



## FDM 19-5-1 General

December 5, 2017

This section is intended to provide guidance for the user on process and procedures for preparing, documenting and checking an estimate, developing a proposal, and submitting it for PS&E.

For mega project estimating, refer to the mega project guidelines webpage at:

<https://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnsit-rsrces/rdwy/mega.aspx>

## FDM 19-5-3 Bid Item Guidance

August 15, 2019

This procedure establishes guidelines for the proper use of bid items. The goal is to obtain uniformity in bidding practices and to use the right bid item correctly for a given situation. Potential bid items are often released as standardized special provisions prior to becoming standard specification bid items.

See the standardized special provisions (STSP) log for a current list of STSP changes:

<https://wisconsindot.gov/Documents/doing-bus/eng-consultants/cnsit-rsrces/contracts/stsp/stsplog.pdf>

and the STSP Index for a complete list of STSPs and guidance on the use of STSPs.

<https://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnsit-rsrces/tools/stsp.aspx>

### 3.1 Updated/Newer Bid Items

The following guidance highlights new or changes to standard specifications bid items. The changes are effective with the August 2019 PS&E submittal.

**Seed Water, Item 630.0500:** Include this item where there is any seeding work to be done.

**Standard Spec Section 644 (Temporary Pedestrian Facilities):** Added Section 644 to specify temporary pedestrian facilities by incorporating STSP 644-010, 644-020 and 644-030.

**Incentive Strength Concrete Barrier, Item 715.0603:** Added incentive bid item for permanent concrete barrier strength. (refer to FDM 19-21-2)

### 3.2 Usage Guidance for Other Items

**Excavation and/or Backfill:** Excavation and backfill beyond what is normally required to accommodate the structure, formwork, and construction operations is excess excavation and backfill. Minor amounts of excess excavation and backfill can be treated as incidental to the Excavation for Structures bid items. Significant amounts of excess excavation and backfill should be paid for separately under other contract excavation and backfill bid items. Add excavation and backfill bid items to contracts that do not already have the appropriate bid items to cover excess excavation and backfill. Determine the quantities for excess excavation and backfill and include those quantities in the amount shown on the miscellaneous quantities sheet for the affected bid items.

**Removing Pavement, Item 204.0100:** If the removal is to an existing joint or if sawing is required it should be noted on the plans. Concrete pavement removed in conjunction with Roadway and Drainage Excavation will be measured and paid for as Removing Pavement.

**Removing Pavement Butt Joints, Item 204.0105 and Removing Asphaltic Surface Butt Joints, Item 204.0115:** Always include a construction detail with these items indicating the pay limits of the butt joint item. If the detail requires a saw cut the saw cut should be paid for separately under the appropriate sawing item.

**Excavation Rock, Item 205.0200:** When rock is apparent within project limits but is not anticipated to be encountered within the excavation limits, do not include it as a bid item. The boring or sounding information should be shown on the plan but do not show extrapolated rock profiles or cross sections. When the designer is aware of the presence of rock which is apparently outside the excavation limits, there are several alternatives available:

- Perform adequate soundings to verify the rock limits, so an accurate determination can be made whether rock excavation is or is not going to be required.
- Perform adequate soundings as above, then adjust the gradeline to avoid rock excavation entirely.
- When, in the judgment of the designer, the available information is deemed adequate to determine that rock excavation will not be required, place a statement in the plan General Notes that indicates there is reason to believe rock is present within the project limits, but outside the proposed excavation

limits, and this information is contained in the district project files.

When rock excavation is known to be required, it shall be included as a contract bid item. Keep in mind that shallow rock cuts or small quantities cost more on a unit basis than deeper cuts, or larger quantities. When such is the case, as when rock is encountered in a ditch line only, the designer must determine whether the ditch can be altered to avoid rock cut, or if the ditch is even necessary.

**Prepare Foundation for Asphaltic Paving (L.S.), Item 211.0100:** This item shall be included in contracts meeting one of the following criteria:

- Asphalt pavement is being constructed over existing concrete pavement, over existing asphaltic pavement, or over existing base course shoulders. NOTE: When existing base course shoulders are to be included under this 1 LS item, clarify this for the bidders by either showing the transverse width of the preparation item via a dimension line going to the outside edge of the base course shoulders on the Typical Finished Sections or by noting this in a special provision article. (Also, a Miscellaneous Quantity listing should be included to clarify to all bidders the Sta. – Sta. limits where this LS item applies.)
- Asphaltic pavement is being constructed under a separate contract from the base layers.
- Through traffic will be using the completed base layers
- Existing asphaltic surface is salvaged full depth and there is no base aggregate item in the contract.
- Existing asphaltic surface is salvaged or removed by milling and carries traffic on milled surface.

**Prepare Foundation for Asphaltic Shoulders (Stations - per side of the roadway), Item 211.0400:** Include this item in contracts where an asphaltic shoulder is being constructed or widened adjacent to an existing asphalt or concrete pavement and requires the excavation of the existing crushed aggregate shoulder prior to placement of the asphaltic shoulder. This item also includes the reconstruction of the base shoulder using the excavated base course material, after the new asphalt shoulder is paved. NOTE: Excess shoulder base course material that can't be bladed to a nearby shortage area along the roadway can be trucked to a shortage area by use of item 305.0504.S, "Hauling Excess Shoulder Material" by the CY

**Shaping Shoulders (Stations - per side of the roadway), Item 305.0500:** Include this item in contracts where it is necessary to blade the existing crushed aggregate shoulder away from the existing pavement and then reshape the shoulders to the desired cross section. NOTE: Excess shoulder base course material that can't be bladed to a nearby shortage area along the roadway can be trucked to a shortage area by use of item 305.0504.S, "Hauling Excess Shoulder Material" by the CY.

**Shaping Roadway (Stations – per centerline of the roadway), Item 305.0502.S:** This item is to be used where all the existing pavement is to be salvaged or removed and the remaining base course shoulders are to be graded and shaped across the whole roadway to prepare a foundation template for new asphalt pavement.

