# Section 500

## Concrete Construction

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**City Engineer's Approval**: ______________________________
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501 - CONCRETE - GENERAL

501.1 Scope of Work
The work under this section shall consist of constructing new or removing and replacing Concrete Sidewalk, Curb & Gutter, and/or Pavement of the dimensions and design shown on the plans or as specified in the Contract Documents. The work shall be placed in one course on the prepared foundation or base, at the specified locations, and to the required lines and grades.

The Contractor shall furnish all labor, equipment, materials, supervision, tools, supplies, and incidentals for the construction of new or remove & replace Concrete Pavement, Curb & Gutter, Sidewalk in accordance with the plans and specifications for the project.

501.2 Associated Specifications
The Contractor is advised that associated work is covered in other sections of this document and he shall be familiar with all applicable standards required for the work. While not all inclusive, the Contractor is especially advised to be familiar with the sections on Erosion and Sediment Control; Earthwork, Grading, and Graveling; Traffic Control; and Landscaping.

Except as hereinafter otherwise noted, the State of Wisconsin Department of Transportation Standard Specifications for Highway and Structure Construction - latest edition, with all current supplemental specifications, are, by reference, made part of these specifications. The aforementioned standard specification is hereinafter referenced as the "Wisconsin DOT Specifications" or as "WDOT".

501.3 Material Source
The source of materials for use on the project shall be subject to the approval of the Engineer.

501.4 Concrete
Concrete shall consist of a mixture of the Portland cement, fine aggregate, coarse aggregate, and water, and shall be proportionally mixed in such a manner as to provide for a hard, durable, impervious substance, free from the effects of any spalling, disintegration, or cracking.

501.4.1 Cement Content
Six (6) bags per cubic yard, unless otherwise specified in the special provisions. (High Early mix shall consist of a 7 bag mix, or as specified in the Special Provisions for the work).
501.4.1.2 **Slump**  
Pavement - maximum three (3") inches.  
Curb & Gutter - maximum three (3") inches.  
Sidewalk - maximum four (4") inches.  
Driveway approach – maximum four (4") inches.  
Testing shall conform to ASTM C143 standard slump cone field test procedure.

501.4.1.3 **Aggregate Size**  
Maximum one and one-half (1 1/2") inches.

501.4.1.4 **Air Entraining**  
Require six (6) percent (+ one (1%) percent) air (by volume).  
Air entraining admixture conforming to ASTM C 260 is permitted.

501.4.1.5 **Fly Ash**  
Permitted up to twenty (20%) percent of the weight of the cement by weight. Only Type "C" fly ash will be allowed.

501.4.1.6 **Maximum Mixing Time**  
One and one-half (1 1/2) hours.

501.4.1.7 **Minimum Mixing Time**  
Twenty (20) revolutions prior to discharging.

501.4.1.8 **Minimum Air Temperature at Time of Pour**  
Thirty-five (35) degrees and rising.

501.4.1.9 **Concrete Temperature at Time of Pour**  
Minimum temperature fifty (50) degrees Fahrenheit.  
Maximum temperature ninety (90) degrees Fahrenheit.

501.4.1.10 **Compression Strength**  
Minimum 3,500 P.S.I. @ 28 days.

501.4.1.11 **Calcium Chloride**  
The use of up to 2% calcium chloride in the concrete mix is permitted when temperatures may drop below freezing within 24 hours of finishing of concrete, unless reinforced concrete is specified.

501.4.1.12 **Admixtures**  
Except as noted above will not be permitted.

501.5 **Concrete Requirements**  
Concrete shall conform to Section 501.4.1 of these Standard Specifications.

Ready mix concrete shall conform to Section 501.3.5, Wisconsin D.O.T. Specifications and also the requirements of the Standard Specifications for Ready Mix Concrete, ASTM C 94.

The ready mix supplier shall furnish duplicate delivery tickets, one for the Contractor and one for the Engineer, which shall provide all pertinent information as specified in Section 501.8.
of these Standard Specifications.

Batching plants shall conform to Section 501.3.6 of the D.O.T. Specifications, and all scales used shall be certified by the State, prior to construction.

The use of site mixed concrete shall not be permitted for city sidewalk, curb & gutter, or pavements.

501.6 Concrete Design Mix
The Contractor shall secure a concrete design mix from the concrete supplier, which conforms to the concrete requirements of these specifications. The exact proportions of fine and course aggregate and the amount of water used per cubic yard of concrete will be the responsibility of the Contractor. Prior to placing of any concrete, the Contractor shall submit to the Engineer for his review, the name of the concrete supplier and the concrete suppliers proposed design mix for the contract. The Engineer reserves the right to reject any, or all, design mixes and suppliers, if he feels that they will not meet the defined concrete requirement criteria. If a design mix fails to meet the requirements as specified, the Contractor shall remove any and all concrete installed which used the non-conforming design mix and replace it with concrete meeting these specifications at no cost to the owner. The design mix once reviewed by the Engineer, shall not be altered in any way without the consent of the Engineer.

501.7 Consistency
The concrete consistency shall conform to Section 415.3.6 of the D.O.T. Specifications. The consistency shall be tested and regulated by means of the slump test (ASTM C 143).

501.8 Load Ticket
With each load of concrete delivered to the job, the concrete producer shall furnish duplicate delivery tickets, one for the Contractor and one for the Engineer, certifying to the following data pertaining to the concrete delivered.

- Date
- Name of ready mix concrete plant or other supplier
- Project location
- Truck number
- Type (Standard, A.E. or H.E.S.)
- Brand of cement used in batch
- Cement content in bags per cubic yard of concrete
- Aggregate size
- A.E. admixture, if used
- % Fly ash, if used
- Other admixtures (Only with prior approval of the Engineer)
- Batch out time
- Arrival time at job site
- Time truck finished unloading
- Total amount of water added after batching (in gallons)
502.1 **Cement**
Normal Portland Cement conforming to ASTM Designation C 150 Type 1, with the addition of air entraining admixture conforming to ASTM Designation C 260, or Air Entraining Portland Cement conforming to ASTM Designation C 150 Type 1A may be used.

502.2 **Water**
Intended to be used with cement in concrete masonry shall be clean and free from injurious amounts of oil, alkali, organic matter, or other deleterious substances. Water which is suitable for drinking or for ordinary household use shall be considered satisfactory.

502.3 **Aggregates**
Coarse and fine aggregates furnished for use in concrete masonry shall conform to the pertinent requirements hereinafter set forth.

502.3.1 **Fine Aggregates**
Fine aggregates shall consist of a combination of sand with fine gravel, crushed gravel, or crushed stone consisting of hard, strong, durable particles conforming to the requirements set forth in this section. At the time of its use, the fine aggregate shall be free of deleterious substances such as frozen material and all foreign material such as wood, hay, burlap paper, or dirt. The fine aggregate shall also be free from injurious amounts of organic impurities.

502.3.1.1 **Size Requirements**
Fine aggregates for curb & gutter, sidewalk, and concrete pavements shall be well graded from coarse to fine and shall conform to the following gradation requirements:

<table>
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<tr>
<th>Sieve Size</th>
<th>% Passing</th>
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<tbody>
<tr>
<td>3/8 inch</td>
<td>100</td>
</tr>
<tr>
<td>No. 4</td>
<td>90 - 100</td>
</tr>
<tr>
<td>No. 16</td>
<td>45 - 80</td>
</tr>
<tr>
<td>No. 50</td>
<td>10 - 30</td>
</tr>
<tr>
<td>No. 100</td>
<td>2 - 10</td>
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</tbody>
</table>

These above gradation requirements for fine aggregate represent the extreme limits to be allowed for use in determining the suitability of material from all possible sources of supply.

502.3.2 **Coarse Aggregates**
Coarse aggregates shall be those aggregates predominately retained on the No. 4 sieve. Coarse aggregates shall be clean,
hard, durable gravel, crushed gravel, or crushed stone free from an excess of thin or elongated pieces, frozen lumps, vegetation, deleterious substances, or adherent coating which would be considered injurious. The amount of acceptable deleterious substances present in coarse aggregate shall be negligible. A maximum amount of allowable chert is 5% by weight.

502.3.2.1 Size Requirements
Coarse aggregate for curb and gutter and pavement shall be well graded combination of Size No. 1 and No. 2 between the limits specified in the following:

<table>
<thead>
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<th>Sieve Size</th>
<th>% Passing Size No. 1</th>
<th>% Passing Size No. 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 inch</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>1 1/2 inch</td>
<td>100</td>
<td>90 - 100</td>
</tr>
<tr>
<td>1 inch</td>
<td>100</td>
<td>20 - 55</td>
</tr>
<tr>
<td>3/4 inch</td>
<td>90 - 100</td>
<td>0 - 15</td>
</tr>
<tr>
<td>3/8 inch</td>
<td>20 - 55</td>
<td>0 - 5</td>
</tr>
<tr>
<td>No. 4</td>
<td>0 - 10</td>
<td>100</td>
</tr>
<tr>
<td>No. 8</td>
<td>0 - 5</td>
<td>100</td>
</tr>
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502.3.2.2 Sidewalk Size Requirements
Coarse aggregate for sidewalk shall be well graded between the limits specified above for Size No. 1 only.

502.4 Admixtures and Additives
The following admixtures and additives may be used in the mix design as long as they conform to the stated conditions. The use of other admixtures or additives without prior written approval of the Engineer is prohibited.

502.4.1 Air Entraining Admixtures
Air entraining admixture shall conform to Section 501 of these Standard Specifications.

502.4.2 Fly Ash
The use of fly ash in the design mix shall conform to Section 501 of these Standard Specifications.

502.4.3 Calcium Chloride
The use of calcium chloride shall conform to Section 501 of these Standard Specifications.

502.5 Jointing Material
Expansion joint filler material for sidewalk, driveway and alley approaches and other concrete construction shall be recycled plastic, recycled rubber, or sponge rubber conforming to the requirements of Section 415.2.3 of the D.O.T. Specifications. Expansion joint filler material for concrete curb and gutter shall be felt or the material of the preceding sentence.

For locations of expansion joints, see Section 503.15

REVISION DATE December 17, 2012
Concrete Curing Agents
Curing shall be accomplished by the use of a liquid membrane-forming compound. Materials for moist curing of all concrete work shall be on hand at all times, shall be applied at a rate of 200 square feet per gallon, and shall conform to the requirements of ASTM C 309, White Pigmented.
503 - CONSTRUCTION STANDARDS & METHODS - GENERAL

503.1  Construction Work Area
The construction work area for concrete pavement shall be limited to two (2') feet behind the face of curb.

The construction work area for curb and gutter shall be limited two (2') feet behind the face of curb.

