next time the facility is altered because physical or site constraints and safety issues may change over time. The determination of exceptions and corresponding documentation needs to be made each time a facility is altered, based on the existing conditions and the scope of the proposed project.

7. **Reduction in Access**: Regardless of whether the additions or alterations involve the modification of the existing pedestrian circulation path, the resulting work cannot have the result of reducing the existing level of accessibility below the minimum requirements. For example, the installation of a bench cannot have the effect of reducing the width of the pedestrian access route to 3 feet (4 feet is the minimum). Likewise, the construction of an overlay cannot result in a street cross slope of more than 5%, nor have a lip at the curb ramp that exceeds 1/2 inch.

Pedestrian facilities may be removed if they are being re-routed for safety reasons, or terminated because they do not connect to a destination or another pedestrian circulation path.
8. **Addition of Pedestrian Facilities:** If a sidewalk exists on both sides of the street, curb ramps shall be installed on both sides when the street is altered. PROWAG does not require construction of pedestrian facilities where none currently exists, although the jurisdiction’s transition plan may require them.

9. **Utility Construction:** If the pedestrian circulation path is disturbed during utility construction, the requirements of this section and Section 12A-4 shall apply.

E. **Standards for Accessibility**

The following section summarizes the design standards for the elements of an accessible pedestrian access route. The minimum and maximum values stated are taken from the PROWAG. Target values are also provided. Designing features to the target values, rather than the allowable maximum or minimum, allows for appropriate construction tolerances and field adjustment during construction while maintaining compliance with the PROWAG standards.

1. **General Requirements:** These requirements apply to all parts of the pedestrian access route.

   a. **Surfacing:** PROWAG requires all surfaces to be firm, stable, and slip resistant (R302.7). All permanent pedestrian access routes, with the exception of some Type 2 shared use paths (see Section 12B-2), shall be paved. When crossing granular surfaced facilities, consider paving wider than the pedestrian access route; see the shared use path section.

   b. **Changes in Level:** Changes in level, including bumps, utility castings, expansion joints, etc. shall be a maximum of 1/4 inch without a bevel or up to 1/2 inch with a 2:1 bevel. Where a bevel is provided, the entire vertical surface of the discontinuity shall be beveled (R302.7.2).

   ![Figure 12A-2.01: Vertical Surface Discontinuities](image)

   c. **Horizontal Openings:** Horizontal openings shall not allow passage of a sphere more than 1/2 inch in diameter. Elongated openings in grates shall be placed so the long dimension is perpendicular to the dominant direction of travel. The use of grates within the pedestrian access route is discouraged; however, where necessary, the grate should be located outside of curb ramp runs, turning spaces, and gutter areas if possible. (R302.7.3)

   It should be noted that none of the standard SUDAS/Iowa DOT intake grates meet the requirements for use within a pedestrian access route; therefore, a special design is required.
2. **Standard Sidewalk:** Sidewalks solely serving private residences are not required to follow these requirements.

   a. **Cross Slope:** The maximum cross slope is 2.0% with a target value of 1.5% (R302.6).

   b. **Running Slope:** Sidewalks with a running slope of 5% or less are acceptable. However, where the sidewalk is contained within the street right-of-way, the grade of the sidewalk shall not exceed the general grade of the adjacent street (R302.5). For design, consider the general grade of the adjacent street to be within approximately 2% of the profile grade of the street.

   c. **Width:** The minimum width of the pedestrian access route is 4 feet. Five foot sidewalks are encouraged and may be required by the Jurisdiction. Iowa DOT will design 5 foot sidewalks unless otherwise requested. (R302.3)

   d. **Passing Spaces:** Where the clear width of the pedestrian access route is less than 5 feet, passing spaces are required at maximum intervals of 200 feet. The passing space shall be 5 foot minimum by 5 foot minimum. Passing spaces may overlap with the pedestrian access route. (R302.4). Driveways may be used as passing spaces, as long as the 2.0% maximum cross slope is not exceeded.
Figure 12A-2.03: Standard Sidewalk and Curb Ramp Elements

- Grass
- Curb Ramp
- Turning Space
- Cross Slope Transition Segment
- Standard Sidewalk
- Passing area
- Detectable Warning
- Curb Transition

Curb ramp requirements:
1. Maximum curb ramp slope of 8.3%, or
2. Minimum length of 15' at any constant slope

Curb Ramp Slopes:
- 6.25% (target)
- 8.3% (maximum)

Special Shaping

Face of Curb
Back of Curb
Grade Break
Special Shaping

Parking

Cross slope:
1.5% (target)
2.0% (maximum)

Match existing sidewalk cross slope.

Parallel Curb Ramp (if required)

Turning Space

5' min.

Space passing area at 200' (max.) intervals (Required for new construction)

5' min.

Passing area if sidewalk is less than 5' wide.

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Revised: 9/20/2012
3. Pedestrian Street Crossings:

a. Cross Slope: The longitudinal grade of a street becomes the cross slope for a pedestrian street crossing. PROWAG has maximum limits for the cross slope of pedestrian street crossings, which vary depending on the location of the crossing and the type of vehicular traffic control at the crossing. These requirements, in effect, limit the longitudinal grade of a street, or require a “tabled crosswalk” at the intersection. (R302.6)

1) **Intersection Legs with Stop or Yield Control:** For pedestrian street crossings across an intersection leg with full stop or yield control (stop sign or yield sign), the maximum cross slope is 2.0% (maximum 2.0% street grade through the crossing).

2) **Intersection Legs without Stop or Yield Control:** For pedestrian street crossings across an intersection leg where vehicles may proceed without slowing or stopping (uncontrolled or signalized), the maximum cross slope of the pedestrian street crossing is 5.0% (maximum 5.0% street grade through the crossing).

3) **Midblock Pedestrian Street Crossings:** At midblock crossings, the cross slope of the pedestrian street crossing is allowed to equal the street grade.

**Figure 12A-2.04:** Example Street Intersection

* Match pedestrian street crossing cross slope or flatter

b. **Running Slope:** The running slope of the pedestrian street crossing is limited to a maximum of 5.0% (maximum street cross slope or superelevation of 5.0%) (R302.5.1).
c. **Location:** Driver anticipation and awareness of pedestrians increases as one moves closer to the intersection. Therefore, curb ramps and pedestrian street crossings should be located as close to the edge of the adjacent traveled lane as practical. Where a stop sign or yield sign is provided, MUTCD requires the pedestrian street crossing, whether marked or unmarked, be located a minimum of 4 feet from the sign, between the sign and the intersection. It is recommended stop and yield signs be located no greater than 30 feet from the edge of the intersecting roadway; however, MUTCD allows up to 50 feet. Consult MUTCD for placement of curb ramps and pedestrian street crossings at signalized intersections.

![Pedestrian Street Crossing Location](image)

**Figure 12A-2.05:** Pedestrian Street Crossing Location

Source: MUTCD, FHWA

d. **Medians and Pedestrian Refuge Islands:** Medians and pedestrian refuge islands in pedestrian street crossings shall be cut through level with the street or complying with the curb ramp requirements. The clear width of pedestrian access routes within medians and pedestrian refuge islands shall be 5.0 feet minimum (R302.3.1). If a raised median is not wider than 6 feet, it is recommended the nose not be placed in the pedestrian street crossing.