**Base Aggregate Dense, Breaker Run, Select Crushed Material, Pit Run and Backfill Granular Conversions, Items 305.0110, 305.0120, 305.0130, 310.0110, 311.0110, 312.0110, 313.0110, 209.0100 and 210.0100:** To gain additional consistency in estimates, the following statewide conversion factors are provided for granular materials. Designers are to use values within the conversion factor ranges of Table 3.1 The conversions are based on Region experience and are for compacted material.

**Table 3.1 Compacted Aggregate Conversion Factors**

Bid Item Number	Material Bid Item Name	Conversion Factor (Tons/Cubic Yard)
305.0110	Base Aggregate Dense 3/4-Inch	1.75 - 2.1
305.0120	Base Aggregate Dense 1 1/4-Inch	1.75 - 2.0
305.0130	Base Aggregate Dense 3-Inch	1.75 - 2.2
310.0110	Base Aggregate Open Graded	1.6 - 1.9
311.0110	Breaker Run	1.7 - 1.8
312.0110	Select Crushed Material	1.7 - 1.9
313.0110	Pit Run	1.6 - 1.8
209.0100	Backfill Granular (Grade 1 or 2)	1.5 - 1.7
210.0100	Backfill Structure (Grade A or B)	1.75 - 2.0

**Base Patching, Items 390.0103 - 390.0403:** All the "Base Patching" items (per the WisDOT Standard Specifications) are for patching existing Concrete Pavement that will be overlaid with new pavement. The items for Base Patching include 1) Concrete Pavement removal, including removal of any asphaltic overlays and 2) replacement of the removed pavement with either concrete or asphaltic pavement. The standard Base Patching

items are:

- "Base Patching" (390.0103 - SY) allows the contractor the option of using either concrete or asphalt for replacement of the removed existing concrete pavement.
- "Base Patching Asphaltic" (390.0201 - Ton or 390.0203 - SY) allows only asphaltic pavement to be used for replacement of the removed existing concrete pavement.
- "Base Patching Concrete" (390.0303 - SY) allows only concrete to be used for replacement of the removed existing concrete pavement.

**Base Patching Concrete SHES, Item 390.0403:** allows only SHES concrete to be used for replacement of the removed existing concrete pavement. Since this item requires a minimum compressive strength in the concrete of 3000 pounds per square inch within 8 hours of placement, it allows traffic to travel over the patches after 8 hours.

**Coloring Concrete WisDOT Red, Item 405.0100:** Use when specifying the standard WisDOT red colored concrete. Other colors will require using STSP 405-020 to specify the color and pigment load. Use standard spec 405 to specify coloring concrete for other concrete bid items. In addition, the region will need to have comparison samples for each color available to the contractor for viewing at the region office.

**Concrete Pavement Gaps, Item 415.0210:** The use of paving gaps should be minimized; however, if the designer determines they are necessary they shall be shown on the plan and profile sheets and listed in the miscellaneous quantities. If the staging requires multiple gaps at one roadway location include a quantity for each gap.

**Concrete Truck Apron 12-inch, Item 416.0512:** Use this bid item for the concrete truck aprons. Include bid item 405.0100 - Coloring Concrete Red when specifying roundabout truck aprons.

**Concrete Rumble Strips Intersection, Item 416.1180:** Use this bid item on projects requiring concrete rumble strips on approaches to intersections. For rumble strips inlaid into existing HMA or concrete pavement include a Concrete Pavement Replacement or Concrete Pavement Replacement SHES bid item.

**Hot Mix Asphalt (HMA) Cold Weather Paving, Item 450.4000:** The intent of the Department is not to pave asphaltic material during cold weather. The proposed construction schedule outlined in the design contract time for completion (refer to [FDM 19-10-30](#)) should not indicate asphalt paving within the locations and during the timeframes outlined below.

However, due to project or community needs, changes in construction schedule, emergencies and weather variability there will be situations where the Department allows the contractor to pave during cold weather.

Include the HMA Cold Weather bid item when the contractor will likely place asphaltic pavements under [standard spec 460](#), [standard spec 465](#) and related special provision items when the ambient temperature is less than 40 degrees Fahrenheit or within the following locations (refer to [FDM 14-10 Attachment 10.5](#)) and timeframes:

- in the WisDOT Northern Asphalt Zone from September 15 through June 1, or
- in the WisDOT Southern Asphalt Zone from October 1 through May 15.

Unless the designer can determine the quantity more accurately, estimate 25 percent of the asphaltic pavements placed within the above-mentioned timeframes or less than 40 degrees Fahrenheit under the HMA Cold Weather Paving bid item. For estimating purposes, use \$3.00 per ton as the HMA Cold Weather Paving bid item.

For example, a project located in the Southern Asphalt Zone anticipates that they will be placing a total of 30,000 tons of HMA Pavement Type MT. The design contract time for completion indicates that 10,000 tons will be placed after October 1st. The designer would estimate 2,500 tons (10,000 tons x 25%) as the HMA Cold Weather Paving bid item and at \$3/ton for \$7500 for the estimate.

In extreme cases, STSP 450-010 should be used on a project by project basis and approved by FHWA. It must be included for those projects that have paving occur within the following:

- in the WisDOT Northern Asphalt Zone from November 1 through April 15, or
- in the WisDOT Southern Asphalt Zone from November 15 through April 1

This can happen by design, during construction as an excusable compensable delay, or by request of the contractor. Paving station limits must be identified. The STSP is only to be used for traffic control, temporary pavements or in emergency situations. Permanent pavement is not to be construed under this STSP.

In addition, designers should consider carrying over portions of the asphalt paving to the following season. Particularly if a project schedule requires a significant amount of late season, or cold weather paving. Designer can use a special provision (SPV) to pave the final layer of asphalt the following construction season.