The construction work area for new and remove & replace sidewalk shall be one (1') foot on each side of the sidewalk. This area shall be expanded if necessary and approved by the Engineer to accommodate the construction of a 4:1 slope.

The Contractor shall be liable for any damage caused beyond the construction work area, as noted above, unless otherwise specified in the Contract Documents. Restoration of the area within the construction work area shall be included in the bid price for the work being done.

503.2  Phasing of Work
On all projects where both curb & gutter and sidewalk are to be constructed, the curb & gutter shall be installed prior to the installation of the sidewalk.

503.3  Damage By the Contractor
Except as directed by the Engineer, the Contractor shall be responsible for the restoration of all areas outside the project limits of the contract. This shall include, but not be limited to lawn, pavement, sidewalk, curb & gutter, utilities, land survey monuments, trees, other vegetation, and topsoil.

Any damage that causes a complaint to be registered against the Contractor shall require a written release from the complainant prior to processing final payment of the contract. The Contractor shall be responsible for negotiating and obtaining said written release.

503.4  Traffic Control
The Contractor shall provide adequate traffic control devices in conformance with Section 900 on Traffic Control in these Standard Specifications.

503.4.1  Basis of Payment
The cost of this item shall be included in the Contract Unit Price for the work causing its need, unless specifically stated otherwise in the contract documents, and shall include all labor, equipment, materials, supervision, supplies, tools, and incidentals required to furnish, transport, install, and maintain the traffic control devices required for the project.
503.5  **Erosion and Sediment Control**
The Contractor shall be responsible for the installation and maintenance of erosion and sediment control devices for the project. Erosion and sediment control shall conform to Section 800 on Erosion and Sediment Control in these Standard Specifications.

503.5.1  **Basis of Payment**
The cost of this item shall be included in the Contract Unit Price for the work causing its need, unless specifically stated otherwise in the contract documents, and shall include all labor, equipment, materials, supervision, supplies, tools, and incidentals required to furnish, transport, install, and maintain the erosion and sediment control devices required for the project.

503.6  **Staking**
All staking required by the work shall conform to Section 203 of these Standard Specifications.

503.7  **Standard Design Dimensions**
Unless otherwise specified in the Contract Documents, the following shall be standards for design of concrete curb & gutter, sidewalk, and pavement. (See details in this section for additional dimensions and standard details.)

The standard curb & gutter is twenty-four (24") inches wide from back of curb to face of flange and the head is six (6") inches high.

The standard sidewalk is five (5') feet wide. The standard thickness of residential sidewalk is four (4") inches. Sidewalks across driveways shall be a minimum of six (6") inches. Reinforcement for sidewalk is not required unless otherwise specified in the Contract Documents.

The standard pavement thickness is a minimum of seven (7") inches.

Additional dimensions are shown in the detail section and may be detailed on the plans.

503.8  **Intersection of Sidewalks and/or Curb Ramps**
When the area between the intersecting sidewalks and the curb is greater than three (3') feet as measured along the curb side of the walk, the area shall be filled in with topsoil and seeded, mulched, fertilized, and watered in accordance with the requirements of these Standard Specifications.

When the area as measured above is less than three (3') feet on a side, the area shall be filled in with four (4") inch thick concrete.
503.8.1 Method of Measurement
The method of measurement will be made in accordance with the measurement for topsoil, seed, mulch, fertilize, and watering, per the landscaping section of these Standard Specifications or per square foot for new four (4") inch thick concrete sidewalk.

503.8.2 Basis of Payment
The basis of payment shall be as measured above and paid for per the contract unit price for Furnish and Place Topsoil, Seed, Fertilizer, Mulch, and Water, or for Furnish and Place 4" Concrete Sidewalk. Said payment shall be full and complete compensation for furnishing all labor, equipment, materials, supervision, tools, supplies, and incidentals required to excavate, grade, prepare the area for either landscaping or concrete placement, and do the work required by this item.

503.9 Curb Ramps
Curb ramps shall be installed at all intersections when either the sidewalk or the curb at the intersection is initially installed or when either is removed and replaced or when work is done within five (5') feet of the intersection of the sidewalks. Curb ramps shall conform to the details in these Standard Specifications. Construction of curb ramps shall conform to applicable specifications for the construction of curb, gutter and sidewalk in these Standard Specifications. See Sections 507.6 and 509.7 for additional specifications on curb ramps.

503.10 Date Stamp
The Contractor shall mark the ends of all pavement, sidewalk, and curb & gutter placed with a date stamp. The date stamp shall contain the Contractor's name and the current year of construction. The Contractor shall place the date stamp at the end of his work at the point where it joins existing work. If only one section of sidewalk, or curb & gutter is being constructed, the new slab shall be marked on one end.

503.11 Equipment

503.11.1 Paving Machine
Paving machines will be permitted for the placement of concrete pavement, curb & gutter, and new sidewalk. No modifications to manhole frames and covers, or catch basin/inlet frames and grates shall be made to accommodate the use of paving machines. The Contractor shall be required to accommodate the standard City manhole and inlet frames and covers as well as water valve boxes in his work. The Contractor shall make such modifications and adjustments to his work as required to accommodate the facilities. The Contractor shall also comply with the details of these Standard Specifications as to dimensions for curb & gutter. See also Sections 413.5 and 413.7 in these Standard Specifications.
503.11.2 Forms
Forms shall be of a minimum height equal to the thickness of the concrete slab. Forms shall be free from twists, bends, warps, and kinks and shall be of sufficient strength and rigidity to resist pressure or load.

Metal forms shall be used on all standard work and on 65 foot or larger radius curves. Only in special cases, such as irregular shapes and short sections, will wood forms be permitted. If the Contractor has flexible metal forms that can be used on said special cases, he shall use the flexible metal forms instead of wood forms.

Wood forms are permitted for short sections of remove & replace sidewalk, new sidewalk and curb & gutter where full length forms are not practical. They shall be commercially surfaced two (2") inch thick planks having a minimum height equal to the proposed thickness of the concrete being poured. Standard 2 x 4's will not be permitted for sidewalk construction. Form lumber having less width may be permitted, but only on irregular shapes and on radii of less than sixty-five (65') feet.

503.12 Form Setting
Forms shall be staked and set to the proper line and grade.

String line grade shall be set not less than two hundred (200') feet in advance of the forms.

The forms shall be completely cleaned of all mortar and foreign substances. The forms shall also be thoroughly oiled before the concrete is placed into them.

The foundation under the form shall be firm and cut true to grade so that the form, when set upon it, will be firmly in contact with the foundation for its entire length and so that the form is set at the desired grade.

The conformity of the alignment and grade shall be checked with the required alignment and grade of the proposed work, and necessary corrections shall be made by the Contractor prior to placing the concrete.

Where any form has been disturbed, it shall be reset and rechecked.

Forms shall be set a reasonable distance in advance of the placing of the concrete, so that satisfactory alignment, both vertically and horizontally, can be obtained to the satisfaction of the Engineer.
In areas of fill, the forms shall be placed after the subgrade has been placed and compacted. Forms set before subgrade is compacted shall be removed and reset after compaction is completed. Compaction shall conform to Section 305 of these Standard Specifications.

503.13 Placing of Concrete

Concrete shall not be placed before 7:30 A.M. or after 4:00 P.M. without the permission of the Engineer.

The Contractor may, with the approval of the Engineer, elect to use a machine for placing, forming, or consolidating the work. If a machine is used, the resulting work shall be of such quality as to equal or exceed that produced by methods herein described.

The subgrade, forms, and any required reinforcement shall be checked and approved by the Engineer prior to the placing of concrete.

After any necessary corrections have been completed, the concrete shall be placed on a moist subgrade.

The concrete shall be placed in such a manner that will provide for one course construction. Placement in layers will not be permitted. The concrete shall be tamped, spaded, or vibrated in such a manner to prevent any honeycombing when the forms are removed. If honeycombing is found, it will be the decision of the Engineer whether to patch, or to remove the defective section. The Contractor shall perform said patching or removal at no cost to the City. If patching is allowed, the voids shall be filled with a well mixed grout composed of one (1) part Portland Cement and three (3) parts of fine aggregate. The surface shall then be finished to a true surface. No feathering of the grout will be allowed on exposed surface.

The concrete shall be placed promptly after mixing and in such a manner to prevent any segregation of the mix. The concrete shall be distributed to such a depth and sufficiently above grade so that, when consolidated and finished, the slab or curb thickness required by the plans will be obtained at all points and the surfaces will conform to all specified grades and slopes.

Placing of the concrete shall be continuous. In case of a temporary shut down, the unfinished end of the concrete slab or curb shall be covered with wet burlap. When the delays are of such a duration as to permit the concrete to attain its initial set, or if the delay exceeds more than thirty minutes, a construction joint shall be installed.
The placing of the concrete shall be discontinued whenever the finishing and curing operation cannot keep up with the placing, or whenever materials, workmanship, or the resultant product fail to meet the requirements of the contract.

The Engineer reserves the right to discontinue or halt any concrete placement if, in the opinion of the Engineer, the Contractor has failed to comply with any portion of the plans and specifications.

Concrete shall not be placed around any frames, castings, catch basin/inlets, or stop boxes until they have been properly aligned and/or accurately adjusted to the specified pitch, alignment, and grade required by the work.

503.14 Manhole, Catch Basin/Inlet Adjustment and Reconstruction
When the work under this section requires the adjustment of manholes, or catch basin/inlets, the work shall be done in accordance with the specifications under Section 400 of these Standard Specifications.

503.15 Expansion Joints
A one-half (1/2") inch wide expansion joint shall be installed at the junction of the sidewalk and the back of curb. Where the sidewalk is constructed curbside, a one-half (1/2") inch wide expansion joint shall be installed between the walk and the curb.

A one-half (1/2") inch expansion joint shall be installed at the following locations; the junction of either side of the walk and a concrete driveway, the intersection of two concrete walks, and at the junction with a building or other stationary object.

A one-half (1/2") inch expansion joint shall be installed between the back of curb and a concrete driveway approach, at the ends of all radii for curb and gutter, and at points of curvature (P.C.) of curb and gutter curves.

A one-half (1/2") inch expansion joint shall be placed at two hundred and fifty (250’) foot maximum intervals for sidewalk and curb and gutter.

At catch basin and storm inlet structures a one-half (1/2") expansion joint shall be installed in the curb and gutter on both sides of the structure at ten (10’) from the edges of the structure.
The joint filler shall extend through the entire cross section of the curb and gutter and sidewalk and be placed flush with the exposed surfaces.

503.15.1 Basis of Payment
The cost of this item shall be included in the Contract Unit Price for the work causing its need, unless specifically stated otherwise in the Contract Documents, and shall include all labor, equipment, materials, supervision, supplies, tools, and incidentals required to install the expansion joints required for the project.