4. **Curb Ramps:**

a. **General:** There are two types of curb ramps: perpendicular and parallel. Perpendicular curb ramps are generally perpendicular to the traffic they are crossing with the turning space at the top. Parallel curb ramps have the turning space at the bottom. Parallel curb ramps may be used where the sidewalk begins at or near the back of curb and there is little or no room between the sidewalk and curb for a perpendicular curb ramp.

A separate curb ramp is required at each pedestrian street crossing for new construction. Parallel ramps with a large turning space, as shown in Figure 12A-2.08, are allowed. For alterations, follow the new construction requirements if possible; however, a single diagonal curb ramp is allowed but not recommended where existing constraints prevent two curb ramps from being installed.

For alterations, it is strongly recommended to construct curb ramps at both sides of a pedestrian street crossing. It is also recommended to correct other curb ramps within the intersection. See Figure 12A-2.06.

For transitions into and out of driveways, curb ramp requirements may be used.
Figure 12A-2.06: Curb Ramps for Alterations

1. Required.
2. Strongly recommended.
3. Add/modify unless a safety issue or existing physical constraint limits installation. Consider installing both sides or removing the existing one.
4. Recommended to address as stated in #3 above, but not required because it is outside the project limits.
5. Address based on pedestrian usage, safety, and land development. Consider installing both sides or removing the existing one.

b. Technical Requirements:

1) **Cross Slope:** The maximum cross slope is 2.0% with a target value of 1.5%; however, for intersection legs that do not have full stop or yield control (i.e. uncontrolled or signalized) and at mid-block crossings, the curb ramp cross slope is allowed to match the cross slope in the pedestrian street crossing section. See “pedestrian street crossings” for additional details. (R304.5.3)

2) **Running Slope:** Provide curb ramps with a target running slope of 6.25% and a maximum slope of 8.3%; however, curb ramps are not required to be longer than 15 feet, regardless of the resulting slope. (R304.2.2 and R304.3.2)

3) **Width:** The minimum width of a curb ramp is 4 feet, excluding curbs and flares. If the sidewalk facility is wider than 4 feet, the target value for the curb ramp is equal to the width of the sidewalk. (R304.5.1)

4) **Grade Breaks:** Grade breaks at the top and bottom of curb ramps must be perpendicular to the direction of the curb ramp run. Grade breaks are not allowed on the surface of curb ramp runs and turning spaces. (R304.5.2)

5) **Flared Sides:** For perpendicular curb ramps on Class A sidewalks, or configurations where the pedestrian circulation path crosses the curb ramp, PROWAG requires the flares along the sides of the curb ramp to be constructed at 10% or flatter. (R304.2.3) This allows pedestrians to approach the curb ramp from the side and prevents a tripping hazard. It is recommended to design these flares at a slope between 8% and 10%, which will clearly define the curb ramp from the sidewalk.

6) **Clear Space:** At the bottom of perpendicular curb ramps, a minimum 4 foot by 4 foot area must be provided within the width of the pedestrian street crossing, but wholly outside of the parallel vehicle travel lanes. (R304.5.5)

7) **Turning Space:** Turning spaces allow users to stop, rest, and change direction on the top or bottom of a curb ramp (R304.2.1 and R304.3.1).
   a) **Placement:** A turning space is required at the top of perpendicular curb ramps and at the bottom of parallel curb ramps.
   b) **Slope:** The maximum cross slope and running slope is 2.0% with a target value of 1.5% (R304.2.2 and R304.3.2). When turning spaces are at the back of curb, cross slopes may be increased to match allowable values in the pedestrian street crossing section (R304.5.3).
c) **Size**: The turning space shall be a minimum of 4 feet by 4 feet. Where the turning space is constrained on one or more sides, provide 5 feet in the direction of the pedestrian street crossing.

8) **Special Shaping Area**: Transition area between the back of curb and the grade break. The longest side cannot exceed 5 feet.

**Figure 12A-2.07**: Curb Ramp Turning Spaces

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c. **Curb Ramp Design Considerations**:

1) **Combination Curb Ramps**: For many intersection configurations, a perpendicular curb ramp will not provide enough length to establish the top turning space at the sidewalk elevation; in these situations, a parallel curb ramp is often required to transition from the turning space up to the sidewalk elevation. The use of a perpendicular curb ramp from the curb to the turning space in conjunction with a parallel curb ramp between the turning space and the sidewalk elevation is referred to as a combination curb ramp. When transitioning from a turning space to sidewalk elevation on a steep street, it is not necessary to chase the grade. As noted in the technical requirements above, a parallel curb ramp is not required to exceed 15 feet in length, regardless of the resulting curb ramp slope. In practice, the parallel curb ramp should be extended to the next joint beyond 15 feet.

2) **Cross Slope Transition Segment**: When connecting to existing construction that is out of cross slope compliance, the cross slope transition should be completed beyond the parallel curb ramp or turning space; this recommendation eliminates the need to list this curb ramp in the transition plan. It is recommended this cross slope transition take place at 1/4% per foot or less. Typically, this can be accomplished in a single panel.

3) **Parking Slope**: In situations where the length of the perpendicular curb ramp is insufficient to bring the turning space up to sidewalk elevation, consider lowering the sidewalk and flattening the parking slope.
5. **Blended Transitions:** A blended transition is allowed but not recommended. Design and constructability is difficult to meet compliance requirements. In lieu of a blended transition, a curb ramp or standard sidewalk should be used.

6. **Detectable Warnings:**

   a. **General:** Detectable warning surfaces are detected underfoot or with a cane by blind and low vision individuals. The warnings indicate the location of the back of curb. Detectable warnings also provide a visual queue to pedestrians with low vision and aid in locating the curb ramp across the street. For these reasons, the detectable warning shall contrast visually (light on dark or dark on light) from the surrounding paved surfaces (R305.1.3).

   b. **Location:** Detectable warnings shall be installed at all pedestrian street crossings and at-grade rail crossings (R208.1). Detectable warning surfaces should not be provided at crossings of residential driveways since the pedestrian right-of-way continues across the driveway. Where commercial driveways are provided with yield control, stop control, or traffic signals at the pedestrian access route, detectable warnings should be installed at the junction between the pedestrian access route and the driveway (Advisory R208.1).

   c. **Size:** Detectable warning surfaces shall extend a minimum of 2 feet in the direction of pedestrian travel and extend the full width of the curb ramp or pedestrian access route (R305.1.4).

   d. **Dome Orientation:** On curb ramps, the rows of truncated domes should be aligned perpendicular to the grade break so pedestrians in wheelchairs can track their wheels between the domes. On surfaces less than 5% slope, dome orientation is less critical.

   e. **Parallel Curb Ramps:** On parallel curb ramps, detectable warning shall be placed on the turning space at the back of curb (R305.2.2).
f. **Perpendicular Curb Ramps**: Placement of detectable warning varies based upon location of grade break as shown in Figure 12A-2.09.