Several factors play into whether or not a project should consider paving the final layer the following year, including:

- Existing pavement structure: Would the lower layers of asphalt placed this season be sufficient to support traffic over the winter season? Designers need to consult with the region pavement engineer.
- Soil conditions: Are there poor soils, and therefore an increased risk of sections of pavement needing repair the following year before paving the surface layer?
- Maintenance and cost responsibility: Consider work zone traffic control, detours, temporary and permanent signage, drainage, erosion control, business and pedestrian accommodations, etc. Who will maintain and repair these items over the winter season and who will pay to repair and replace? For example, if there are inlets, manholes or other structures that will require ramping, who would maintain these temporary items and who would pay to repair or replace?
- Business and local resident impacts: Are there reasons that carrying over would cause undue burden to the businesses or local residents? Do these business and local impacts override constructing a better-quality surface the following paving season?
- Project schedule impacts: Are there reasons that carry over of this project would cause problems with the staging of other projects? Does the need to complete this project due to another project staging override a better-quality surface the following paving season?

There may be additional considerations, but these are some items to think about when considering using an SPV to carry over the construction project to the following construction season.

**Asphaltic Surface Patching, Item 465.0110:** A quantity of Asphaltic Surface Patching should be included on all asphaltic pavement resurfacing contracts that are open to traffic. This will provide the contractor with a means to make minor repairs (i.e - filling pot holes or pop outs that occur under traffic handling and for ramping as directed by the engineer at saw cut match-in joints prior to the asphaltic pavement overlay being constructed). Also, provide a "Remarks" column on the MQ table and explain the intended purpose of each undistributed estimated quantity shown.

**Ice Hot Weather Concreting (for Hot Weather Paving Concrete Structures), Item 501.1000.S:** As outlined in [Standard Spec 501.3.8.2](#), the contractor is responsible for the quality of concrete placed in hot weather. The contractor must utilize ice or other means to control the concrete temperature in hot weather. Use the following design guidance to determine when and estimate how much ice to include when project includes pouring concrete structures during hot weather.

Include Ice Hot Weather Concreting, Bid Item 501.1000.S in the structure plan when;

1. The structure contract utilizes any quantity of High Performance Concrete (HPC) masonry structures or,
2. The combined contract quantity of the items listed in [Standard Spec 501.3.8.2.1\(2\)](#) is 2,000 CY or more, and
3. The placement of the above-mentioned items is between June 15th and August 15th.

Use the following equation to estimate the quantity of ice for hot weather concreting structures;

$$\text{Ice (lbs)} = (15\%) \times (\text{Concrete Quantity CY}) \times (50 \text{ lbs/CY})$$

**Curb and Gutter:** When curb and gutter is built under a separate contract from the grading work, the designer shall specify who is responsible for backfilling the two feet behind the curb and gutter.

**Adjusting or Reconstructing Inlets and Manholes, 611.8110 - 611.8115:** If a new or salvaged frame and cover is to be supplied for an existing structure, up to twelve inches of adjustment of the manhole or inlet is included in the bid item for the new or salvaged cover.

- Use the bid items Adjusting Inlets or Adjusting Manholes when the existing frame and cover will be reused on the existing drainage structure and an adjustment of twelve inches or less is required.
- Use the bid items Reconstructing Inlet or Reconstructing Manhole for any situation requiring an existing drainage structure to be adjusted more than twelve inches.

**Barrier System Grading and Shaping Finishing, Item 614.0010:** Use this item when grading, shaping and finishing for barrier systems fall outside the grading limits. For work within the grading limits, the work is paid for under other contract items.

**Maintenance and Repair of Haul Roads, 618.0100:** This is required on all projects on the State Trunk Highway System, except projects within city limits where there's so much other truck traffic that it would be difficult to determine whose trucks did what pavement structure damage and where the city already has a roadway maintenance program.

**Mobilization, 619.1000:** This is required on all contracts. Contracts with multiple projects shall have one bid item prorated between projects.

**Culvert Pipe Checks, 628.7555:** This item is measured and paid by the individual bag used, not by specific location.

**Signs Type I (reflectivity), Item 637.1000-1999, Signs Type II, Items 637.2000-2999, and Signs Type III, Items 637.3000-3999:** Refer to the Sign Code and Sign Plate manuals to determine the type of reflective sheeting for sign.

<https://wisconsin.gov/Pages/doing-bus/local-gov/traffic-ops/manuals-and-standards/manuals.aspx>

**Traffic Control Covering Signs Type I, Item 643.0910 and Type II, Item 643.0920:** Use these items to cover conflicting permanent type I and type II signs during construction. Indicate in the miscellaneous quantities which signs are to be covered and include a quantity for each time the sign will be covered and uncovered throughout the project. Refer to [FDM 11-50-20.7.2](#) for further guidance.

**Traffic Control, 643.5000:** Include this item in all projects with any traffic control work. In contracts with multiple projects, prorate the quantity so the contract total equals one (1).

**Marking Line Same Day:** Include a quantity for same day marking of the centerline and no passing lines on the surface layer for all projects that are open to traffic. Also, if necessary, include an item for temporarily marking any intermediate layers.

**Cold Weather Marking Epoxy, 4-Inch Item 646.6464.S and 8-Inch Item 646.6468.S (STSP 646-010):** Include a special provision adding a bid item for late season marking on all projects projected to be completed after October 1 for the Northern Zone and October 15 for the Southern Zone.

**Construction Staking:** Consider the time a contractor will need to perform initial staking. Ensure that there is adequate time available after contract execution to complete the initial staking and subsequent contract work within the prescribed contract time. Give large grading projects and projects let late in the year careful consideration. To estimate the contract execution date, assume the contract will be executed approximately 6 weeks after the let date.

If a project's letting date is delayed and the contract includes initial staking, reevaluate whether the contractor will have ample time to complete initial staking and subsequent contract work within the prescribed contract time.

If determined that the contractor will likely be unable to complete the supplemental project survey control, slope staking and subsequent contract work within the prescribed contract time, consider utilizing the survey services of one of the following:

- State or consultant forces.
- Consultants administering or providing support on the project.
- Consultant under surveying master contract.