503.16 Sawcut Joints
Contraction joints at least one (1") inch in depth and approximately one-eighth (1/8") inch in width may be sawed in the concrete curb and gutter or sidewalk. The sawing shall be done as soon as practical after the concrete has set sufficiently to preclude raveling during the sawing and before any shrinkage cracking takes place in the concrete.

503.16.1 Basis of Payment
The cost of this item shall be included in the Contract Unit Price for the work causing its need, unless specifically stated otherwise in the Contract Documents, and shall include all labor, equipment, materials, supervision, supplies, tools, and incidentals required to saw cut the contraction joints required for the project.

503.17 Finishing Concrete
Before the mortar has set, the concrete surface shall be worked until a uniform, thin mortar surface is obtained.

Immediately after the water glaze or sheen has disappeared, the surface shall be troweled smooth. The application of neat cement to the surface is prohibited.

After the surface has become partially set and the water glaze or sheen has disappeared, the surface shall be brushed lightly with a damp fine bristle broom. Care shall be taken in brushing so that scratches or ridges are not formed.

Forms shall not be removed until the concrete has been allowed to set.

503.18 Concrete Disposal
The Contractor shall properly dispose of all waste material from the project. See Section 209 of these Standard Specifications regarding proper disposal of waste materials.

503.19 Existing Stone, Brick, or Block Walks
If stone, brick, or block sidewalks are removed, the Contractor shall place the material adjacent to the project on the
property owner's yard, preferably off of any grass area, if possible. It shall be the property owner's responsibility to restore his private walk or dispose of the materials.

503.19.1 Method of Measurement
The method of measurement will be per square foot of walk removed.

503.19.2 Basis of Payment
The basis of payment shall be as measured above and paid for per the contract unit price for Remove Existing Sidewalk. Said payment shall be full and complete compensation for all labor, equipment, materials, supervision, supplies, tools, and incidentals required to remove the material and place at a location on the owner's property.

503.20 Curing
Curing shall be required for all concrete masonry work and shall be accomplished by the impervious coating method. Failure to provide a sufficient amount of approved curing materials or failure to properly perform the requirements prescribed herein shall be cause for immediate suspension of concrete placing operations.

As soon as the free water has disappeared after the finishing operations, the entire concrete surface shall be sealed by spraying it with a uniform coating of curing material in such a manner as to provide a continuous, water-impermeable film on the entire concrete surface. The curing compound shall be applied by an approved mechanical power sprayer or by hand where mechanical power sprayer is impractical.

The curing material shall be applied to form a uniform coverage at the rate of not less than one (1) gallon per two-hundred (200) square feet of surface area, unless the manufacturer recommends a heavier application.

During hot weather, the forms shall be loosened as soon as practical without damaging the concrete. The sides of the work shall then be coated with curing compound at the same rate as specified above.

Between October 1st, and April 1st, the Contractor shall utilize curing compounds of linseed oil membrane-forming emulsions, or emulsifiable concentrates, for curing and protection of concrete pavement and curb and gutter. See Cold Weather Construction in this section of these Standard Specifications.

503.20.1 Basis of Payment
The cost of this item shall be included in the contract unit price for the work causing its need, unless specifically stated elsewhere in the Contract Documents, and shall include all labor, equipment, materials, supervision, supplies, tools, and incidentals required for the curing work.
503.21 Asphallic Concrete Removal
When required by the work, or where directed by the Engineer, the Contractor shall remove existing asphaltic concrete pavement or driveway as required to facilitate the work.

503.21.1 Basis of Payment
The cost of this item shall be included in the contract unit price for the work causing its need, unless specifically stated otherwise in the Contract Documents, and shall include all labor, equipment, materials, supervision, supplies, tools, and incidentals required for the work, including proper disposal of the waste material.

503.22 Street Pavement and Driveway Restoration
All areas of street, alleys, private drives, etc. that are disturbed by the work under this section shall be restored by the Contractor to the original condition and thickness.

If, in the case of an asphalt driveway, the Contractor is able to saw the pavement along the edge of his work and the pavement is of adequate thickness, line, and grade, the Contractor may use the edge for his form in placing the new work. Any undermining of the pavement caused by the excavation shall be filled in and compacted at the Contractor's expense prior to proceeding with the placing of the concrete. The Contractor shall be responsible for any damage to the pavement caused by his work.

Prior to patching, the Contractor shall saw cut the pavement or driveway. The sawcutting shall be parallel and/or perpendicular to the centerline of the street or as otherwise approved by the Engineer. This saw cutting shall be included in the unit price for the item causing its need.

Unless approved by the Engineer, no asphaltic concrete pavement may be placed adjacent to new concrete until either seventy-two (72) hours of curing time has occurred if the new concrete is high early strength concrete or until the new concrete has reached a compressive strength of 3500 psi., as evidenced by a proof test cylinder break furnished by the Contractor at no extra cost to the City.

Where patching of asphalt or concrete driveways is required, the Contractor shall excavate to allow for the placement of a minimum of four (4) inches of compacted Gradation No. 2 crushed aggregate or road gravel. The thickness of the driveway pavement to be restored shall be equal to four (4) inches for asphaltic concrete pavement, four (4) inches for concrete pavement at residential properties, and six (6) inches for concrete pavement at non-residential properties, or equal to the thickness of the existing pavement, whichever is the greater thickness.

The Contractor shall backfill existing gravel driveways with compacted Gradation No. 2 crushed aggregate or road gravel,
minimum thickness of six (6") inches, and a minimum of eighteen (18") inches from both sides of the walk or curb. Driveway elevations shall meet the finished abutting concrete elevation.

503.22.1 Basis of Payment

The cost of this item shall be included in the contract price for the work causing its need, unless specifically stated otherwise in the Contract Documents, and shall include all labor, equipment, materials, supervision, supplies, tools, and incidentals required to prepare the area, including saw cutting the pavement, and to furnish, transport, and properly install the materials required to restore the area.

503.23 Driveways With Excess Pitch In Area Of Proposed Walk

Subject to field verification, where driveway pitch is in excess of two and one-half (2 1/2") inches across the sidewalk portion of the driveway, the driveway shall be subject to removal by the Contractor upon the direction of the Engineer.

When removal is directed by the Engineer, the Contractor shall remove the portion within the area of the walk and shall extend the removal to the first joint either side of the walk, or to a point indicated by the Engineer, to allow for reasonable ingress and egress.

To facilitate the ingress and egress, the Contractor shall place a compacted granular base material in the area of the removed driveway, to match the grade of the existing remaining driveway section on either side of the walk.

503.23.1 Method of Measurement

The method of measurement will be per square foot for the replaced sidewalk and the replaced driveway on both sides of the sidewalk.

503.23.2 Basis of Payment

The basis of payment shall be as measured above and paid for per the contract unit prices for Remove and Replace Existing Concrete Driveway and Remove and Replace 6" Concrete Sidewalk. Said payment shall be full and complete compensation for the furnishing of all labor, equipment, materials, supervision, supplies, tools, and incidentals required to remove the existing concrete driveway on both sides of the proposed walk, to regrade the area for construction of the walk, to furnish and install granular fill, to provide ingress and egress to the property, and to replace the concrete driveway sections removed.

503.24 Backfilling

Backfill material shall be earth material, 90% free of stone and rubble. No stone or rubble shall be larger than one and one-half (1 1/2") inches in diameter. All acceptably sized stone and rubble shall be placed a minimum three (3") inches below the finished subgrade elevation. Backfill material shall conform to material specified in the Section 300 of these Standard Specifications.
All backfilling shall be completed within two (2) to four (4) days after removing forms and within three (3) to five (5) days after placing the concrete.

Backfill shall extend to a point four (4") inches below the top of the curb and gutter or sidewalk. The remaining four (4") inches shall be backfilled with approved topsoil.

503.25 Protection Of The Work
Protection of freshly poured concrete shall be provided by the Contractor. The Contractor shall erect and maintain suitable barricades and employ watchmen as may be necessary to exclude (pedestrian or vehicular) traffic from the newly constructed concrete masonry until it has sufficiently cured that it will not be affected by the traffic.

The Contractor shall have sufficient materials available to protect the unhardened concrete against damage by rain or hail. When rain is imminent, the unhardened concrete shall be immediately covered with paper, plastic sheeting, or other suitable material, and planks or forms shall be placed along the edge of the work to hold the protective materials in place.

Prior to acceptance, any part of the concrete damaged by traffic, weather, or other causes shall be repaired or replaced by the Contractor in a manner satisfactory to the Engineer and at no cost to the Owner. See Sections 105.3, and 107.14 of the D.O.T. specifications.

Grinding or rubbing of minor defects will be allowed as an alternative to removal, provided the finish appearance is not damaged to the point of being noticeable.

Epoxy grout will only be permitted if the area of repair is minor and the color of the epoxy is similar to weathered concrete. Use of epoxy grout will not be permitted for repair of cracked sidewalk.

If, in the opinion of the Engineer, the repair work is not acceptable, the Contractor shall remove and replace the affected work at no cost to the Owner.

503.26 Underdrains
See Section 304.5 for underdrains.

503.27 Construction Work Area Restoration
Restoration of the lawn area shall be done in conformance with the Section 700 on landscaping in these Standard Specifications and as specified herein.

Restoration shall be completed within ten (10) days after the area is disturbed.
Damage restoration outside the specified construction work area shall not be a pay item unless authorized by the Engineer prior to the Contractor disturbing the area.

503.27.1 Basis of Payment
The cost of this item shall be included in the contract price for the work causing its need, unless specifically stated otherwise in the Contract Documents, and shall include all labor, equipment, materials, supervision, supplies, tools, and incidentals necessary to restore the construction work area in conformance with these Standard Specifications.

503.28 Protection of Vegetation
The Contractor shall protect and preserve trees, shrubs, plantings, and other vegetation not shown to be removed in the Contract Documents. See Section 700 of these Standard Specifications as to procedure to follow during construction to assure protection of the vegetation.
504.1 Grading And Foundation Preparation
The subgrade shall be accurately shaped to conform to the bottom contour of the work as shown on the plans. All soft and unsuitable material shall be removed and replaced with suitable granular fill and the foundation, or the material underlying the proposed work, shall be mechanically compacted and finished to a firm, true surface.

If the Contractor has done excessive cutting, beyond that required by the plans or required by the Engineer, he shall, at no expense to the Owner, return the subbase under the work to the correct grade with thoroughly compacted suitable granular fill.

The base material shall be thoroughly moistened immediately prior to the placing of the concrete.

The final four (4) inches of base material shall consist of gradation #2 gravel, crushed stone, traffic bond, or other approved material.

504.2 Unstable Subgrade
See Sections 211.1 through 211.3.1 of the Wisconsin D.O.T. Specifications for information on the preparation of subgrade and use of suitable and unsuitable materials.