*Figure 12A-2.08: Detectable Warnings on Parallel Curb Ramps*

*Figure 12A-2.09: Detectable Warnings on Perpendicular Curb Ramps*
g. **Refuge Islands:** Where refuge islands are 6 feet wide or greater from back of curb to back of curb, detectable warning shall be placed at the edges of the pedestrian island and separated by a minimum 2 foot strip without detectable warnings. Where the refuge island is less than 6 feet wide, a 2 foot strip without detectable warnings cannot be installed. In these situations, detectable warnings shall not be installed at the island and the pedestrian signal must be timed for full crossing. (R208.1 and R208.2)

h. **Rural Cross-section:** Detectable warnings should be placed similar to urban layouts, except at the edge of shoulder instead of the back of curb.

### F. Bus Stop

1. **Bus Stop Pads:** New and altered bus stop pads shall meet the following criteria.
   - Provide a firm, stable, and slip resistant surface (R308.1.3.1).
   - Provide a minimum clear length of 8 feet (measured from the curb or roadway edge) and minimum clear width of 5 feet (measured parallel to the roadway) (R308.1.1.1).
   - Connect the pad to streets, sidewalks, or pedestrian circulation paths with at least one accessible route (R308.1.3.2).
   - The slope of the pad parallel to the roadway will be the same as the roadway to the maximum extent practicable (R308.1.1.2).
   - Provide a desirable cross slope of 1.5% up to a maximum cross slope of 2.0% perpendicular to the roadway (R308.1.1.2).

2. **Bus Shelters:** Where new or replaced bus shelters are provided, install or position them to allow a wheelchair user to enter from the public way. An accessible route shall be provided from the shelter to the boarding area. (R308.2)

### G. Accessible Pedestrian Signals

An accessible pedestrian signal is an integrated device that communicates information about the WALK and DON'T WALK intervals at signalized intersections in a non-visual format (i.e. audible tones and vibrotactile surfaces) to pedestrians who have visual disabilities. Each traffic signal project location should be evaluated to determine the need for accessible pedestrian signals. An engineering study should be completed that determines the needs for pedestrians with visual disabilities to safely cross the street (MUTCD 4E.09). The study should consider the following factors:

- Potential demand for accessible pedestrian signals
- Requests for accessible pedestrian signals by individuals with visual disabilities
- Traffic volumes when pedestrians are present, including low volumes or high right turn on red volumes
- The complexity of the signal phasing, such as split phasing, protected turn phases, leading pedestrian intervals, and exclusive pedestrian phases
- The complexity of the intersection geometry

If a pedestrian accessible signal is warranted, audible tones and vibrotactile surfaces should be included. Pedestrian push buttons should have locator tones for the visually impaired individual to be able to access the signal. See MUTCD 4E.09 through 4E.13 for more information. Consistency throughout the pedestrian system is very important. Contact the Jurisdictional Engineer regarding the standards and equipment types that should be incorporated into the design of the accessible pedestrian system.
Chronology of Changes to Design Manual Section:

012A-002  Accessible Sidewalk Requirements

9/20/2012  Revised
- Definition for "Structurally Impracticable" was added
- Improved the explanation of Right Of Way availability

4/17/2012  NEW
Protruding Objects

A. Introduction

This section provides guidance to comply with section R402 of PROWAG. The pedestrian area is any prepared area available for pedestrians (equivalent to the pedestrian circulation path as defined in PROWAG). A protruding object is any obstacle that reduces the clearance width and/or the clearance height within a pedestrian area. The pedestrian area is not limited to the sidewalk or the pedestrian access route intended by the designer. The pedestrian area includes any areas that may be perceived as a pedestrian walking space, including adjacent parking lots and paved frontage.

Common protruding objects include:
- Signs and Sign poles
- Landscaping and branches
- Utility boxes or poles and their stabilizing wires
- Mailboxes (public and private)
- Trash cans
- Transit shelters
- Bike racks
- Planters
- Fire hydrants
- Parking meters
- Benches
- Public Art

B. Protruding Object Locations

1. Outside the Pedestrian Area: A protruding object can result in narrow passing spaces, reduced access, and injury. Therefore, protruding objects should be placed completely outside of the pedestrian area whenever possible.

2. Within the Pedestrian Area: Ideally, the full width of the pedestrian area should be free of protruding objects and the pedestrian access route would be clearly separated from other paved surfaces. However, if some obstacles must be located within the pedestrian area, they should all be placed either right or left of center to provide a consistent pedestrian access route. Figure 12A-3.01 shows an acceptable pedestrian area with obstacles aligned, providing a consistent pedestrian access route. Figure 12A-3.02 shows an undesirable pedestrian area with a poorly defined pedestrian access route. The pedestrian access route within the pedestrian area must meet guidelines defined in this chapter. Special sidewalk treatments (such as brick pavers or stamped concrete) are recommended to provide a different surface texture to differentiate between the object corridor and the pedestrian access route.

Figure 12A-3.01: Acceptable Pedestrian Area  Figure 12A-3.02: Undesirable Pedestrian Area
C. Clearance

1. **Vertical Clearance**: Vertical clearance is minimum unobstructed vertical passage space required along the entire width of the pedestrian corridor. A minimum vertical clearance of 80 inches must be provided or the object must be shielded with a barrier. The leading edge of the barrier shall be a maximum of 27 inches above the finished surface. See Figure 12A-3.03.

   **Figure 12A-3.03**: Shielding for Vertical Clearance Obstacles

2. **Horizontal Clearance**: Objects mounted at or below 27 inches may extend from a fixed structure into the pedestrian area, provided the remaining sidewalk width complies with Section 8A-2. Objects that extend below 27 inches are easily detectable by most pedestrians.
Objects that extend into the pedestrian area at a height above 27 inches are not easily detected with a cane and pedestrians may walk into them. This type of object cannot extend into the pedestrian corridor more than 4 inches from its base. The base shall be at least 2.5 inches in height. See Figure 12A-3.04.

**Figure 12A-3.04:** Vertical Clearance

3. **Objects Mounted Between Posts:** Where an object is mounted between posts or pylons and the clear distance between the posts or pylons is greater than 12 inches, the lowest edge of the object shall be between 0 and 27 inches or 80 inches or more above the ground (see Figure 12A-3.05). For objects mounted on posts closer than 12 inches, follow the requirements for horizontal clearance defined above.

**Figure 12A-3.05:** Height Restriction for Signs Mounted Between Posts
Chronology of Changes to Design Manual Section:

012A-003  Protruding Objects

9/20/2012  Revised
Updated header to include SUDAS for joint publication.

4/17/2012  NEW
New. Replaces Section 11C-5
Pedestrian Facilities During Construction

A. Introduction

When projects impact pedestrians, it is important for the engineer to develop a temporary traffic control plan for pedestrians, including those with disabilities. For Iowa DOT projects, see Iowa DOT Design Manual Section 9A-5 for temporary traffic control plans. The applicable guidelines for the temporary traffic control plan are the July 26, 2011 “Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way” (PROWAG) and the Manual on Uniform Traffic Control Devices (MUTCD).