Construction Staking, Storm Sewer System, Item 650.4000	Include in projects where storm Sewer is being placed and contractor staking is used
Construction Staking, Subgrade, Item 650.4500	Include on grading projects. Item may be added for a dense base contract where the grading was done in previous contract and needs to be rechecked before placing dense base.
Construction Staking, Base, Item 650.5000	Include on base aggregate and asphalt projects. Do not include this item when concrete pavement is being constructed in same contract. Concrete pavement staking covers staking dense base and open-graded base.
Construction Staking, Curb, Gutter, Curb & Gutter, Item 650.5500	This item is for asphalt roadways. Use this item if there is 50 L.F. (15 m) or more of curb and gutter required. Do not include this item with concrete roadways. Do not use this item for staking curb and gutter in rural intersections on resurfacing projects.
Construction Staking, Pipe Culvert, Item 650.6000	Include on projects for staking culvert pipe cross drains. Do not include item for field or private entrance pipes.
Construction Staking, Structure Layout, Item 650.6500	Include in projects for stakeout of structures, box culverts, retaining walls, and sound walls.
Construction Staking, Concrete Pavement, Item 650.7000	Include on concrete paving projects. This item includes staking of dense and open graded base course Construction Staking, Subgrade is not included in this item and should be included as a separate item in the contract if grading is completed within the contract prior to placing concrete pavement.
Construction Staking, Concrete Barrier, Item 650.7500	Include in projects where large quantity is involved. Do not include this item if concrete barrier abuts concrete pavement.
Construction Staking, Resurfacing Reference, Item 650.8000	Include in resurfacing or pulverizing projects
Construction Staking, Electrical Installations, Item 650.8500	Include in all projects where large quantity is involved. Consider not using where numerous installations need field adjustment or plan does not have layout information available.
Construction Staking, Curb Ramps, Item 650.9000	Include in all projects where individual curb ramps have location-specific layout information that includes elevations in the plan details. Standard Detail Drawings (SDD) are not considered layout information. Do not use pay item on any individual curb ramp that does not have layout information.
Construction Staking, Supplemental Control, Item 650.9910	Include in all projects where contractor staking is used.
Construction Staking, Slope Stakes, Item 650.9920	Include on all grading projects when the department is not performing slope staking.

NOTE: When two or more roadways occur, construction staking subgrade, crushed aggregate base course, concrete pavement, resurfacing reference, and slope stakes will be measured by the linear foot along the centerline or reference line of each roadway.

**Temporary Diversion Channels:** To construct concrete box culverts, structural plate pipes or structural plate pipe arches, it is sometimes necessary to construct temporary diversion channels to maintain drainage. If a temporary diversion channel is required, bid items for all work to be performed for the construction and removal of the channel shall be included in the contract. If the channel is optional, only the bid items for erosion control shall be included in the contract. The excavation will be considered incidental to the bid item of Excavation for Structures.

### 3.3 Quantities

Accurately estimating quantities can influence contractor bidding and construction administration and is important to minimizing contract over/under runs.

Information on the goals and reporting of the quantities performance measure can be found on the DTSD performance management page under the Project development functional area.

Follow region procedures for entering quantities into FIIPS. DOT Staff can refer to the project management

manual (PMM) 05-10-15. [Attachment 3.1](#) or a similar form can be used to report quantities to the region.

### **3.3.1 Undistributed Quantities**

Bid items that require specific design such as pavements, storm sewer, curb and gutter, etc. shall not include undistributed quantities. However, bid items not tied to specific designs may have all or part of their quantities included as undistributed.

Examples of these items are:

- topsoil
- seeding
- sodding
- erosion mat
- erosion bales
- mulching
- silt fence

Undistributed erosion control quantities should be estimated to provide the engineer with ample quantities for use in emergencies and unforeseen erosion control problems.

### **3.3.2 Vacant**

### **3.3.3 Rounding Quantities**

Round quantities to the number of decimal places justified by the data. Quantity table totals must match the Estimate of Quantities Sheet. Consider the following guidance when rounding:

- Use the same rounding methodology for a bid item in multiple projects or categories.
- Rounding should only be done once in a quantity table. The summation of line items must match the quantity table subtotal.
- Plan quantities should never be more exact than can be measured in the field.
- Clearly defined and measured items should not be rounded or rounded to the lowest quantity range of [Table 3.3](#).
- The use of partial units is discouraged. However, partial units may be used for items measured by acre, mile (MI), or hundredweight (CWT). Partial units may also be used for items such as signs (SF) or beam guards (LF) due to the method of measurement for the items.
- If not directly stated in Table 3.3, round precision to the leading three numerical digits. For instance, 23,576 SY of erosion mat should be rounded to 23,600 SY.

**Table 3.3 Guide for Rounding Quantities**

ITEM NAME	UNIT	QUANTITY RANGE					
		0-10	10-100	100-1,000	1,000-10,000	10,000-50,000	OVER 50,000
"Each" and "Station" Items	EA, STA	1	1	1	1	-	-
Clearing and Grubbing	IN DIA	1	1	10	10	100	-
Clearing and Grubbing	ACRE	0.01	0.1	1	10	-	-
Removals	SY, LF, CY	1	1	10	10	100	-
All Excavation/ Granular Backfill	CY	1	1	10	10	100	100
Granular Subbase Course	CY, TON	1	1	10	10	100	-
Asphalt Stabilized Base Course/Shoulders	SY	1	10	10	100	100	1,000
Base Aggregate Dense	CY, TON	1	1	10	10	100	100
HMA and Concrete Base Courses/Surfaces	TON, SY	1	1	1	10	10	-
Concrete Surface Drains/Mortar Rubble Masonry	CY	0.1	1	1	-	-	-
Concrete Masonry	CY	1	1	1	1	1	1
Prestressed Girder	LF	1	1	1	1	1	1
Bar Steel Reinforcement	LB	10	10	10	10	10	10
Structural Steel/Plates	LB	1	1	10	10	10	100
Timber & Lumber	MBM	0.01	0.1	1	-	-	-
Piling	LF	5	5	5	5	5	5
Sheet Piling	SF	1	1	1	10	10	100
Culvert Pipe/Pipe Cattle Pass	LF	2	2	2	2	-	-
Structural Plate Pipe	LF	2	2	2	2	-	-
Concrete Sidewalk	SF	1	1	10	10	100	-
Slope Paving	SY	1	1	1	1	1	1
Riprap	CY	1	1	1	-	-	-
Storm Sewer Pipe	LF	1	1	1	1	-	-
Calcium Chloride, AG Lime, Mulching	TON	0.1	1	1	-	-	-
Erosion Control Items	SY, LB	1	1	10	10	100	100
Fertilizer	CWT	1	1	10	-	-	-
Signs	SF	0.01	0.01	0.01	0.01	0.01	-
Drill Holes, Well Casing Pipe	LF	1	1	10	-	-	-
Water	MGAL	0.1	1	10	100	-	-
Locating No-Passing Zones	MI	0.01	0.1	1	-	-	-