504.3 Cut Existing Grade
Where the existing grade from sidewalk to roadway does not permit proper drainage, the Engineer may direct the Contractor to grade the area to provide for proper drainage. Payment for this item shall only apply to areas beyond the project limits, when required by the Engineer.

This work shall consist of excavation of excess material between the sidewalk and curb, and grading the area. The Contractor shall then place topsoil, seed, mulch, fertilize, and water the area per these Standard Specifications.

For calculation of quantities, excavation shall be limited to a maximum of eight (8") inches below a line from the top of the street side of the sidewalk to the top of the curb. Beyond this point, the Contractor shall receive additional payment for undercutting. This limit shall allow for unknown roots and other obstacles that might exist within the area of the excavation.

504.3.1 Method of Measurement
The method of measurement will be per square yard in place.
504.3.2 **Basis of Payment**
The basis of payment shall be as measured above and paid for per the contract unit price for cutting. Said payment shall be full and complete compensation for all labor, equipment, materials, supervision, supplies, tools, and incidentals necessary to excavate and dispose of excess materials and to fill and grade to subgrade. Topsoil, seed, mulch, fertilize, and water shall be paid per the appropriate bid item for such work.

504.4 **Fill Existing Grade**
The Engineer may direct the Contractor to adjust the grade of an area by use of borrow material. When so directed, the Contractor shall furnish, place, and grade the material as needed to meet the grade and line required by the Engineer. Payment for this item shall only apply to areas beyond the project limits, when required by the Engineer.

The placement of topsoil, seed, mulch, fertilizer and watering shall be done by the Contractor in conformance with these Standard Specifications.

504.4.1 **Method of Measurement**
The method of measurement shall be per cubic yard.

504.4.2 **Basis of Payment**
The basis of payment shall be as measured above and paid for per the contract unit price for filling. Said payment shall be full and complete compensation for all labor, equipment, materials, supervision, supplies, tools, and incidentals required to acquire, transport, furnish, install, and grade the fill material required for the work.

504.5 **Compaction**
Fill and subgrade material within the project limits shall be compacted in conformance with the Section 305 on Compaction in these Standard Specifications.

504.5.1 **Basis of Payment**
The cost of this item shall be included in the contract price for the work causing its need, and shall include all labor, equipment, material, supervision, supplies, tools, and incidentals to adequately compact the materials placed in accordance with the requirements of the section on Compaction in these Standard Specifications.
505 - COLD WEATHER CONSTRUCTION

505.1 General

Concrete placement in cold weather shall conform to the requirements of Section 415.3.15 of Wisconsin D.O.T. Specifications.
Linseed Oil Treatment
Linseed oil treatment is required when concrete is placed after October 1 and before April 1. See Section 503.20 - Curing.

The linseed oil shall be applied in two applications according to the following directions and specifications;

- The curb & gutter, or pavement, shall be dry and swept clean, and have a temperature above 50 degrees Fahrenheit.

- The first coat shall be composed of a 50-50 mixture of commercial boiled linseed oil and mineral spirits and should dry in two (2) to three (3) hours at the above temperature.

- The second application shall be a 75-25 mixture of commercial boiled linseed oil and mineral spirits respectively and may be applied after the first coat has dried.

- The nozzle of the spraying equipment must be held close to the pavement to get complete coverage. NOTE: One gallon of the mixture will cover about fifty (50) square yards of pavement.

505.2.1 Basis of Payment
The cost of this item shall be included in the contract price for the item causing its need and shall include all labor, equipment, materials, supervision, supplies, tools, and incidentals required for the work.
506.1 Cylinder Tests
The Contractor shall be responsible for making all cylinder samples required for the work. The Contractor shall pay for the taking of the cylinders, protection of cylinders until delivered to the certified testing lab, the transportation to the certified testing lab, the testing of the cylinders by the certified testing lab, and the cost of mailing a copy of the test results to the Engineer. For the testing of the concrete samples, the Contractor shall select an independent testing laboratory which is acceptable to the owner and shall obtain approval of the testing laboratory prior to sending samples to the laboratory for testing.

Test cylinders shall be prepared and handled in accordance with ASTM C-31 Standard Practice for Making and Curing Concrete Test Specimens in the field.

A minimum of one set of three (3) 12" x 6" diameter cylinders shall be prepared for each fifty (50) cubic yards, excluding the first five (5) cubic yards per pour day, as shown in the following chart.

<table>
<thead>
<tr>
<th>Cubic Yards / Pour Day</th>
<th>Sets</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 5</td>
<td>0 Sets</td>
</tr>
<tr>
<td>5 - 50</td>
<td>1 Set</td>
</tr>
<tr>
<td>51 - 120</td>
<td>1 Additional Set</td>
</tr>
<tr>
<td>121 - 180</td>
<td>2 Additional Sets</td>
</tr>
<tr>
<td>181 - 240</td>
<td>3 Additional Sets</td>
</tr>
</tbody>
</table>

The Engineer may direct when the cylinders are to be taken, within the above guidelines. This does not, however, remove the responsibility from the Contractor for the taking of the test cylinders as prescribed above.

Unless specified otherwise in the Contract Documents, two of the three test cylinders shall be used for a 7-day and a 28-day compression strength test, leaving the third test cylinder as a spare. In exceptional cases upon written request by the Contractor, and for concrete sidewalk and curb and gutter the 7-day test and test cylinder may be waived by the Engineer thus requiring two cylinders per set instead of three.

The Engineer may also require the Contractor to prepare additional cylinders, beyond the guidelines noted above, as deemed necessary and at the Owners expense.

506.1.1 Test Cylinder Handling
The Contractor shall utilize a box for the protection of all cylinders. Said box may be a box of adequate size to hold test cylinders and bedding medium. Bedding medium shall be coarse sand or other material approved by the Engineer.

The box shall be firm enough to support the cylinders in an upright position. If the box becomes weakened in use, it shall be replaced by the Contractor.
The Contractor shall have an adequate supply of boxes and bedding material to accommodate the cylinders until they are transported to the test lab.

Following the preparation of the test cylinders per ASTM C-31, they shall be covered with a plastic bag, and labeled as to the date made and the location, or address, of the pour. They shall then be placed in the box and surrounded with the bedding medium. The box shall be placed in a location of maximum shade and protection from the elements and other disturbances. They shall be left in that location until being transported to the lab. If weather conditions require, the bedding medium shall be kept moist during the initial curing period. Wet burlap may also be placed over the box to keep the samples cool.

Test cylinders are to be transported to the certified testing lab within not less than twenty-four (24) hours nor more than forty-eight (48) hours of being molded.

The certified testing lab shall send one copy of the test report directly to the Engineer as soon as the data from the seven (7) day and the twenty-eight (28) day tests are available.

506.1.1.1 Basis of Payment
The cost of this item shall be included in the Contract Unit Price for the work causing its need and shall include all labor, equipment, materials, supervision, supplies, tools, and incidentals required to furnish the test cylinders; prepare, protect, and transport the samples to the certified testing laboratory; test the cylinders; and prepare and mail the test results to the Engineer.

506.1.2 Failure of Cylinder Test
In the event that the twenty-eight (28) day cylinder fails to meet the required design compressive strength, the spare cylinder shall be tested. If the spare test cylinder also fails to meet the required design compressive strength, the Contractor may elect to take a series of standard cores from the actual concrete in question. Said cores shall be taken and tested in accordance with ASTM Designation C-42 by a certified testing laboratory. If these test cores fail to show that the design compressive strength has been met, that lot of nonconforming concrete will be considered unacceptable and shall be removed and replaced by the Contractor at no additional cost to the Owner. The Engineer will determine the quantity of material to be replaced based on the project testing data and an inspection of the completed concrete work. If the Engineer decides to leave the nonconforming materials in place, the concrete will be paid for at seventy-five (75%) percent of the contract unit price for the item of concrete work.
If the nonconforming materials are placed in a private development requiring acceptance by the City and if the Engineer decides to leave the nonconforming materials in place, the Developer shall pay to the City an amount equal to the quantity of nonconforming concrete multiplied by 0.25 times the average unit price submitted by the bidders awarded contracts for similar concrete items on public works projects in the City during the year in which the concrete is placed and during the previous year. At the discretion of the Engineer, the City may accept a 5-year warranty on the nonconforming concrete items in lieu of the payment described in the preceding sentence.

506.1.2.1 Basis of Payment
The cost of additional testing, coring, and removal of defective work shall be the responsibility of the Contractor and the cost shall not be factored into any other bid items.

506.2 Slump, Air Entrained, and Concrete Temperature Testing
The Engineer shall complete all tests for slump, air entraining, and concrete temperature at no cost to the Contractor.

Failure of the concrete to pass the slump, air entrainment, or concrete temperature tests shall result in rejection of the load being tested. The Engineer may require that concrete placed prior to the testing be removed from the work. The Contractor shall not be compensated for additional costs for labor, equipment, materials, supervision, supplies, tools, or incidentals due to rejection of the materials by the Engineer.
507.1 Scope of Work
The work under this section shall consist of constructing new concrete curb and gutter or the removal and replacement of existing concrete curb and gutter of the dimensions and design shown on the plans or as specified in the Contract Documents. The work shall be placed in one course on the prepared foundation or base, at the specified locations, and to the required lines and grades.

The Contractor shall furnish all labor, equipment, materials, supervision, supplies, tools, and incidentals for the work.

507.2 Jointing
Curb and gutter shall be constructed in ten (10') foot sections with scored, sawed, or expansion joints separating the sections.

507.3 Expansion Joints
Placement of expansion joints shall conform to Section 503 of these Standard Specifications.

507.3.1 Basis of Payment
The cost of this item shall be included in the contract unit price for the work causing its need and shall include all labor, equipment, materials, supervision, supplies, tools, and incidentals required to furnish and install the expansion joint material.

507.4 Fill Areas
The cost of unclassified excavation and fill required for the installation of the curb and gutter shall be included in the cost of curb and gutter construction (new and/or remove and replace).

All fill areas under the curb and gutter shall be filled with crushed aggregate compacted per Section 300 of these specifications.

This item shall be a pay item only if authorized by the Engineer prior to the excavation and if measured by the Engineer prior to the placement of fill material. The Contractor shall not be paid for unauthorized over-excavation.

507.4.1 Method of Measurement
The method of measurement will be per cubic yard of excavation to be filled and shall be measured in place.

507.4.2 Basis of Payment
The basis of payment shall be as measured above and paid for per the contract unit prices for Overexcavation and Filling. Said payment shall be full and complete compensation for all labor,
507.5 Base Material
The Contractor shall undercut and place a minimum of four (4") inches of granular base under all new, or remove and replace, curb and gutter, unless the construction is being done in conjunction with new construction, and gravel has been placed to proper depth and grade by the grading contractor. Said granular material shall consist of crushed aggregate gradation #2 conforming to Section 300 of these Standard Specifications.