According to PROWAG, when a pedestrian circulation path is temporarily closed for construction or maintenance activities, an alternate pedestrian access route complying with sections 6D.01, 6D.02, and 6G.05 of the MUTCD shall be provided (R205). However, MUTCD (Section 6D.01) also requires knowledgeable persons to conduct appropriate evaluations or use engineering judgment in determining temporary traffic controls for pedestrian circulation paths. This section includes guidance on conducting the evaluation when an alternate pedestrian access route may not be practical.

B. Evaluating Pedestrian Needs

The initial design activity should be to determine the level of the accessibility of the current pedestrian circulation path within the area of the project and the adjacent areas. The impact to the pedestrian circulation path, including transit stops, from the construction or maintenance activity needs to be determined. Develop pedestrian accommodations to provide the best accessibility practical through all stages of work. Consider obtaining local input through a public meeting or contact with residents or public officials to see where additional accessibility needs should be addressed (e.g., senior centers, medical facilities, schools, public facilities, etc.).

Whenever possible, the work should be done in such a manner that does not create a need to detour pedestrians from existing routes. Pedestrians rarely observe detours and the cost of providing accessibility and detectability might outweigh the cost of maintaining a continuous route through the construction zone (MUTCD 6D-01). All methods should be given consideration, including providing alternate means of traversing the construction zone. If pedestrians are to be directed through the construction zone, safety as well as accessibility must be addressed. If a pedestrian detour is developed, it should replicate the accessibility of the existing route.

C. Facility Options

To address the impacts to the pedestrian circulation path, including transit stops, consider the following:
- Develop a temporary traffic control plan to guide the pedestrians through the construction zone.
- Close the pedestrian circulation path through the construction zone.
- Close the pedestrian circulation path through the construction zone; develop a detour route consistent with the accessibility features present in the pedestrian circulation path being closed.
- Provide alternate means for pedestrians to traverse the construction zone, such as free accessible shuttles or other forms of assistance.
D. Barricades, Channelizing Devices, and Signs

Pedestrian barricades and channelizing devices shall comply with sections 6F.63, 6F.68, and 6F.71 of the MUTCD.

1. **Barricades**: Barricades are used for pedestrian circulation path closures. See Iowa DOT Specifications Section 2528.

2. **Channelizing Devices**: The designer should consider the safety of pedestrians and vehicles when choosing channelizing devices.
   
a. **Type A**: Type A devices are redirecctive barriers designed for highway applications. These devices are suitable when pedestrians are routed into the travel way and allow for the most protection for pedestrians from vehicular intrusion.

b. **Type B**: Type B devices are crashworthy but do not redirect vehicles. These devices are designed to minimize risks associated with flying debris.

c. **Type C**: Type C devices include any device that meets ADA requirements for channelizing pedestrians and may not be crashworthy. These devices are for locations where vehicular intrusions are unlikely (e.g., closed roads, when there is a separation between pedestrians and vehicular traffic, or where vehicular traffic is at low speeds).

3. **Signs**: See Iowa DOT Standard Road Plan TC-601 and TC-602.

E. Temporary Pedestrian Facilities

Temporary pedestrian facilities should comply with the other sections within this chapter to the extent practical. It is strongly recommended that detour routes be on paved surfaces.

Temporary pedestrian facility surfaces must be firm, stable, and slip resistant. Granular surfacing for short term, temporary pedestrian facilities is acceptable. The granular surfacing material should be well graded, such as Class A road stone (Iowa DOT Specifications Section 4196, Gradation No. 8) or special backfill (Iowa DOT Specifications Section 4196, Gradation No. 30). Maintenance of the temporary pedestrian facility surface to meet the firm, stable, slip resistant, and minimum width is required at all times. The temporary pedestrian facility surface must be removed and a permanent pedestrian facility must be replaced prior to the end of the construction season.

F. Utility Construction

If the pedestrian circulation path is disturbed during utility construction, the requirements of this section and Section 12A-2 shall apply.
Chronology of Changes to Design Manual Section:

012A-004 Pedestrian Facilities During Construction

9/20/2012 Revised
Updated header to include SUDAS for joint publication.

4/17/2012 NEW
New.
**PAVEMENT REHABILITATION**

**PART 1 - GENERAL**

1.01 **SECTION INCLUDES**

A. Full and Partial Depth PCC Patches
B. Full and Partial Depth HMA Patches
C. Full Depth Composite Patches
D. Diamond Grinding
E. Milling
F. Cleaning and Filling Joints and Cracks
G. Curb and Gutter Replacement

1.02 **DESCRIPTION OF WORK**

A. Construct full depth PCC, HMA, and composite patches.
B. Construct partial depth PCC and HMA patches.
C. Grind existing PCC pavement surface for profile improvement using a diamond grinder.
D. Mill the surface of HMA or PCC pavement to improve the surface profile and cross-section in preparation for resurfacing.
E. Clean and fill longitudinal and transverse joints and random cracks in PCC and HMA pavement.
F. Remove existing pavement and curb and gutter.

1.03 **SUBMITTALS**

Follow the General Provisions (Requirements) and Covenants, as well as the following:

A. PCC mix design.
B. HMA mix design.

1.04 **SUBSTITUTIONS**

Follow the General Provisions (Requirements) and Covenants.

1.05 **DELIVERY, STORAGE, HANDLING, AND SALVAGING**

Follow the General Provisions (Requirements) and Covenants, as well as the following:

A. **PCC**: See Section 7010.
B. **HMA**: See Section 7020.
1.06 SCHEDULING AND CONFLICTS

Follow the General Provisions (Requirements) and Covenants.

1.07 SPECIAL REQUIREMENTS

None.

1.08 MEASUREMENT AND PAYMENT

A. Full Depth Patches

1. **Measurement:** Measurement will be in square yards for each type of full depth patch. Patches less than 2 square yards in area will be considered 2 square yards.

2. **Payment:** Payment will be made at the unit price per square yard for each type of full depth patch.

3. **Includes:** Unit price includes, but is not limited to, sawing, removing, and disposing of existing pavement and reinforcing; restoring the subgrade; furnishing and installing tie bars and dowel bars; furnishing and placing the patch material, including the asphalt binder and tack coat; forming and constructing integral curb; surface curing and pavement protection; joint sawing and filling; and placing backfill and restoring disturbed surfaces.

B. Subbase Overexcavation:

1. **Measurement:** Measurement will be in tons of subbase material placed for authorized overexcavation.

2. **Payment:** Payment will be made at the unit price per ton of subbase material.

3. **Includes:** Unit price includes, but is not limited to, removal of existing subbase or subgrade, disposal of materials removed, furnishing and placing subbase material, and any additional excavation required for subbase placement.

C. Partial Depth Patches:

1. **Measurement:** Measurement will be in square feet for each type of partial depth patch. Patches less than 1 square foot in area will be considered 1 square foot.

2. **Payment:** Payment will be made at the unit price per square foot for each type of partial depth patch.