**LIST OF ATTACHMENTS**[Attachment 3.1](#)

FIIPS Quantities Update Form



## 5.1 Estimate Components and Accuracy

Two components make up the estimate: unit cost and quantity. Accuracy of each component influences the highway program by reducing uncertainty of funding and scheduling, as well as providing a benchmark for comparing bid prices.

WisDOT program stability relies on accurate estimates. Project schedules are based on the estimated cost of a project. WisDOT balances project-specific parameters during the fiscal year to ensure proper workloads and spending between regions, contract type (concrete, asphalt, structures), and funding sources. An accurate estimate allows WisDOT to make the best decisions with available funding. Estimates that are higher than the low bid may initially seem beneficial for the department, however, the savings is usually spent on projects that are designed on an accelerated schedule and may be constructed earlier than needed based on the service life of the roadway. Estimates that are lower than the low bid require extra funding and may result in rejecting the project or requiring WisDOT to delay work on other projects.

The estimate is a benchmark for reviewing the contractor's bid prices. Bids are analyzed before contracts are awarded to determine if the bids are acceptable. Bids compared with accurate estimates allow for straightforward bid analysis of the contract. Discrepancies between the bid and estimated prices require examination to determine the accuracy of both the estimate and the bid prices.

Designers are expected to produce an accurate estimate for each life cycle of the project. Update FIIPS at each life-cycle change and on a semi-annual basis.

Estimate accuracy is measured by two WisDOT standards:

- 60% of the estimates will be within 10% of the low bid
- 75% of the estimates will be within 15% of the low bid.

The Engineer Estimate Accuracy Performance Measurement measures estimate accuracy, which is available on the estimating website, DTSD performance management page under the Project development functional area or the WisDOT MAPPS page:

<https://wisconsin.gov/Pages/about-wisdot/performance/mapss/measures/additional/engacc.aspx>

All new consultant contracts will include a component to evaluate a designer on estimate development and quality.

## 5.2 Tools and Resources

Estimating tools currently used by WisDOT include:

### AASHTOWare Project Estimator

- Estimator is a cost estimating tool that is part of the AASHTOWare software suite. It is used to help designers determine the overall construction project cost using bid results from the last three years of Wisconsin lettings. Results provided include a calculated cost for each bid item based on multiple variables selected by the user including; location of project, work type classification, and quantity of item. Estimator is WisDOT's preferred method for selecting an initial estimated price for standard bid items. See [FDM 19-5-10](#) for more information.
- Verify that you are using the most current Estimator catalog. Consultants must download and install catalog updates from:

<https://awpkb.dot.wi.gov/Content/precon/Estimator/LicenseInstallConfig.htm#EstCatalogFile>

- WisDOT catalogs are updated after each catalog release.
- The AASHTOWare Preconstruction Estimation tool is not approved for use at this time.

### Bid Express

- Bid Express is an Info Tech Inc. product located on the web at [www.bidx.com](http://www.bidx.com). Bid Express is a website comprised of a searchable database of historical bid tab data. The database can be used to find average cost information for specific bid items, search for keywords in bid item descriptions, and review awarded contracts. The data search can be tailored to include a specific date range, specific bid items or item descriptions. A Bid Express user guide is available at:

<https://wisconsin.gov/Documents/doing-bus/eng-consultants/cnslt-rsrcs/tools/estimating/bid-express-user-guide.pdf>

- DOT employees have access to Bid Express by requesting login ID and password from the mailbox: [hcci.dtid@dot.wi.gov](mailto:hcci.dtid@dot.wi.gov). Include your name, email address, and phone number in your request. Regions requesting access for multiple users should submit one spreadsheet with requested information to the HCCI mailbox.
- Consultants are not covered under the WisDOT license agreement. If a consultant decides, they

would like to utilize Bid Express they would need to acquire their own license.

#### Similar Projects Tool

- The similar projects tool uses bid history that can be filtered by a variety of criteria. The results include mobilization percentages, traffic control costs, item class percentages for allowance items, and project information. The similar project tool is available on the estimating website or download directly at:

<https://wisconsin.gov/Documents/doing-bus/eng-consultants/cnslt-rsrcs/tools/estimating/similar-projects.xlsx>

Instructions for using the similar projects tool is found within the similar project tool Excel file.

#### Estimating Website

- Item bid history for asphalt, [similar projects tool](#), and bridge painting costs are available on the "Estimating projects" page of the consultant website at:

<https://wisconsin.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/tools/estimating/est-tools.aspx>

#### Past Bid Results

- Past bid results should be used to compare the design project to past projects with similar scope, location, and project complexities. All awarded proposals in the past year are available on the WisDOT HCCI website at:

<https://wisconsin.gov/Pages/doing-bus/contractors/hcci/bid-let.aspx>

Choose a past letting date and select all bids received. Past proposals are also accessible through Bid Express.