Base material shall be placed, thoroughly compacted to the requirements of Section 300, and finished to a firm true surface.

507.5.1 Basis of Payment
The cost of this item shall be included in the contract unit price for the curb and gutter, unless specifically stated otherwise in the Contract Documents, and shall include all labor, equipment, materials, supervision, supplies, tools, and incidentals required to furnish, transport, place, level, and compact the base material required for the project.

507.6 Curb Ramps
Curb ramps shall conform to Section 503.9 of these Standard Specifications

This work includes the modification of existing curb and gutter to accommodate a curb ramp. The Contractor may make the modification by sawing the curb head only if truck or rail mounted concrete cutting equipment is used. The cutting equipment must be designed specifically for this use. The dimension for the curb cut shall be equal to those indicated on Detail 503.

If the Contractor has curb forms, he may, with the consent of the Engineer, remove and replace the curb and gutter through the ramp area and restore it in lieu of removal of the curb head. This shall remain the Contractor's option at no change in cost to the Owner. It shall, however, require the Contractor to repair any pavement or roadway damaged by the work at no additional cost to the Owner and to the satisfaction of the Engineer.

The Contractor, as required by the Engineer, shall remove as many slabs of walk as necessary to provide a slope on the ramp which does not exceed 1:12 or eight and one-third (8 1/3%) percent per Wisconsin Statutes and to provide for the elevation of the high point of the ramp to be at least six (6) inches higher than the elevation of the gutter at the low end of the ramp. Prior to pouring the walk and curb, the Contractor shall install a felt expansion joint along the back of curb and pour the curb separate from the sidewalk section, so that they are not one unit. Should the entire curb and gutter section be removed and replaced, the felt expansion joint shall still be placed between the curb and sidewalk.
The Contractor shall also furnish and install a detectable warning field of truncated domes at each curb ramp conforming to Detail 534.

Where possible, a type II ramp shall be installed.

See Sections 503.9 and 509.7 for additional specifications on curb ramps.

507.6.1 Method of Measurement
The method of measurement shall be per lineal foot for curb repair and per square foot for sidewalk and curb ramp.

507.6.2 Basis of Payment
The basis of payment shall be as measured above. All costs associated with modifying the existing curb head shall be included in the contract unit price for Cut Curb for Curb Ramp. Said payment shall be full and complete compensation for all labor, equipment, materials, supervision, supplies, tools, and incidentals required to remove the existing curb head and repair the curb and gutter per these Standard Specifications. The method of measurement and basis of payment for the sidewalk of the curb ramp shall be in accordance with Section 509.7.1.

507.7 End of Curb Transition
When the curb and gutter terminates, said termination shall include a transition curb head which shall consist of tapering the curb head from a normal six (6) inch high curb to matching the gutter. The transition shall conform to the dimensions indicated on Detail 504. There shall be a one-half (1/2") expansion joint at the beginning of the section of curb and gutter that contains the transition piece.

507.7.1 Method of Measurement
The method of measurement shall be per lineal foot, measured along the face of the curb.

507.7.2 Basis of Payment
The basis of payment shall be as measured above and paid for per the contract unit price for Furnish and Place Concrete Curb and Gutter. Said payment shall be full and complete compensation for all labor, equipment, materials, supervision, supplies, tools, and incidentals required to do the work.

507.8 Driveway Curb Cuts
Driveway curb cuts shall conform to the requirements of Section 509.9 as to method of construction.

At the Contractor's option, in lieu of using a driveway curb cut, the Contractor may, with the consent of the Engineer, remove and replace the curb and gutter at the driveway as a unit. If this option is used, the Contractor shall repair any pavement or roadway damaged by the work at no additional cost to the City and to the satisfaction of the Engineer.

507.8.1 Method of Measurement
The method of measurement shall be per lineal foot.
507.8.2 Basis of Payment
The basis of payment shall be as measured above and paid for per the contract unit price for Cut Curb for Driveway. Said payment shall be full and complete compensation for all labor, equipment, materials, supervision, supplies, tools, and incidentals required to do the work.

507.9 Reinforcement of Utility Crossings
For removal and replacement of existing curb and gutter and for new curb and gutter, the curb and gutter shall be reinforced with deformed steel rebars where a utility crosses under the curb and gutter. The rebars shall be #4 bars conforming to ASTM A-615 with 60,000 psi minimum yield strength. No coating is required for the rebars. Two rebars shall be used and positioned within the gutter pan at equal horizontal spacing. The rebars shall be positioned to have a minimum of two (2) inches of concrete cover on all sides and shall be spaced at a minimum of sixteen (16) inches. The reinforcement shall extend through one or more sections of curb and gutter so that there is at least five (5) feet of reinforcement curb and gutter on each side of the centerline of the utility. The reinforcement requirement of this section is applicable where a utility such as water, gas, electric, power, telephone, cable television, communications, sanitary sewer, storm sewer, or any other underground utility line passes under the curb and gutter and has been installed by trenching. No reinforcement is needed in the curb and gutter when the utility has been installed by jacking or other means not involving a surface trench.

507.9.1 Method of Measurement
The method of measurement shall be per lineal foot of curb and gutter reinforced.

507.9.2 Basis of Payment
On City contracts where a separate bid item has been established for reinforcement of curb and gutter, the basis of payment shall be as measured above and paid for per the contract unit price for Furnish and Place Reinforcement for Curb and Gutter. Said payment shall be full and complete compensation for all labor, equipment, materials, supervision, supplies, tools, and incidentals to furnish and place the reinforcing steel in the curb and gutter. All other costs associated with constructing the curb and gutter shall be included in the appropriate bid item for the curb and gutter.

On City contracts where a separate bid item has not been established for reinforcement of curb and gutter, all costs associated with furnishing and placing the reinforcement shall be included in the contract unit price bid for the work (or shall be considered incidental to the work) causing the need for the reinforcement.
508.1 Scope of Work
The work under this section shall consist of constructing new concrete curb and gutter or the removal and replacement of existing concrete curb and gutter of the dimensions and design as shown on the plans or as specified in the Contract Documents. The work shall be placed in one course on the prepared foundation or base, at the specified locations, and to the required lines and grades.

The Contractor shall furnish all labor, equipment, materials, supervision, supplies, tools, and incidentals for the work.

508.1.1 Method of Measurement
The method of measurement shall be per lineal foot, measured along the face of the curb. When concrete pavement is constructed with integral curb and gutter, the measurement of the pavement shall be to the back of curb and shall include all work required to construct the curb section.

508.1.2 Basis of Payment
The basis of payment shall be as measured above and paid for per the contract unit price for Furnish and Place Concrete Curb and Gutter or for Remove and Replace Concrete Curb and Gutter (of the specified size). Said payment shall be full and complete compensation for the furnishing of all labor, equipment, materials, supervision, supplies, tools, and incidentals required to remove the existing curb and gutter; properly dispose of the excess materials; excavate for subgrade; furnish and install base material; grade, level, and compact the base material; construct the new curb and gutter or remove and replace the existing curb and gutter; and restore the area within the construction work area.

When concrete pavement is constructed with integral curb and gutter, the payment for concrete pavement with integral curb shall include the cost of the curb and gutter, as well as the cost of any manhole and catch basin/inlet adjustments, including backplastering.

508.2 Construction Work Area
The construction work area for curb and gutter shall be one (1') foot behind the face of curb.

508.3 Line and Grade
The Contractor shall construct the new curb and gutter to line and grade as shown in the Contract Documents or as staked by the Engineer.
The Contractor shall construct the replacement curb and gutter to match the line and grade of the abutting curb and gutter, as shown in the Contract Documents, or as staked by the Engineer.

508.4 Restoration
The area between the curb and sidewalk, outside the construction work area shown above, shall be restored by the Contractor in accordance with the specifications for topsoil, seed, mulch, fertilizing and watering as shown in Section 700 on landscaping.

508.4.1 Method of Measurement
The method of measurement shall be per the appropriate bid item under Section 700 of these Standard Specifications.

508.4.2 Basis of Payment
The basis of payment shall be as measured above and paid for by the appropriate bid item under Section 700 of these Standard Specifications. Said payment shall be full and complete compensation for all labor, equipment, materials, supervision, supplies, tools, and incidentals required to do the work in accordance with the requirements of Section 700 in these Standard Specifications.

Areas damaged by the Contractor outside the construction limits shall not be measured for payment, unless the work was directed by the Engineer.

508.5 Topsoil for Remove and Replace Curb & Gutter
For remove and replace curb and gutter, the Contractor shall use screened topsoil conforming to the specifications in Section 700 of these Standard Specifications.
509 - SIDEWALK STANDARDS AND CONSTRUCTION - GENERAL

509.1 Grade
The standard grade of the walk is one-third (1/3) of an inch per foot above the top of the curb to the street side of the walk, with the distance being measured from the face of curb. In addition, the standard transverse pitch of the standard five (5') foot walk is 0.08 foot, or one (1") inch down toward the street.

The maximum pitch, across the width of the standard five (5') foot walk, shall not exceed two-tenths (0.20) foot or two and a half (2 1/2") inches down toward the street.

The maximum grade of the walk shall not exceed 1:12 or, 8.33%, without the consent of the Engineer.

509.2 Staking
The project staking shall conform to Section 203 of these Standard Specifications.

509.3 Jointing
Sidewalk shall be constructed in five (5') foot sections with construction joints separating the sections. The construction joints shall be prepared by scoring or sawing or by installing expansion joints.

509.4 Expansion Joints
Placement of expansion joints shall conform to Section 503.15 of these Standard Specifications.

509.4.1 Basis of Payment
The cost of this item shall be included in the Contract Price for the work causing its need and shall include all labor, equipment, materials, supervision, supplies, tools, and incidentals required to furnish and install the expansion joint material.

509.5 Excavation and Fill Areas
All unclassified excavation required for the installation of the sidewalk shall be included in the cost of sidewalk construction (new and/or remove and replace).

All fill areas under sidewalks and driveways shall be filled with crushed aggregate and compacted per Section 300 of these Standard Specifications.

This item shall be a pay item only if authorized by the Engineer prior to excavation and if measured by the Engineer prior to placement of fill material. Over-excavation by the Contractor shall not qualify for this pay item.
509.5.1 Method of Measurement
The method of measurement will be per cubic yard of excavation to be filled measured in place.

509.5.2 Basis of Payment
The basis of payment shall be as measured above and paid for per the contract unit price for Furnish and Install Crushed Aggregate Fill Material. Said payment shall be full and complete compensation for all labor, equipment, materials, supervision, supplies, tools, and incidentals required to excavate, dispose of excess material, furnish new granular fill, place fill, grade, and compact the material.