3. **Includes:** Unit price includes, but is not limited to, sawing, removing, and disposing of existing pavement; furnishing tack coat or bonding agent; furnishing and placing the patch material; curing; joint filling (PCC patches only); placing backfill; and restoring disturbed surfaces.

4. **Extra Payment:** When partial depth patches are constructed to full depth at the direction of the Engineer, payment will be at 2 times the unit price per square foot for each type of partial depth patch.
1.08 MEASUREMENT AND PAYMENT (Continued)

D. Crack and Joint Cleaning and Filling, Hot Pour:

1. Measurement: Measurement will be in linear feet measured along the cracks or joints.

2. Payment: Payment will be made at the unit price per linear foot of crack and joint cleaning and filling.

3. Includes: Unit price includes, but is not limited to, furnishing crack and joint filler material and routing, sawing, cleaning, and filling joints or cracks.

E. Crack Cleaning and Filling, Emulsion:

1. Crack Cleaning and Filling, Emulsion:
   a. Measurement: Measurement will be in linear feet measured along the cracks. Map cracked areas will not be measured.
   b. Payment: Payment will be made at the unit price per linear foot of crack cleaning and filling.
   c. Includes: Unit price includes, but is not limited to, furnishing emulsified crack filler material, cleaning cracks, placing soil sterilant, and filling cracks.

2. Hot Mix Asphalt for Crack Filling:
   a. Measurement: Measurement will be in tons of HMA used for filling cracks greater than 1 inch. Quantity will be based upon scale tickets. Mixture not used in the work will be deducted based upon scaled weights.
   b. Payment: Payment will be made at the unit price per ton for HMA used in filling cracks over 1 inch.
   c. Includes: Unit price includes, but is not limited to, cleaning, applying tack coat, and furnishing and placing HMA for crack filling.

F. Diamond Grinding:

1. Measurement: Measurement will be in square yards for the area of diamond grinding.

2. Payment: Payment will be made at the unit price per square yard of diamond grinding.

3. Includes: Unit price includes, but is not limited to, diamond grinding pavement, testing for smoothness according to the contract documents, and removal of slurry and residue from the project site.

G. Milling:

1. Measurement: Measurement will be in square yards for the area of milling.

2. Payment: Payment will be made at the unit price per square yard of milling.

3. Includes: Unit price includes, but is not limited to, milling pavement; furnishing water; and salvaging, stockpiling, and removing cuttings and debris.
1.08 MEASUREMENT AND PAYMENT (Continued)

H. Pavement Removal:

1. **Measurement:** Measurement will be in square yards. No deduction in area will be made for manholes, storm sewer intakes, valve boxes, or other structures less than 2 square yards in area. Pavement removal for patching is included as part of the patching item and will not be measured separately.

2. **Payment:** Payment will be made at the unit price per square yard.

3. **Includes:** Unit price includes, but is not limited to, sawing, breaking, removing, and disposing of existing pavement and reinforcing steel.

I. Curb and Gutter Removal:

1. **Measurement:** Measurement will be in linear feet measured along the back of curb.

2. **Payment:** Payment will be made at the unit price per linear foot of curb and gutter removed.

3. **Includes:** Unit price includes, but is not limited to, sawing, breaking removing, and disposing of existing curb and gutter.

J. **Sampling and Testing:** Required sampling and testing for pavement repair and rehabilitation work is incidental to other project costs and will not be paid for separately.
PART 2 - PRODUCTS

2.01 MATERIALS

A. PCC:

1. **Standard Patching**: Use Class C mix complying with Section 7010. Comply with Iowa DOT Materials I.M. 401. Construct all patches as standard patches unless otherwise specified in the contract documents.

2. **High Early Strength Patching**: Use Class M mix complying with Section 7010. Do not use calcium chloride unless otherwise specified in the contract documents.

3. **Partial Depth Patching**: Use a coarse aggregate in concrete mix complying with Iowa DOT Article 4109.02, Gradation No. 5.

B. **HMA**: Provide a minimum 300,000 ESAL mixture complying with Iowa DOT Article 2303.02 unless otherwise specified in the contract documents. Provide mixture with a PG 64-22 asphalt binder.

C. **Crack and Joint Filler Material**:

1. **Hot Pour Crack and Joint Filler**: Comply with Iowa DOT Section 4136.

2. **Emulsified Asphalt Crack Filler**: Provide CRS-2 or CRS-2P emulsions complying with Iowa DOT Section 4140.

3. **HMA for Filling Cracks**:
   a. Provide a 3/4 inch, 1/2 inch, or 3/8 inch HMA mixture complying with Section 7020, or a similar mixture from a commercial source subject to approval from the Engineer.
   b. Upon approval of the Engineer, a high performance bituminous cold premix may be used, depending on the availability of the specified hot mix asphalt.

4. **Blotting Material**: Provide sand complying with Iowa DOT Sections 4124 or 4125, or similar sand approved by the Engineer.

5. **Soil Sterilant**: Provide soil sterilant as specified in the contract documents.

D. **Primer or Tack Coat Bitumen**: Comply with Iowa DOT Article 2303.02.

E. **Epoxy for Bonding Dowel and Tie Bars**: Comply with Iowa DOT Materials I.M. 491.11.

F. **Tie Bars and Dowel Bars**: Provide epoxy coated bars complying with Iowa DOT Section 4151.

G. **Subbase Material**: Unless otherwise specified in the contract documents, use modified subbase complying with Section 2010.

H. **Liquid Curing Compound**: Comply with Iowa DOT Section 4105.

I. **Cement Grout**: Provide a water cement grout mixture with a ratio of one part water to one part cement.
PART 3 - EXECUTION

3.01 GENERAL

A. Conduct all operations to minimize inconvenience to traffic. Confine operations to one traffic lane, unless the road is to be closed to traffic. Minor encroachment into the adjacent lane, such as for sawing and installing forms, will be acceptable with the use of a flagger according to MUTCD.

B. Do not remove pavement for either full depth or partial depth patching unless the patch can be completed before the end of the working day.

C. Construct full depth and partial depth patches to the dimensions specified in the contract documents or as marked by the Engineer in the field. Construct all full depth patches to full panel width.

D. Make saw cuts parallel or perpendicular to the centerline.

E. Remove and dispose of materials not designated for salvage.

F. Restore the area outside the pavement by placing and compacting backfill material, placing topsoil, and sodding or seeding as specified in the contract documents.

3.02 FULL DEPTH PATCHING

A. Pavement Removal:

1. Saw pavement to full depth at the edges of the patch. A second saw cut, 2 inches inside the initial saw cut, may be required to prevent damage to adjacent pavement.

2. Do not damage pavement that is to remain. Do not use heavy equipment adjacent to new concrete until the opening strength is achieved.

B. Restoring Subgrade or Subbase:

1. Excavate 2 inches below the bottom of the existing pavement. If more than 2 inches is excavated, place and compact new subbase material as required to bring the subbase to a level 2 inches below the bottom of the existing pavement. Correct unauthorized overexcavation at no additional cost to the Contracting Authority.

2. Compact the exposed subgrade or subbase by a minimum of four complete passes with a plate-type vibratory compactor with a minimum force rating of 3,600 pounds.