#### Structure Costs

- Refer to the WisDOT Bridge Manual Chapter 5; Economics and Costs at:

<https://wisconsin.gov/dtsdManuals/strct/manuals/bridge/ch5.pdf>

- For structures designed by the Bureau of Structures (BOS), BOS staff will provide the estimate and estimate documentation for structure items.

#### Cost Based Estimating

- Use this method for atypical bid items such as special provisions (SPVs) where historical data is limited. The process includes determining actual labor, materials, and production rates required to complete the bid item similar to how contractors bid work. Actual cost data can be determined by discussing project with contractors or material suppliers. Estimator has cost sheets built into the application to assist in the development of bid item cost using the cost based estimating method.

#### Statewide Average Unit Prices

- Statewide average unit prices should only be used for conceptual estimates, and not as a source for the PS&E estimate. The statewide average unit prices do not take into consideration the factors of quantity, location, or other project characteristics, so the information is not specific enough for the PS&E estimate. The past three years of average prices are available on the WisDOT HCCI website.

### **5.3 Construction Estimate Development**

#### **5.3.1 Special Provisions (SPVs)**

Use standard bid items whenever possible. SPVs require extra work to create bid documents, administer in the field, and for the contractors to estimate. SPVs do not have history for implementation in the field, so even a well written SPV can create uncertainty which can increase the bid price. Estimating SPV items can be completed by comparison to past proposals or cost-based estimating. Estimator regression equations are not produced for SPV items due to the inability to categorize the items. The special provisions for comparable projects must be reviewed to determine the differences between past projects and the current design.

#### **5.3.2 Typos**

The estimate should be reviewed for typing errors. Typos usually increase/decrease the unit price by a factor of 10 or 100, which can cause a significant change in the overall estimated price of a proposal. Errors like this are a great example of why an independent check should be performed on an estimate.

#### **5.3.3 Risk**

Remove contractor risk from the PS&E documents that may affect estimate prices by addressing uncertainty in the plans, specifications, and schedule. Discuss potential risk during the design phase with experienced construction personnel or members of the contracting industry to determine how risk may affect the cost of the proposal. The more uncertainty or risk in a proposal, the greater chance the contractor will increase the bid cost to protect against financial loss. For instance, traffic control items will have higher risk and cost if there is ambiguity in the traffic control plan or there is not enough room in the work area for contractors to perform the work.

### 5.3.4 Conservative Estimates

Designers often account for project risk or complexities in multiple locations within an estimate, which generally increases the overall cost of the estimate over and above a reasonable bid price. Be careful not to adjust for multiple factors with the same underlying factor, such as increasing estimate prices for expedited schedule and night work. As an example, paving will be completed in multiple stages due to traffic staging. For this example, the overall estimate may be too high if the estimate is increased in the mobilization, traffic control, and/or asphalt bid items.

### 5.3.5 Competition

Competition plays a critical role in bid prices. Strong competition will generally result in aggressive bid prices. Certain work types have less competition. For example, asphalt producer locations are controlled by material sources (pits and quarries), so the location of the project drives who will bid on a proposal. Review similar past proposals for expected competition. Plan holders and eligible bidders are available on the HCCI website or Bid Express, Lettings Tab. Review competition within a proposal and adjust for competition among contractor work classifications. For example, on one proposal there may be little competition from the asphalt suppliers, but strong competition from structural contractors.

### 5.3.6 Time of the Year Letting

Season has an effect on competition, due to the contractor's capacity for work. Contractors bid aggressively when they have a small work backlog, which can result in lower bid prices. Competition is higher in the fall and winter months. The recent record for estimate accuracy by Let month, for single bid proposals, and by number of bidders is posted in the Engineering Estimate Accuracy Performance Measure Report at:

<https://wisconsin.gov/Documents/doing-bus/eng-consultants/cnslt-rsrcs/tools/estimating/estimate-accuracy.pdf>

### 5.3.7 Unit Price Considerations

The following information should be considered when determining unit prices for individual items. These considerations are not all-inclusive but provides a starting point.

- Have the unit prices been rounded? Prices shall be rounded according to the engineer's confidence in the estimate price. Roughly estimated items should have the unit price rounded to one or two leading numerical digits. Estimate prices usually do not need more than three leading numerical digits. Example: A regression price of \$34.18 should be rounded to \$35.
- Are the unit prices using all applicable parameters if there is a potential for alternatives? Example: A proposal will contain work in two counties. Check the unit prices twice; once for each county in the proposal. This applies to other factors, such as multiple work types.
- Are there multiple projects in a proposal? Blend prices based on total proposal quantity.
- In Estimator, how did the project quantity fit into the item regression curve? Estimator curves are most reliable between the 25% and 75% quartiles.
- What were the similarities between the current project and the past projects that are being used for comparison?
- What are project characteristics that can influence the bid price?
  - Site specific situations
    - Availability of earthwork on site
    - Haul distances for waste material
    - Aesthetics including form liner, unique landscaping items, etc.
  - Competition - bid prices are typically lower as competition increases.
    - What level of competition do you expect for this proposal?
    - How did you adjust the estimate considering the expected competition?
  - Location - bid prices are typically higher as a project is more remote.
    - Where are suppliers located in relation to the project? Consider asphalt and concrete plants.
    - Urban/rural setting
  - Time constraints - bid prices are typically lower with fewer constraints in the schedule.
    - Is there adequate time to construct the project?
    - When will the project be built during the construction season? Are there end of year time constraints?
    - Are there constraints on the work such as night work, utility conflicts, or wildlife conflicts?
  - Traffic - bid prices are typically lower with fewer shifts in traffic.