509.6 Base Material
For all new sidewalk and for sidewalk to be removed and replaced, the Contractor shall remove the existing base and place granular base for the sidewalk. The granular base shall be six (6) inches thick for six (6) inch sidewalk and four (4) inch thick for four (4) inch sidewalk, unless it is determined by the Engineer that the existing granular base meets this requirement. Said granular material shall consist of crushed stone, crushed aggregate, traffic bond, crushed concrete, or other approved base material. Sand and existing subgrade material will not be permitted to be used as the base material.

Base material shall be placed, thoroughly compacted, and finished to a firm true surface.

509.6.1 Basis of Payment
The cost of this item shall be included in the contract unit price for the sidewalk, unless specifically stated otherwise in the Contract Documents, and shall include all labor, equipment, materials, supervision, supplies, tools, and incidentals required to furnish, transport, place, level, and compact the base material required for the project.

509.7 Curb Ramps
Curb Ramps shall conform to Sections 503.9 and 507.6 of these Standard Specifications.

Four (4) inches of base material conforming to the requirements of Section 509.6 of the City's Standard Specifications shall be placed and compacted beneath all curb ramps.

The Contractor shall furnish and install detectable warning fields conforming to Detail 534 at all new curb ramps.

All areas around the curb ramps disturbed by the ramp construction shall be backfilled, regraded, topsoiled, seeded, fertilized, mulched, and watered by the Contractor.

Only when specified in the Special Provisions or on the project plans of City contracts, the Contractor shall paint 4" wide yellow stripes at the curb ramp. The materials and application of the stripes shall conform to the requirements of WDOT 646 for water borne or solvent borne paint.
509.7.1 Basis of Payment
If the Contract Documents do not have a specific bid item for curb ramps, the basis of payment for curb ramps shall be at the contract unit price for Furnish and Place Concrete Sidewalk or for Remove and Replace Concrete sidewalk. Otherwise, the basis of payment of curb ramps shall be as follows:

Measurement of curb ramps shall include all sidewalk constructed or removed and replaced by the Contractor at each ramp location and shall be made in square feet. Payment for Remove and Replace 4" Concrete Curb Ramp will be made per square foot of curb ramp constructed. The bid price for Remove and Replace 4" Concrete Curb Ramp shall include all costs for removing and properly disposing of existing concrete sidewalk sections off-site; excavating, grading, furnishing, and compacting the subgrade material; furnishing and placing ramp materials, including 1/2" felt joints; ground restoration; painting yellow stripes (if required); making concrete test cylinders and testing; and all labor, supervision, tools, equipment, supplies, and incidentals necessary to construct the curb ramps.

Measurement and payment for the detectable warning fields shall be per unit, where one unit means the entire area of the detectable warning field installed on each curb ramp surface. The bid price for Furnish and Install Detectable Warning Field at Curb Ramp shall include all costs associated with furnishing and installing the detectable warning field into the fresh concrete of the curb ramp being constructed. All costs associated with placing the concrete located below the detectable warning field shall be included in the payment item for the curb ramp.

The cost of cutting or removing and replacing existing curb and gutter at curb ramps shall be paid for under the appropriate bid item for the curb cut or for removal and replacement of curb and gutter.

509.8 Thickness of Sidewalk
Unless specified otherwise in the Contract Documents, the thickness of sidewalk shall be a minimum of six (6) inches at locations adjacent to residential or non-residential driveways, eight (8) inches at industrial driveways, and four (4) inches at all other locations. See Detail 503.

509.9 Concrete Driveway Approach & Curb Cut Requirements
All driveway approaches and curb cuts require a permit issued by the City of West Bend Engineering Department, except for work done under City contract. The permit must be obtained from the Engineering office prior to beginning the work.

Concrete for approaches shall be grade A, air-entrained, and shall conform to Section 500 of the City of West Bend Standard Specifications and in particular, meet the following requirements: minimum concrete content, 6.0 bags per cubic yards; minimum compressive strength after 28 days of curing, 3500 psi; maximum
amount of water per bag of cement, 6.0 gallons; size of coarse aggregate required, #1 plus #2; slump, 1"-3"; air content, 5% - 7%. Curing membrane shall be used to cover all finished concrete. As soon after finishing operations as the free water has disappeared, the concrete surface shall be sprayed with the curing membrane. Additionally, linseed cure is required for concrete placed October 1st through April 1st. See Section 505 - Cold Weather Construction, of these standard specifications, for further cold weather concrete requirements.

The driveway approach and the sidewalk sections located adjacent to the driveway shall be constructed with a minimum of six (6) inches of concrete and with a minimum of six (6) inches of crushed stone or crushed concrete base. For driveway approaches and sidewalk at industrial locations, the concrete shall be a minimum of eight (8) inches and the base shall be a minimum of eight (8) inches.

One-half inch (½) x 6" expansion joint material shall be placed full depth between the curb and gutter and the approach and between the street side of the walk and the approach, or as directed by the Engineer.

It is the City's intent to allow the removal of the existing curb and gutter section of the concrete curb and gutter to provide an opening to be used for the installation of the driveway approach. Curb cuts and the removal of the curb head will only be allowed if cutting is done by the use of truck or rail mounted concrete cutting equipment. This equipment must be designed specifically for this use.

The curb cut shall allow for a minimum of ½ inch rise to a maximum of 1 inch rise from the gutter to the street side of the cut of the curb back. The ascending slope from that rise to the back of the curb shall be 1 inch. In lieu of the sloped curb cut, the cut may be made horizontally at one and one-half inches (1½") to two (2") inches above the gutter flow line elevation. If cutting is done from the back of curb, the area adjacent to the back of the proposed curb cut shall be cut back a minimum of 3 feet along the entire width of the proposed curb cut and excavated down to a depth of 1 inch below the gutter elevation.

The existing curb shall be cut with a 12 inches minimum to 18 inch maximum down slope at each side of the driveway opening.

In lieu of cutting the curb, the entire curb & gutter section may be removed and replaced. Any pavement damaged during this work shall be repaired by the Contractor performing the work, at no cost to the City.
510.1 **Scope of Work**

The work under this section shall consist of constructing new concrete sidewalk or the removal and replacement of existing concrete sidewalk of the dimensions and design as shown on the plans or as specified in the Contract Documents. The work shall be placed in one course on the prepared foundation or base, at the specified locations, and to the required lines and grades.

The Contractor shall furnish all labor, equipment, materials, supervision, supplies, tools, and incidentals for the work.

510.1.1 **Method of Measurement**

The method of measurement shall be per square foot.

510.1.2 **Basis of Payment**

The basis of payment shall be as measured above and paid for per the contract unit price for Furnish and Place Concrete Sidewalk or for Remove and Replace Concrete Sidewalk (of the specified thickness). Said payment shall be full and complete compensation for the furnishing of all labor, equipment, materials, supervision, supplies, tools, and incidentals required to excavate for subgrade, including removal of existing sidewalk; furnish and install base material; grade, level, and compact the base material; construct the sidewalk; and restore the area within the construction work area.

510.2 **Construction Work Area**

The construction work area for new and remove and replace sidewalk shall be one (1') foot either side of the sidewalk. This area shall be expanded as required to accommodate the construction of a 4:1 slope.

The Contractor shall be liable for any damage caused beyond the construction work area noted above, unless specified otherwise in the Contract Documents of the project being constructed. Restoration of the area within the construction work area shall be included in the bid price for the work being done.

510.3 **Removal Limits**

Removal limits shall be marked by the Engineer prior to the Contractor beginning removal. Only those slabs marked by the Engineer shall be considered for payment. If the Contractor finds that additional slab removal will be necessary to make his work satisfactory, he shall contact the Engineer to review the proposed removal and shall mark any additional slabs, or portion thereof, that the Engineer agrees are required by the work.
If the Contractor is to remove a section of walk, whenever possible no fewer than two (2) slabs shall be left in place between the removal areas. Should the Contractor note that fewer than two (2) slabs shall remain between areas of his removal, he shall contact the Engineer, who shall then review the need to remove the additional slabs.

510.4 Line and Grade
The Contractor shall construct the new sidewalk to the line and grade as shown in the Contract Documents or as staked by the Engineer.

The standard line for new sidewalk shall be two (2') feet inside the right-of-way of the street, unless otherwise shown on the plans or staked by the Engineer.

The standard grade for new sidewalk shall be one-third (1/3") inch per foot above the top of the curb for each foot measured from the face of the curb to the street side of the sidewalk. The standard transverse pitch shall be one (1") inch down toward the street side of the walk.

510.5 Removal
When required by the Engineer, removal shall be done by the Contractor to allow for adjoining slabs to be adjusted for line and grade. The purpose of said removal shall be to eliminate any trip hazards from offset joints, broken or cracked slabs, spalled slabs, or water pockets. The final grade shall eliminate these problems allowing for smooth joints and positive drainage either across the planting strip to the curb or down the walk.

510.6 Saw Cutting
Saw cutting may be done at the option of the Contractor to assist in removal of slabs.

Saw cutting may be done when approved by the Engineer to reduce the area of removal. The part of a sidewalk slab remaining in-place from a section that is sawcut shall not be shorter than three (3') feet.

510.6.1 Method of Measurement
The method of measurement will be per lineal foot of sawcut.

510.6.2 Basis of Payment
The basis of payment shall be as measured above and paid for per the contract unit price for Saw Cut Sidewalk. Said payment shall be full and complete compensation for all labor, equipment, materials, supervision, supplies, tools, and incidentals required to saw cut the slab to the dimensions required by the Engineer.
510.7 Remove Existing 4", or 6", Sidewalk
When required by the Engineer, the Contractor shall remove existing four (4") or six (6") inch sidewalk and shall restore the area with topsoil, seed, mulch, fertilizer, and water, unless otherwise specified in the Contract Documents.

510.7.1 Method of Measurement
The method of measurement will be per square foot for sidewalk removal, and per square yard for topsoil, seed, mulch, fertilize, and water.

510.7.2 Basis of Payment
The basis of payment shall be as measured above and paid for per the contract unit price for Remove Existing Sidewalk and for Furnish and Place Topsoil, Seed, Fertilizer, Mulch, and Water, unless specified otherwise in the Contract Documents. Said payment shall be full and complete compensation for all labor, equipment, materials, supervision, supplies, tools, and incidentals required to remove the existing four (4") or six (6") inch sidewalk, grade the removal area, restore the area within the construction limits with topsoil, seed, mulch, and fertilizer, and to water the area per these Standard Specifications.

510.8 Removal of Temporary Asphalt Patch
In the event that the City has put a temporary asphalt patch in place of a slab of sidewalk, curb & gutter, driveway section, or other concrete work, the Contractor shall remove the temporary asphalt material and construct the sidewalk, curb & gutter, driveway section, or other concrete work in conformance with the specifications for removal and replacement of the appropriate bid item.