3. When unstable material or excessive moisture is encountered, the Engineer may order removal and replacement of the unstable material.
   a. Remove existing unstable subgrade or subbase, or both, to the depth directed by the Engineer.
   b. Place and compact new subbase material as required to bring the subbase to a level 2 inches below the bottom of the existing pavement.

C. Placing PCC Patches:

1. Equipment: Comply with Iowa DOT Article 2301.03, A, specifications on equipment for standard concrete pavement.
3.02 FULL DEPTH PATCHING (Continued)

2. Tie Bars and Dowel Bars: Comply with Section 7010 and the figures in Sections 7010 and 7040.
   a. When there is a common line between two adjacent patches, a bent bar may be placed in a keyway and later straightened.
   b. Cost dowel bars extending into the patch area with a bond breaker. Do not coat tie bars.

3. Forms: Comply with Section 7010, 3.02, D, as well as the following.
   a. Use forms on all exposed edges and along the centerline for patches that extend into an adjacent lane, unless full pavement width patches are constructed.
   b. Rigid wood forms may be used in lieu of steel.

4. Placing, Consolidation, and Finishing the Concrete:
   a. Moisten the subbase or subgrade, or cover with a single layer of polyethylene film lapped at 12 inches for large areas.
   b. Except for preplanned joints, place the patch continuously until the patch is completed.
   c. When a delay of 45 minutes cannot be avoided, construct a day's work ('DW') joint.
   d. Carefully place concrete into the patch area to avoid segregation; spread into place and consolidate with a mechanical vibrator. Place full lane width patches over 25 feet in length with a suitable finishing machine that has at least one vibrating screed. Avoid excessive vibrating.
   e. Finish patches per Section 7010, 3.02, H.
   f. For joints with tie bars, tool the edge. For joints with dowel bars, saw to a depth of approximately 1 1/8 inch, leaving an opening of at least 3/8 inch in width to provide a reservoir for joint filler.
   g. Texture the patch to match the adjacent surface.

5. Curing: Comply with Section 7010, 3.02, I. Cure the concrete, including exposed vertical edges, immediately after the concrete has been finished and the surface water has evaporated.

6. Joints: Construct and fill joints according to Section 7010, 3.02. Place joints at locations specified in the contract documents.

7. Pavement Protection: Comply with Section 7010, 3.05.

8. Use of Pavement: Comply with opening strength requirements of Section 7010, 3.06. Maturity testing is not required.

D. Placing HMA Patches:

1. Use equipment complying with Iowa DOT Article 2303.03. Use of a paving machine is not required.

2. Apply tack coat to the vertical edges of the remaining pavement at a rate of 0.10 to 0.15 gallons per square yard.

3. Place HMA patch mixture in lifts that will not exceed 3 inches in thickness after compaction, with the top lift not exceeding 2 inches in thickness when compacted.

4. Compact each lift while hot by rolling or compacting with a vibratory compactor. Subsequent lifts may be placed as soon as the preceding lift has been properly compacted.
3.02 FULL DEPTH PATCHING (Continued)

5. Smooth the final lift with a steel-tired finish roller. Ensure the final compacted surface is level with, or no more than 1/8 inch above, the adjacent pavement and has a smooth riding surface. If the patch becomes distorted for any reason, smooth the surface by blading, scraping, grinding, filling, or other approved means.

6. Do not extend patch material beyond the edge of the existing pavement; remove patch material that extends outside the patch limits.

7. Do not open to traffic until the mixture has cooled sufficiently to provide stability.

3.03 PARTIAL DEPTH PATCHING

A. Pavement Removal:

1. Ensure all patches are square or rectangular in shape.

2. Saw to a depth of 2 inches at the removal limits.

3. Using a 15 pound maximum size pneumatic hammer, remove the deteriorated pavement down to sound pavement.

4. In lieu of sawing and removal with a pneumatic hammer, the designated patch area may be milled to the prescribed depth. Saw edges of milled removal areas to create vertical face, unless otherwise specified in the contract documents.

5. Remove pavement to the appropriate depth. If the required depth to sound pavement exceeds the maximum removal depth, construct a full depth patch.
   a. PCC Pavement: Minimum removal depth of 2 inches or a maximum depth of 1/3 of the pavement thickness.
   b. HMA Pavement: Minimum removal depth of 2 inches or a maximum depth of 1/2 of the pavement thickness.

B. PCC Patch Placement:

1. Clean removal area by sandblasting, followed by airblasting, until the area is clean and dry. Ensure the compressed air used for cleaning is oil and moisture free. Place concrete the same day as sandblasting.

2. Place resilient filler material complying with Iowa DOT Article 4136.03 along existing joints. Filler material is to extend 1 inch below the patch and 3 inches beyond the patch boundaries.

3. Thoroughly coat the bottom and sides of the patch area with a cement grout immediately prior to placement of concrete. Do not allow grout to set prior to placement of concrete. Remove grout set by sandblasting and reapply.

4. Deposit concrete in the patch; finish patch from the center outward. Ensure concrete does not infiltrate into existing cracks or joints.

5. Apply joint filler material to expansion joints. At the interface between the patch and the slab, apply cement grout to fill.

6. Texture the patch similar to the adjacent surface.

7. Cure patch according to Section 7040, 3.02.
3.03 PARTIAL DEPTH PATCHING (Continued)

C. HMA Patch Placement:

1. Clean removal area by airblasting until the area is clean and dry. Ensure the compressed air used for cleaning is moisture free.

2. Cover the entire removal area with tack coat at a rate of 0.10 to 0.15 gallons per square yard.

3. Place HMA patch mixture in lifts that will not exceed 3 inches in thickness after compaction, with the top lift not exceeding 2 inches in thickness when compacted.

4. Compact each lift while hot by rolling with an adequately weighted pneumatic tire roller or by tamping with a mechanical tamper. Succeeding lifts may be placed as soon as the preceding lift has been properly compacted.

5. Smooth the final lift with a steel-tired finish roller. Ensure the final compacted surface is level with, or not more than 1/8 inch above, the adjacent pavement and has a smooth riding surface. If the patch becomes distorted for any reason, smooth the surface by blading, scraping, grinding, filling, or other approved means.

6. Do not open to traffic until the mixture has cooled sufficiently to provide stability.

3.04 DIAMOND GRINDING

A. Use equipment complying with Iowa DOT Article 2532.03, A.

B. Grind and texture the entire surface of the pavement parallel to the centerline until the pavement surface on both sides of transverse joints and all cracks are in the same plane and meets the required smoothness.

C. Ensure the ground surface is of uniform texture. In each lane, ensure at least 95% of the area in each 100 foot section has a newly textured surface.

D. Except at joints and cracks, ensure grinding depth does not exceed 1/2 inch. At joints and cracks, ensure grinding depth does not exceed 3/4 inch.

E. For multiple passes, ensure overlaps do not exceed 1 inch. Begin at the crown of the roadway, proceeding toward the pavement edge with each subsequent pass. Ensure each subsequent pass is at least as deep as the previous pass in order to provide transverse drainage. All passes are to begin and end at the same station location.