- How will traffic be handled during construction?
- Will traffic accommodations reduce production rates?
- Are multiple stages required?
- What are the mobilization needs for the project? Project size, location, construction stages all influence contractor's bid for mobilization. A common method for estimating the Mobilization bid price is as a percent of the total proposal cost. **The similar projects tool** and tables showing median mobilization percentages for past proposals by **improvement** type are included on the estimating website under the Estimating Tools page. Similar sized projects should be compared in the **similar projects tool** for more accurate mobilization percentages. Although these resources help determine a starting point, the estimated Mobilization bid price should be adjusted for project specific details: <https://wisconsin.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/tools/estimating/est-tools.aspx>
- Is there enough bid history for the current asphalt item? The combined asphalt items began their use in April 2016. Estimate prices can be obtained from Bid Express. If additional bid history is needed, use the Asphalt Excel spreadsheet on the Estimating Tools website at: <https://wisconsin.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/tools/estimating/est-tools.aspx>

## FDM 19-5-6 Construction Estimate Documentation

December 5, 2017

Estimate documentation is required for all WisDOT let proposals. The purpose of the documentation is to provide a record of the decisions made during the development of the proposal cost estimate. Reviewers will use the documentation during the estimate review process as outlined in [FDM 19-5-7](#). The documentation should also reflect modifications made by the project team during the final estimate development and review.

### 6.1 Estimate Documentation Report

The estimate documentation report is a required exhibit to be submitted with a let project PS&E to central office as described in [FDM 19-10-1.2.1](#). The latest Estimate Documentation Report Template is at the following location:

<https://wisconsin.gov/Documents/doing-bus/eng-consultants/cnslt-rsrcs/tools/estimating/esd-template.docx>

The current template includes the following information:

- Estimate Documentation Information
- Executive Summary
- Project Characteristics
- Item Level Documentation
- Estimate Review Summary
- Estimator Parameters
- Attachments

#### 6.1.1 Estimate Documentation Information

At the top right of the first page, enter requested information in the following fields.

- Design ID(s)
- Construction ID(s)
- Est. Doc. Prepared for - Draft PS&E or Final PS&E.
- Est. Doc. Prepared by
- Preparer's email
- Report finished on - Date

#### 6.1.2 Executive Summary

Provide a brief description of the project scope in the relevant fields, including a summary of how the overall estimate came together, and the factors that could potentially impact the estimate. The following are different sections of the Executive Summary.

1. Description of proposed work. Provide a brief description of the proposed work, including reconstruction segments, rehabilitation segments, number of various structures and the major factors that could potentially impact the estimate.
2. Type of work. See [FDM 3-5-2](#) for definitions. Select all that apply.
3. Similar project or proposals. List the similar projects- include Project IDs and Proposal IDs - used to develop the estimate. Provide a brief explanation for how each project is similar and what items prices were compared.

### 6.1.3 Project Characteristics

Enter information related to each section of project characteristics. The following are different sections of project characteristics. Provide comments on characteristics that impacted estimate prices.

1. Schedule and road user costs.
2. Traffic control.
3. Construction conflicts.
4. Competition of Contractors. Provide the best guess for competition based upon similar projects, how desirable the project may be for contractors, and the remoteness of the project. See [FDM 19-5-5.3](#) for additional information about competition.
5. Other considerations.

### 6.1.4 Item Level Documentation

The amount of documentation required for any one individual item will vary on the importance of that item to the overall total project cost. Significant items require the most documentation. These items are the top 20% of items by amount, which may equal approximately 80% of the total estimate. Significant items have the greatest influence on estimate accuracy; therefore, it is recommended that more time and effort be focused on determining the unit cost for these items using multiple sources. For all other items, the level of effort and documentation required should be relative to their importance to the overall project cost.

Complete item level documentation as the estimate is being developed. It documents what factors were considered when selecting the price and answering the question “why” a price was chosen. Examples of the Item Level Documentation are provided on the Estimate Development page of the estimate website at:

<https://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/tools/estimating/est-guidance.aspx>

List the significant items including total proposal quantity and percent of total proposal contract value for each significant item. Provide Item Level Documentation for each significant item and summary for non-significant items.

1. Significant items list and item level documentation. Provide methodology used to estimate these items. Item level documentation may be an attachment to the estimate documentation template such as the Estimator notes section, an added column to the Q2P main Bid Item worksheet (for WisDOT staff only), an added column to a custom project spread sheet, or a Word document. If the significant item documentation is within an attachment, provide a list of significant items, and state the attachment that contains the documentation.
2. Non-Significant items summary. Summarize the methodology used to estimate non-significant items. Item Level Documentation is not required for non-significant items where the prices were determined in Estimator and it fits the regression curve between the 25% and 75% quartiles. Prices outside of the 25% and 75% quartiles should be verified with another source.

### 6.1.5 Estimate Review Summary

List who reviewed the estimate including names, titles, and dates completed per [FDM 19-5-7](#). Ensure item documentation includes results of decisions made based on review comments.

### 6.1.6 Estimating Tool Parameters

1. Estimator Parameters. Document the use of the Estimator parameters shown below.

Work Type:	<input type="text"/>	<input type="text"/>
Highway Type:	<input type="text"/>	<input type="text"/>
Urban/Rural Type:	<input type="text"/>	<input type="text"/>
Season:	<input type="text"/>	<input type="text"/>
County:	<input type="text"/>	<input type="text"/>
District:	<input type="text"/>	<input type="text"/>

2. Bid Express and Other Tool Parameters. List the general parameters. Variations of these should be noted in the item price documentation.

### 6.1.7 Attachments

Attachments may be referenced throughout the Estimate Documentation. Select the attachments that have been included in the Estimate Documentation. Other attachments may include Bid Express printouts of significant items or cost-based estimate worksheets.

**FDM 19-5-7 Construction Estimate Review**

December 5, 2017

**7.1 Independent Review**

An independent review of the estimate and its documentation must be completed by the project manager or delegate who did not develop the estimate. This review is in addition to the Program Controls Review. Independent review should be completed throughout the estimate development.

**7.2 Region Program Controls Review**

Estimates will be reviewed by the Region Program Controls Unit or delegate.

**7.3 Central Office Review****7.3.1 Pre-Letting**

A cursory review of all estimates will be completed by the Statewide Estimating Engineer. An in-depth review of specific items will be performed based upon current trends.