Unless otherwise specified in the Contract Documents, the removal and proper disposal of temporary asphalt patch shall be included in the bid price of the replacement concrete item.
510.9 Roof Drain Replacement
The Contractor shall take care to preserve all existing roof drains that extend under the sidewalk. When the work requires that a roof drain be lowered or relocated, the Contractor shall attempt to save the pipe and shall perform the work by excavating and adjusting, or if required, replace the existing drain pipe with a new four (4) inch non-perforated drain pipe. The Contractor shall seal the joint connections and fill the excavation with granular fill.

This pay item shall only be allowed when required by the Engineer, based on the need to relocate the existing drain pipe. Negligence on the part of the Contractor in preserving the existing drain will not be a basis for application of this bid item.

510.9.1 Method of Measurement
The method of measurement will be per unit of roof drain installed with each roof drain replacement constituting one (1) unit.

510.9.2 Basis of Payment
The basis of payment shall be as measured above and paid for per the contract unit price for Remove and Replace Roof Drain. Said payment shall be full and complete compensation for all labor, equipment, materials, supervision, supplies, tools, and incidentals required to excavate, salvage and install or furnish and install drain pipe, backfill trench, and restore lawn damaged by the work.

510.10 Swale in Curb Lawn
When required by the Engineer, the Contractor shall construct a swale in the curb lawn between the walk and the back of curb to improve the drainage from the walk to the curb and gutter. The swale shall be constructed with an approximately two (2') foot wide drainage bed and with sides sloping at a maximum steepness of 6:1 (17%).

Unless otherwise specified in the Contract Documents, all costs associated with constructing a swale in the curb lawn shall be included in the bid items for ground restoration.
510.11 Restoration

510.11.1 Topsoil
For remove and replace sidewalk work, the Contractor shall use screened topsoil conforming to the specifications in Section 700 of these Standard Specifications.

The area between the curb and sidewalk outside the construction work area (described in Section 503.1) shall be restored by the Contractor in accordance with the specifications for topsoil, seed, mulch, fertilize, and water as shown in Section 700 on landscaping. The use of sod may be specified by the Engineer in lieu of seed and mulch.

510.11.2 Method of Measurement
The method of measurement shall be per the appropriate bid item under landscaping.

510.11.3 Basis of Payment
The basis of payment shall be as measured above and paid for per the contract unit price for Furnish and Place Topsoil, Seed, Fertilizer, Mulch, and Water. Said payment shall be full and complete compensation for all labor, equipment, materials, supervision, supplies, tools, and incidentals required to do the work per Section 700 on landscaping in these Standard Specifications.
511 - CONCRETE PAVEMENT STANDARDS & CONSTRUCTION - GENERAL

511.1 Scope of Work
The work under this section shall consist of construction of new concrete pavement or of the repair or removal and replacement of existing concrete pavement as shown on the plans or as specified in the Contract Documents. The work shall be placed in one course on the prepared foundation or base, at the specified locations, and to the required lines and grades.

The Contractor shall furnish all labor, equipment, materials, supervision, supplies, tools, and incidentals for the work.

511.2 Reinforcement
All deformed bars shall be epoxy coated in conformance with Section 505.2.4 of the D.O.T. Specifications.

Dowels, expansion caps, and wire mesh shall conform to Section 505 of the D.O.T. Specifications.

Dowels at joints shall be held firmly in place by rigid baskets and "00" gauge steel wire while the concrete is placed, so that they retain their proper place and spacing.

511.3 Expansion Joint Filler
Expansion joint filler shall be recycled plastic, recycled rubber, or sponge rubber conforming to the requirements of Section 415.2.3 of the D.O.T. Specifications.

511.4 Joint Sealer
Unless specifically stated in the Contract Documents, joints in concrete pavement will not be sealed.

If the Contract Documents specify that the joints in concrete pavement are to be sealed, the concrete joint sealers shall conform to the specification requirements for the type of sealer specified.

A Certificate of Compliance shall be furnished to the Engineer before application.

The backer rod shall be extruded closed-cell polyethylene foam or other approved material, and shall be compatible with the specified sealant.

511.4.1 Hot-Poured Elastic Type
This material shall conform to the requirements of the Specifications for Joint Sealants, Hot-Poured, for Concrete and Asphalt Pavements, ASTM Designation: D 3405.

511.4.2 Cold-Poured Silicone Type
This material shall conform to the requirements of Federal Specifications TT-S-1543, Class A, and TT-S-230 Type II. The sealant shall be a one-part, low-modulus silicone rubber with an ultimate elongation of 650 percent.
511.5 Forms For Slip Form Paving
Whenever forms, box-out lumber, etc. are used, they shall be of a height equal to the thickness of the concrete immediately adjacent to the boxout. Wood forms shall be two (2") inch surfaced plank. Lumber of less thickness will be permitted only on irregular shapes and short curves.

Whenever the paving machine deviates from proposed alignment to pave around hydrants, poles, etc., forms shall be set to proper grade at these locations to contain the concrete.

During the finishing of the curb opening for a driveway, forms of proper height shall be set to maintain the section of the pavement.

511.6 Driveway Openings
The Contractor shall refer to the project plans and/or consult with the property owners and the Engineer to determine where curb openings are desired for driveways. At these locations the curb shall be omitted and the gutter shall be shaped per the details in these Standard Specifications.

511.7 Joints
All contraction joints shall be saw cut to a minimum depth of one-quarter (1/4) of the thickness of the pavement, but not less than one and one-half (1 1/2") inch.

Joint finishing and edging shall conform to Section 415.3.11.7 of D.O.T. Specifications.

Any other type of contraction joint or section must be approved by the Engineer before it will be permitted.

Transverse contraction joints shall be located a minimum of six (6') feet and a maximum of ten (10') feet from the nearest construction joint.

To avoid premature cracking of contraction joints, every fifth joint shall be made with suitable separator plates or by using a knife joint. The knife for cutting joints shall be approved by the Engineer before its use will be permitted.

511.7.1 Basis of Payment
The cost of sawing, cleaning, and sealing of the joints shall be included in the contract unit price for the concrete pavement, unless specifically stated otherwise in the Contract Documents. Said price shall include all labor, equipment, materials, supervision, supplies, tools, and incidentals required to do the work.

511.8 Longitudinal And Transverse Joints
Longitudinal joints and transverse joints shall be constructed as and where shown on the plans and details.
Transverse construction joints shall be located a minimum of four (4') feet from the nearest contraction joint and may be constructed either parallel to the contraction joints or at ninety (90) degrees to the centerline.

511.9 Expansion Joints
A one (1") inch expansion joint shall be placed in the curb section at all radius point joints, at intersections, and at all breaks in horizontal, or vertical alignment.
512 - CONCRETE PAVEMENT CONSTRUCTION -
REPAIR AND REMOVE AND REPLACE

512.1 Scope of Work
The work under this item shall consist of the repair (or removal and replacement) of concrete pavement of the thickness and at the locations indicated in the contract.

512.1.1 Method of Measurement
The method of measurement will be per square yard. When concrete pavement is constructed with integral curb and gutter, the measurement of the pavement will be to the back of curb and shall include all work required to construct the curb section.

512.1.2 Basis of Payment
The basis of payment shall be as measured above and paid for per the contract unit price for Repair P.C. Concrete Pavement or for Remove and Replace P.C. Concrete Pavement (of the specified thickness). Said payment shall be full and complete compensation for all labor, equipment, materials, supervision, supplies, tools, and incidentals required to remove existing pavement (and curb and gutter, if specified); excavate for subgrade; furnish and install base material; grade, level, and compact the base material; furnish and install any specified steel reinforcement, dowels, tie bars, expansion caps, and support baskets; construct the new concrete pavement; and restore the area within the construction work area.

When concrete pavement is constructed with integral curb and gutter, the payment for concrete pavement with integral curb shall include the cost of the curb and gutter as well as the cost of any manhole, and catch basin/inlet adjustment and associated backplastering.

512.2 Full Depth Pavement Patching

512.2.1 Dimensions
The minimum width of a patch measured perpendicular to the nearest joint or pavement edge shall be six (6') feet.

The minimum dimension of an interior patch, not bounded by a joint or pavement edge, shall be four (4') feet.

All sides of an interior patch shall be at least four (4') feet from a joint or pavement edge.

Full depth patches shall be the same thickness as the existing pavement.

The edges of full depth patches shall be tied to the adjoining existing pavement using epoxy-coated deformed steel tie bars. The tie bars shall be one-half (1/2") inch diameter, two (2') feet long, and shall be placed at two (2') feet on center and
in accordance with the requirements of Sections 415.3.9.1 and 505.2.6.3 of the Wisconsin D.O.T. Specifications.

If load transfer dowels exist along an edge of the patch, the Contractor shall furnish and install new dowel bars (of the same size, type, and length as the existing dowel bars) along the two edges that are parallel to the existing dowelled edge.

512.2.2 Removal
   Pavement removal shall be rectangular in shape, and the area of pavement removal shall be marked by the Engineer prior to removal.

   The Contractor shall not disturb the subgrade any more than is necessary during the removal of the pavement. Any damage to surface or underground facilities shall be the sole responsibility of the Contractor.

512.3 Base Course
   All base course shall be mechanically compacted, smoothed and leveled to proposed pavement depth. Additional base material may be required to obtain an acceptable base and/or proper depth.

512.3.1 Basis of Payment
   The cost of this item shall be included in the Contract Unit Price for the work causing its need, unless specifically stated otherwise in the Contract Documents. Said price shall include all labor, equipment, materials, supervision, supplies, tools, and incidentals required to furnish, transport, install, level, compact, and maintain the base course material as required for the project.

512.4 Placing Concrete
   All placing, finishing, and curing of concrete shall conform to requirements of the appropriate sections of these Standard Specifications.

   All straight edging of patches shall be done in a transverse direction, so the crown of the existing pavement is retained.

   Longitudinal and transverse joints shall conform to the pattern of the existing pavement (or as required by the Engineer) and shall be sealed prior to opening of the street to traffic.

   Expansion joints shall conform to the pattern of the existing pavement or shall be as required by the Engineer.

512.4.1 Basis of Payment
   The cost of sealing and saw cutting shall be included in the Contract Price bid for the work causing its need, unless specifically stated otherwise in the Contract Documents. Said price shall include all labor, equipment, materials, supervision, supplies, tools, and incidentals required to furnish, transport, install, and maintain the work as required for the project.
The cost of expansion joints shall be included in the Contract Unit Price for the work causing its need, unless specifically stated otherwise in the Contract Documents. Said price shall include all labor, equipment, materials, supervision, supplies, tools, and incidentals required to furnish, transport, install, and maintain the expansion joints as required for the project.
513.1 **Scope of Work**
The work under this section shall consist of the adjustment of Portland cement concrete items (such as pavement slabs, curb and gutter, sidewalk slabs, and curb ramps) by the process of mudjacking to bring them into alignment with adjoining items. The work shall be at the locations shown on the plans or specified in the Contract Documents.