F. Assemble and adjust the grinding head as necessary during the project to produce the following tolerances on pavements with the indicated coarse aggregates. Both the distance between grooves and the texture depth must be within the specified range to be in compliance.

<table>
<thead>
<tr>
<th></th>
<th>Crushed Stone</th>
<th>Gravel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blade Segment Thickness</td>
<td>0.130&quot; max.</td>
<td>0.130&quot; max.</td>
</tr>
<tr>
<td>Distance Between Grooves*</td>
<td>0.100&quot; to 0.125&quot;</td>
<td>0.080&quot; to 0.110&quot;</td>
</tr>
<tr>
<td>Texture Depth**</td>
<td>Target of 1/16&quot; with average between 1/32&quot; and 3/32&quot;</td>
<td></td>
</tr>
</tbody>
</table>

*Based on an average of a minimum of ten measurements across the ground width for one pass.

**Based on an average of a minimum of six measurements across the ground width for one pass.
3.04 DIAMOND GRINDING (Continued)

G. Prior to enforcement of the tolerances listed above, a 1,000 square yard test area will be allowed for a new head that has been restacked, provided a surface texture in reasonable conformance with the specifications, as determined by the Engineer, is being produced.

H. Ensure the transverse slope of the ground pavement is uniform to a degree that there are no depressions or misalignment of slope greater than 1/4 inch in 12 feet when tested by string line or straightedge placed perpendicular to the centerline.

I. Continuously remove all slurry or residue resulting from the grinding operations, and remove from the project limits. Ensure residue from grinding operations does not flow across lanes occupied by public traffic or into gutters, storm sewers, ditches, or other drainage facilities.

J. When pavement smoothness testing is specified in the contract documents, measure smoothness with a profilograph, which produces a profilogram (profile trace) of the surface tested, according to Iowa DOT Materials I.M. 341 and the following requirements:

1. Prior to performing any grinding work, provide a control profilogram for each lane and/or segment over 50 feet in length that is to be ground. Ensure pavement is relatively clean and free of debris prior to establishing the control profilogram.

2. Ensure each segment of the finished ground surface has a final profile index less than or equal to 35% of the control profilogram trace or 22 inches per mile, whichever is greater, and does not include any bumps exceeding 1/2 inch in 25 feet.

3. Depressed pavement areas due to subsidence or other localized causes and areas where the maximum cut restricts further grinding will be excluded from testing with the profilograph when approved by the Engineer.

3.05 MILLING

A. Use equipment complying with Iowa DOT Article 2531.03, A.

B. Mill the entire pavement area designated to the depth specified in the contract documents. Mill in straight lines. Make sufficient passes, or cuts, such that all irregularities or high spots are eliminated.

C. Control milling operations to provide a surface that is true within a nominal tolerance of 1/4 inch and 1/4 inch at longitudinal joints where adjacent passes meet. The profile may be inspected by checking with a 10 foot surface checker placed parallel to the centerline. Correct variations greater than 1/4 inch.

D. Load cuttings directly into dump trucks and remove the remaining small cuttings and debris from the street. Sweep the scarified surface with a rotary broom before opening to traffic. Unless otherwise specified in the contract documents, all materials removed are property of the Contractor.

E. Do not operate metal tracked equipment on streets, other than those being milled.

F. Ensure excessive dust does not become airborne during construction. Additional water may be required at any time for dust control.

G. Mill around manholes and utility valves. Correct any damage to manholes or valves by the milling operation at no additional cost to the Contracting Authority.

H. Do not leave a vertical drop of more than 2 inches at the centerline or lane line overnight. Taper the ends of milled sections subject to traffic to provide a uniform and gradual transition.
3.06 CRACK AND JOINT CLEANING AND FILLING, HOT POUR

A. General:

1. Use equipment complying with Iowa DOT Articles 2541.03 (HMA) and 2542.03 (PCC).

2. Route or saw joints and cracks with an average opening of 3/8 inch or less to provide a minimum sealant reservoir of 3/8 inch wide by a nominal 1/2 inch deep. For joints and cracks less than 3/8 inch wide, widen by routing or sawing to a minimum width of 3/8 inch and depth of 1/2 inch.

B. Crack and Joint Cleaning:

1. Clean cracks or joints of existing joint filler material, backer rod, vegetation, dirt, and other foreign material.

2. Clean joints or cracks by air blasting or by other methods as necessary to remove debris.

3. If specified in the contract documents, clean wet sawn joints with high pressure water immediately after sawing to remove residue produced by the sawing operation.

4. When cleaned joints or cracks are contaminated before being filled, clean them again before filling.

C. Crack and Joint Filling:

1. Ensure cracks and joints are dry prior to placement of filler material.

2. Heat, handle, and apply joint filler material to the proper level as specified in the contract documents and as recommended by the manufacturer.
   a. PCC Pavement: Do not overfill joint or crack with filler material. Immediately remove filler material placed on the pavement surface.
   b. HMA Pavement: Slightly overfill the entire crack reservoir with filler material. Smooth with a narrow V-shaped squeegee immediately after placement of the filler material to within 1/2 inch on each side of the crack edge.

4. Place joint filler material when the pavement and ambient air temperatures are 40°F or higher. When near this minimum, additional air blasting or drying time, or both, may be necessary to ensure a satisfactory bond to the joint surfaces.

5. Lanes may be opened to traffic only after the filler material has set sufficiently so it will not pick up under traffic. Blotting material may be applied to the filler material, but only after the surface has set to avoid penetration of the blotting material into the filler material.

3.07 CRACK CLEANING AND FILLING, EMULSION

Use emulsified asphalt for filling cracks in HMA surfaces only. Do not use on PCC pavements.

A. General:

1. Clean cracks with either high pressure air or water equipment. Do not use water when freezing temperatures exist or are forecasted.

2. Ensure vegetation is removed from cracks. Alternative cleaning methods may be necessary to remove vegetation.
3.07 CRACK CLEANING AND FILLING, EMULSION (Continued)

3. When specified in the contract documents, apply a soil sterilant in crack prior to placing the filler material.

4. For filling cracks, use a hand operated wand or pouring pot, capable of placing the filler material into the crack and filling to the adjacent surface. Use a spout or nozzle small enough to place the filler material into the crack without soiling the adjacent surface.

5. Immediately after placement of the filler material, tightly spread the emulsion using a 2 inch, or less, V-shaped rubber-edged squeegee. Take proper measures to hold the filler in place and prevent runout at edge of pavement or at low areas.

B. Cracks Wider Than 1 inch:

1. Clean the cracks of loose and spalled material, sand, and other foreign debris to a depth of 3 inches using high pressure water.

2. When specified in the contract documents, utilize additional methods to clean cracks of old crack filler.

3. Blow the cleaned cracks free of water with high pressure air.

4. Lightly apply a tack coat to the crack surfaces.

5. Fill the cracks with hot mix asphalt.
   a. Ensure mix is warm and pliable when placed.
   b. Rod and tamp the mix into place level with the adjacent surface.
   c. Place mixture prior to filling cracks with emulsion.