**7.3.2 Post Letting**

Do not contact a contractor that submitted a bid on a proposal during the post letting review process. A contractor's bidding strategies or opinion of the proposal shall not influence the decision to award or reject a proposal. Designers are encouraged to contact eligible bidders that did not turn in a bid to determine reasons for lack of interest in a proposal.

To obtain contractor's perspective during design, WTBA can be contacted to provide bidability and constructability information.

The designer is required to review the estimate when the estimate and actual bid prices varies from the low bid in four instances.

- The estimate is higher than the low bid by more than 10% (LOW BID is denominator for measurement of estimate accuracy and FHWA/DOT Stewardship compares the estimate to the low bid).
- The low bid is higher than the estimate by more than 5% (LOW BID is the denominator for the governor's letter explaining why the bid prices are high compared to the estimated costs).
- A bid item significant to the proposal is bid at a penny by the low bidder. The designer is required to verify that the quantities are accurate for items bid much higher than the estimate and items bid a penny.
- A bid item significant to the proposal is bid differently between bidders that a small change in quantities could change the low bidder. The designer is required to verify that the quantities are accurate for these items.

Guidance for how the designer is to respond is attached to the email from Bureau of Project Development and on the Estimate Development site:

<https://wisconsin.gov/Documents/doing-bus/eng-consultants/cnslt-rsrcs/tools/estimating/just-email-guid.pdf>

The review completed by the designer will include analysis of costs and quantities for bid items that are significant to the contract to provide a project specific perspective on the discrepancies between the bid and estimated prices. Source:

<https://www.fhwa.dot.gov/programadmin/contracts/ta508046.cfm>

**FDM 19-5-10 Create Estimate and Proposal**

May 15, 2019

AASHTOWare PES is being replaced with an updated web-based version of the product called AASHTOWare Project Preconstruction. For more information on AASHTOWare Project Preconstruction go to the web site at:

<https://wisconsin.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/tools/awp/awp.aspx>

The link below will direct the user to documents that are intended to guide the designer through the process of preparing an estimate, developing a proposal, and submitting it for PS&E. The Bureau of Project Development, Publication Standards/Technology Unit can also be contacted for process and procedure questions.

<https://awpkb.dot.wi.gov/Content/precon/Precon.htm>

**FDM 19-5-20 FHWA Project Authorization Process (Delegated Projects)**

December 20, 2013

**20.1 Background Information**

Differences in project estimates between Federal Highway Administration's (FHWA's) Fiscal Management Information System (FMIS) and related WisDOT systems have caused problems on delegated projects. One of the more common errors occurs in the FMIS Total Project Cost data element. This cost data is transmitted electronically from WisDOT's Financial Integrated Improvement Programming System (FIIPS), but its original source is AASHTOWare. When FHWA reviews a sample of delegated projects, the FMIS cost estimate at the

time that authorization of federal funds was requested and approved does not always match the Engineer's Estimate (AASHTOWare) that was provided.

The following process has been developed to identify and preserve the AASHTOWare estimate that matches FMIS (PS&E estimate or a later estimate that is used at the time of authorization), so it can be provided to FHWA upon request in the event the project is selected for review. For additional information, WisDOT staff can refer to document number 06-10-60 of the Program Management Manual.

## 20.2 Corrective Actions for the Cost Estimate Data

As mentioned, one of the more common errors occurs in the FMIS Total Project Cost data element. This cost data is transmitted electronically from FIIPS, but its original source is AASHTOWare. When FHWA reviews a sample of delegated projects, the FMIS cost estimate at the time that authorization of federal funds was requested and approved does not always match the Engineer's Estimate (AASHTOWare) that is provided.

The following process has been approved to identify and preserve the AASHTOWare estimate that matches the FMIS project cost (PS&E estimate or a later estimate that is used at the time of authorization), so it can be provided to FHWA upon request in the event the project is selected for review.

For state projects:

- When a AASHTOWare project estimate has been revised after the initial PS&E submittal, either by the plan checkers, Region designers or consultants, a PDF of the updated estimate(s) shall be sent to the Region Project Manager. Region Project Managers are required to keep a copy of all AASHTOWare estimates made between PS&E and award, not just the latest estimate. The estimates shall be stored in the project directory to ensure that they can be accessed by anyone. *Only cost estimate changes after PS&E that exceed \$100,000 or 10%, either up or down, will be made in FIIPS.* The Region Project Manager will inform the Region FIIPS Coordinator of all cost estimate updates after PS&E that exceed this threshold. The Region FIIPS Coordinator must make these updates to the estimate in FIIPS and delegate the project to Central Office for check-in. Note that there is an approximate 3-week lockout of FIIPS while the project is at FHWA for authorization.

For local projects:

- When a AASHTOWare project estimate has been revised after the initial PS&E submittal, either by plan checkers or the design consultant, a PDF of the updated estimate(s) shall be sent to the Region Management Consultant. Region Management Consultants are required to keep a copy of all AASHTOWare estimates made between PS&E and award, not only the latest estimate. *The Region Management Consultant will inform the Region FIIPS Coordinator of all cost estimate updates after PS&E that exceed the \$100,000 or 10%.* The Region FIIPS Coordinator must make updates to the estimate in FIIPS and delegate the project to Central Office for check-in. Note that there is an approximate 3-week lockout of FIIPS while the project is at FHWA for authorization.
- The Proposal Management Section will use the FHWA Compliance Assessment Program form to help Regions identify documents for review (refer to [Attachment 20.1](#)). This summary identifies the Region Project Managers, the exact Engineer's Estimate (FIIPS FHWA 37 Form Estimate) that needs to be provided to FHWA, and the estimate date taken from FIIPS Tracking to help Regions locate the estimate.
- [FDM 19-1 Attachment 1.5](#) provides a timeframe when authorization will be taking place for each letting date (between when the PS&E is submitted to FHWA and the AD Meeting). The Region can check that they have a copy of the cost estimate in the project files that matches FIIPS (FMIS) at that time.

## **LIST OF ATTACHMENTS**

[Attachment 20.1](#) Sample FHWA Compliance Assessment Program Form