The Contractor shall furnish all materials, labor, and equipment for the mudjacking work.

513.2 **Materials**
The materials for the mudjacking slurry shall consist of a mixture of ground limestone, lime, or fly ash; sand; soil; Portland Cement; and water. A slurry of stiff consistency shall be used for raising pavement slabs and a more fluid mix shall be used for filling voids.

The seven-day compressive strength for the mudjacking slurry shall be 300 psi minimum and 1,000 psi maximum.

The Contractor shall submit his mix design for the mudjacking slurry to the Engineer for review and approval prior to the start of the work.

All materials for the mudjacking slurry shall be mixed and measured to assure conformance with the approved mix design.

513.3 **Holes for Pumping**
The holes in the slab through which the mudjacking slurry is to be pumped shall be a minimum of one (1) inch in diameter up to a maximum of two and one-half (2.5) inches in diameter. The holes shall be drilled to the full depth of the concrete item to be raised.

The holes for pumping shall be spaced as necessary to assure complete communication of the slurry between holes. In pavement slabs the holes along an edge shall be located not less than twelve (12) inches or more than eighteen (18) inches from a transverse or longitudinal joint or existing crack.

If offset adjacent slabs refuse to separate or slide, relative to each other, a saw cut shall be made along the entire joint and run the full depth of the slab.

513.4 **Pumping and Patching Holes**
For correcting a dip or sag in the pavement, jacking should begin at the low point in the sag and progress in such an order to prevent cracking of the slab. The mudjacking shall continue until the slab has been raised to the desired elevation. All holes shall then be pumped so that no voids remain under the slab.
After jacking operations are completed and the slurry has stabilized, all holes shall be cleaned to remove excess slurry and powder from the exposed sidewalls. The holes shall then be filled with a stiff concrete grout. The grout shall be tamped into place and fluted to a smooth finish.

513.5 Line and Grade
Concrete items being mudjacked shall be raised to the level of the adjacent items. The completed operation shall produce a slab that is within one-eighth (1/8) inch tolerance of the desired finished grade.

513.6 Damage
Any concrete item damaged in raising operations shall be removed and replaced by the Contractor at his own expense.

513.7 Cleanup
The Contractor shall cleanup the site promptly after the mudjacking operation is completed. The cleanup shall include removal and proper disposal of all dirt, slurry, and debris resulting from the work.

513.8 Restoration
If the sidewalk slab or curb and gutter is raised to a point where the slab is above the adjoining landscape, the Contractor shall topsoil, seed, mulch, fertilize, and water the area in conformance with Section 700 of these Standard Specifications.

513.9 Method of Measurement
The method of measurement for mudjacking will be per square foot for concrete pavement, curb ramps, and sidewalk raised and per lineal foot for curb and gutter raised.

513.10 Basis of Payment
The basis of payment for mudjacking shall be as measured above and paid for per the contract unit price for mudjacking items. Said payment shall be full and complete compensation for all labor, equipment, materials, supervision, supplies, tools, and incidentals required to furnish, mix, and pump the mudjacking slurry mixture (as required to bring the work within the required alignment with the adjacent existing work), to sawcut joints as specified above, and to cleanup the site.

- END OF SECTION 500 -
### SECTION 500 - CONCRETE CONSTRUCTION

#### DETAILS

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NOTES:

1. FOR CONSTRUCTION OF CURB & GUTTER, HALF INCH EXPANSION JOINTS SHALL BE PLACED AT A MAXIMUM SPACING OF 250 FEET AND CONSTRUCTION JOINTS SHALL BE SAWS OR SCORED ON 10 FOOT CENTERS.

2. HALF INCH EXPANSION JOINTS SHALL BE PLACED 10 FEET FROM EACH SIDE OF STORM INLETS OR CATCH BASINS.

3. REVERSE SLOPE GUTTER SHALL ONLY BE USED WHERE SPECIFICALLY INDICATED ON THE PROJECT DRAWINGS.

4. A MINIMUM OF 4 INCHES OF CRUSHED STONE BASE SHALL BE INSTALLED UNDER ALL CURB AND GUTTER.

5. CRUSHED STONE BASE SHALL BE CONSTRUCTED TO AT LEAST 1 FOOT BEHIND THE BACK OF CURB.
NOTES:

1.) FOR CONSTRUCTION OF CURB & GUTTER, HALF INCH EXPANSION JOINTS SHALL BE PLACED AT A MAXIMUM SPACING OF 250 FEET AND CONSTRUCTION JOINTS SHALL BE SAWED OR SCORED ON 10 FOOT CENTERS.

2.) A MINIMUM OF 4 INCHES OF CRUSHED STONE BASE SHALL BE INSTALLED UNDER ALL CURB AND GUTTER.

3.) CRUSHED STONE BASE SHALL BE CONSTRUCTED TO AT LEAST 1 FOOT BEHIND BACK OF CURB.

4.) CURB AND GUTTER MEASURED BY THE LINEAR FOOT.
DRIVEWAY CURB CUT

NOTES:
1. THE CURB CUT SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 509.9
   OF THESE STANDARD SPECIFICATIONS.
2. IN LIEU OF CUTTING AND REMOVING THE CURB AS SHOWN IN THIS DETAIL, THE EXISTING
   CURB & GUTTER MAY BE REMOVED AND CURB & GUTTER CONSTRUCTED AT THE APPROACH.
END SECTION
CURB AND GUTTER
1/2" EXPANSION JOINT
4" SIDEWALK
4" CRUSHED AGGREGATE

NATIVE SOIL

SIDEWALK ANCHORS ARE FOR USE ON SLOPES EXCEEDING 10%
EXISTING SIDEWALK

2' WIDE FLAT BOTTOM SWALE

SLOPE AS NECESSARY TO MATCH EXISTING SIDEWALK AND EXISTING TOP OF CURB

6:1 SLOPE FROM EXISTING GROUND TO 2' WIDE BOTTOM

MATCH EXISTING GROUND

MINIMUM 6" TOPSOIL

EXISTING CURB & GUTTER

DRAINAGE SWALE IN CURB LAWN

DRAWN BY: D.M.W.
DATE: 11/97

APPROVED BY: D.A.T.
DATE: 11/97

DETAIL NO. 512
SHEET 1 OF 1
NOTES:

1. THE TERM "MAJOR STREET" REFERS TO COLLECTOR AND ARTERIAL STREETS.

2. THE BASE FOR THE SIDEWALK, DRIVEWAY APPROACH, AND ALLEY APPROACH, SHALL BE CRUSHED STONE, CRUSHED AGGREGATE, TRAFFIC BOND, OR CRUSHED CONCRETE.
CONCRETE DRIVEWAY
DEPRESSED TYPE

SEE DETAIL 521 FOR STANDARD DRIVEWAY NOTES
NOTES:
1. HIGH POINT OF RAMP SHALL BE AT LEAST 6" ABOVE THE FLOW LINE.

2. IF THE CURB RAMP IS LOCATED ON OR ADJACENT TO CITY OWNED PROPERTY, THE FLAT AREA AT THE BOTTOM OF THE RAMP BETWEEN THE SLOPED TRANSITION CURBS SHALL BE 6'-8" WIDE.

3. SEE DETAIL 534 FOR DETECTABLE WARNING Fields REQUIRED AT CURB RAMPs.
NOTES:

1. High point of ramp shall be at least 6" above the flow line.

2. If the curb ramp is located on or adjacent to City owned property, the flat area at the bottom of the ramp between the sloped transition curbs shall be 8'-0" wide.

3. See detail 534 for detectable warning fields required at curb ramps.

Curb Ramp Type II

2. The DWF shall be made of stainless steel as manufactured by Advantage Tactile Systems or by Metadome, LLC or of cast iron as manufactured by Neenah Foundry Company.

3. The DWF shall be composed of metallic truncated domes and of yellow color.

4. The truncated domes shall have a base diameter of 0.9 inch minimum and 1.4 inches maximum, a top diameter of 50 percent of the base diameter minimum to 65 percent of the base diameter maximum, and a height of 0.2 inch.

5. The truncated domes shall have a center-to-center spacing of 1.6 inches minimum and 2.4 inches maximum, and a base-to-base spacing of 0.65 inch minimum, measured between the most adjacent domes on a square grid.

6. The DWF shall be installed in fresh concrete in accordance with the manufacturer's written installation procedures.

7. The DWF of each ramp shall be installed so that the line of domes is parallel to the normal user approach path for each ramp.

8. The DWF shall extend to the full width of the curb ramp (exclusive of the flared sides) and shall extend a minimum of 24 inches deep along the normal user approach path of the ramp.

9. When a curb ramp approaches a curved section of curb, the leading low end of the DWF shall be installed within one inch of the back of the curb and the other edge farther back from the curb, while keeping the domes in line with the normal user approach path.
CONTRACTION JOINT SEALER SHALL COMPLY WITH SECTION 511.4 OF THE CITY’S STANDARD SPECIFICATIONS

SAWED CONTRACTION JOINT

1/4” SAW CUT X D/4 DEEP

LONGITUDINAL CONSTRUCTION JOINT

1” EXPANSION JOINT FILLER SHALL COMPLY WITH WDOT 418.2.3

CONCRETE PAVEMENT JOINT AND SLAB DETAIL

DRAWN BY: J.M.I.
DATE: 11/04

APPROVED BY: J.A.N.
DATE: 11/04

DETAIL NO. 541 SHEET 1 OF 1
CONCRETE
ROADWAY
SLAB

J O I N T  ( T Y P )

M A N H O L E  C A S T I N G

1'-6"  M I N .
2'-6"  M A X .

#4 EPOXY COATED DEFORMED STEEL TIE BARS TO BE INSTALLED PER WDOCT 415.3.9.1 TIE BARS TO BE 2' LONG AND SPACED AT 2' CENTERS WITH A MINIMUM OF TWO TIE BARS PER SIDE OF BOXOUT.

POINTS OF BOXOUT SHALL BE IN THE DIRECTION OF THE PAVEMENT JOINTS.
GENERAL NOTES

1. Dowel bars shall be coated in conformance with subsection 505.2.4 of the Wisconsin DOT standard specifications.
2. Dowel bars shall be installed parallel to the pavement centerline and pavement surface.
3. Dowel bars shall be anchored into drill holes with an approved epoxy grout.
4. The free end of the dowel bar shall receive a thin coating of bond grease.
5. A retaining ring shall be inserted over the bar and pushed flush against the concrete surface to retain epoxy.