6. Place a thin application of emulsion over the hot mix asphalt and tightly spread with a squeegee.

C. Cracks 1/4 inch to 1 inch in Width:

1. Clean the cracks of loose and spalled material, sand, and other foreign debris with high pressure air or high pressure water. Clean crack down to sound material, but a depth greater than 3 inches will not be required.

2. When specified in the contract documents, utilize additional methods to clean cracks of old crack filler.

3. Fill cracks with emulsion filler material.

D. Cracks Less Than 1/4 inch in Width:

1. Clean sufficiently to remove sand and other foreign debris.

2. Fill cracks with emulsion filler material.

E. Map-cracked (Alligator) Areas:

1. Cover area with emulsion filler material.

2. Spread emulsion over area with squeegee, working emulsion into cracks. Provide a thin, smooth application.

3. Promptly cover the filler material with a light application of blotter material.
3.08  PAVEMENT REMOVAL

A. Saw full depth at pavement removal limits.

B. Extend pavement removal limits to existing joint lines as directed by the Engineer.

C. Protect existing pavement, beyond removal limits, from damage. Remove to a new saw line and replace, at no additional cost to the Contracting Authority, all concrete broken or damaged beyond the removal limits designated by the Engineer.

3.09  CURB AND GUTTER REMOVAL

A. Saw longitudinally along the existing gutter joint or at a location directed by Engineer. Saw transversely at the curb and gutter removal limits.

B. Remove existing curb and gutter without damaging the existing pavement to remain.

END OF SECTION
ONE PANEL WIDTH PATCH WITH OPPOSING JOINT

ONE PANEL WIDTH PATCH NO OPPOSING JOINT

FULL ROADWAY WIDTH PATCH

GUTTERLINE JOINTING

EXISTING JOINT

'B' Joint

'RD' Joint

'KT-2' or 'BT-3' Joint

6'-0" min. 15'-0" max.

EXISTING PAVEMENT

SECOND POINT JOINTING

EXISTING JOINT

'B' Joint

'RD' Joint

'KT-2' or 'BT-3' Joint

6'-0" min. 15'-0" max.

EXISTING PAVEMENT

CENTER PANEL PATCH WITH OPPOSING JOINTS

EXISTING JOINT

'B' Joint

'RD' Joint

'RT' Joint

6'-0" min. 15'-0" max.

EXISTING PAVEMENT

CENTER PANEL PATCH NO OPPOSING JOINT

EXISTING JOINT

'B' Joint

'RD' Joint

6'-0" min. 15'-0" max.

EXISTING PAVEMENT

OUTSIDE PANEL PATCH NO OPPOSING JOINT

OUTSIDE PANEL PATCH WITH OPPOSING JOINT

EXISTING JOINT

'B' Joint

'RD' Joint

6'-0" min. 15'-0" max.

EXISTING PAVEMENT

FULL ROADWAY WIDTH PATCH

FULL ROADWAY WIDTH PATCH

ADJACENT PANELS PATCH

1. Patches on roadways with quarter point jointing will be similar to third point jointing details.
2. Minimum distance between existing joint and patch is 5 feet. If distance is less than 8 feet, extend patch to existing joint.
3. When subgrade or subbase material is required below patch, bring material to bottom of pavement and match existing patch thickness.
GUTTERLINE JOINTING

EXISTING PAVEMENT

"RD" JOINT

"KT-2" or "BT-3" Joint

10'-0" min. 6'-0" max.

10'-0" min. 6'-0" max.

ONE PANEL WIDTH PATCH

THIRD POINT JOINTING

EXISTING PAVEMENT

"RD" JOINT

"BT" Joint

10'-0" min. 6'-0" max.

10'-0" min. 6'-0" max.

OUTSIDE PANEL PATCH

EXISTING PAVEMENT

"RD" JOINT

"BT" Joint

10'-0" min. 6'-0" max.

10'-0" min. 6'-0" max.

CENTER PANEL PATCH

EXISTING PAVEMENT

"KT-2" or "BT-3" Joint

10'-0" min. 6'-0" max.

10'-0" min. 6'-0" max.

FULL ROADWAY WIDTH PATCH

1. Patches on roadways with quarter point jointing will be similar to third point jointing details.
2. Minimum distance between existing joint and patch is 6 feet. If distance is less than 6 feet, extend patch to existing joint.
3. Match existing joint type and locations.
4. 'C' joint unless 'CD' joint is specified.
5. If existing joint spacing is greater than 20 feet, add a 'CT' joint at mid-panel.
6. When subgrade or subbase material is required below patch, bring material to bottom of pavement and match existing patch thickness.

LONGITUDINAL SECTION THRU PCC PATCH

EXISTING CURB

Dowel or Tie Bars

EXISTING PAVEMENT

T+2" (typ.)

FULL DEPTH PCC PATCHES GREATER THAN 15' LONG
When subgrade or subbase material is required below patch, bring material to bottom of pavement and match existing patch thickness.

When removing pavement, saw to full depth or 10 inches, whichever is less.
1. Vertical saw cut (typical). Apply tack coat to sides and bottom.
2. Vertical saw cut (typical). Apply cement grout to sides and bottom.
3. Saw and seal existing joint.
4. Extend patch limits at least 3 inches beyond distressed area.
5. When milled removal is allowed, sawdust and debris shall be removed from milled area. Apply cement grout to milled area.

**SECTION B-B**

**SECTION A-A (Option 1: Smooth Edges)**

**SECTION A-A (Option 2: Milled Edges)**
**FLOWABLE MORTAR CUTOFFWALL**

*Without Sewer*

- **Subbase** (as specified)
- **Pavement**
- **Undisturbed Soil**
- **1500 PSI Flowable Mortar**
- **12" min.**
- **3'-0" min.**
- **6"**
- **6010.501 (SW-501) intake. See dimensions in contract documents for other intake types.**

**SECTION A-A**

*Flowable mortar cutoffwall and storm sewer*

- **Subbase** (as specified)
- **Pavement**
- **Undisturbed Soil**
- **1500 psi Flowable Mortar**
- **12" min.**
- **3'-0" min.**
- **6"**
- **6" Perforated Subdrain (perforations down)**

**FLOWABLE MORTAR CUTOFFWALL**

*With Subdrain*

- **Subbase** (as specified)
- **Pavement**
- **Undisturbed Soil**
- **Filter Fabric (when specified)**
- **Perforated Storm Sewer (perforations up)**
- **Impervious Bedding Compacted in Place**

**DISTANCE FROM C INTAKE TO C CROSSRUN**

<table>
<thead>
<tr>
<th>Size</th>
<th>Distance (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15&quot; RCP</td>
<td>0.7&quot;</td>
</tr>
<tr>
<td>15&quot; CMP</td>
<td>0.8&quot;</td>
</tr>
<tr>
<td>18&quot; RCP</td>
<td>0.5&quot;</td>
</tr>
<tr>
<td>18&quot; CMP</td>
<td>0.7&quot;</td>
</tr>
</tbody>
</table>

Length of cutoffwall to be back of curb to back of curb.