Estimating

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Transportation Improvement Conference
Wilderness Conference Center, Wisconsin Dells, WI

March 4, 2020

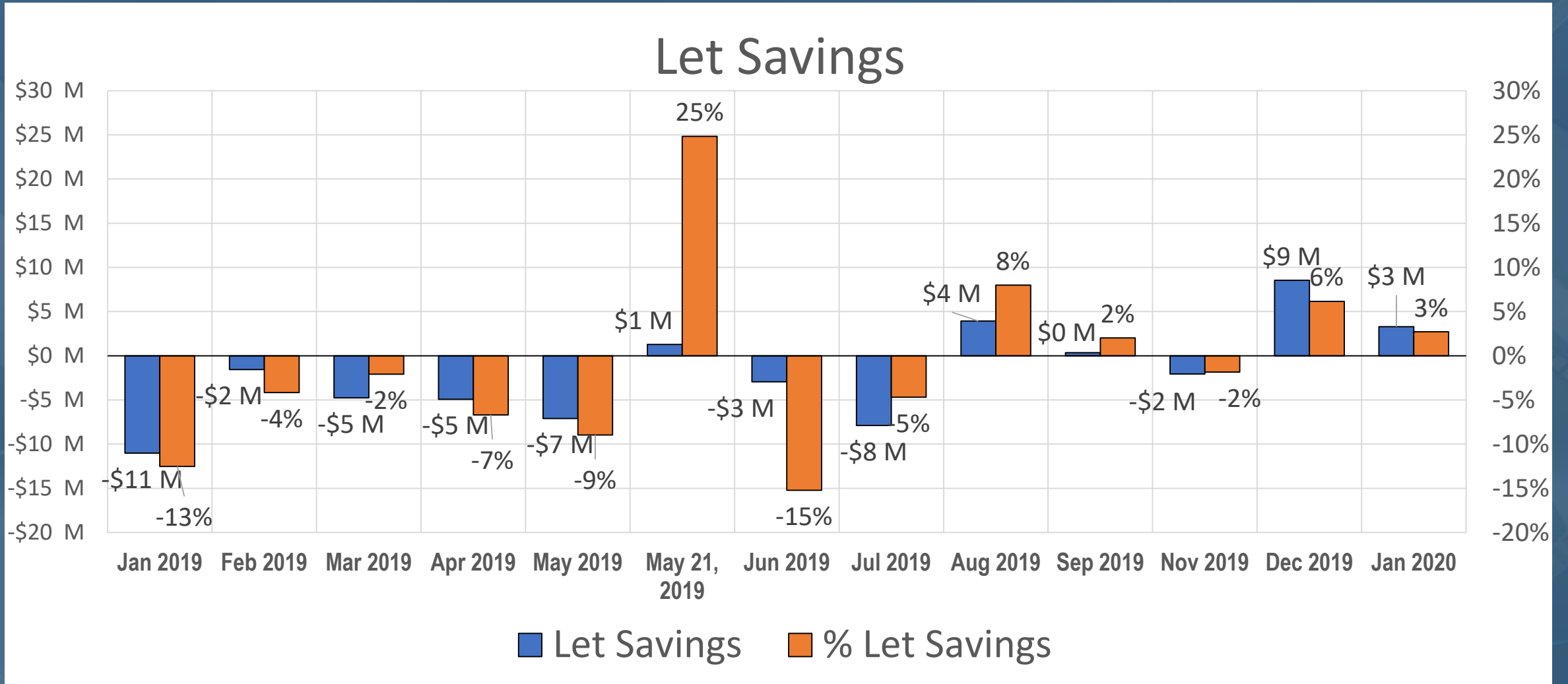WISCONSIN DEPARTMENT OF TRANSPORTATION

Estimating

Agenda

- Estimate Accuracy

- Estimate Considerations
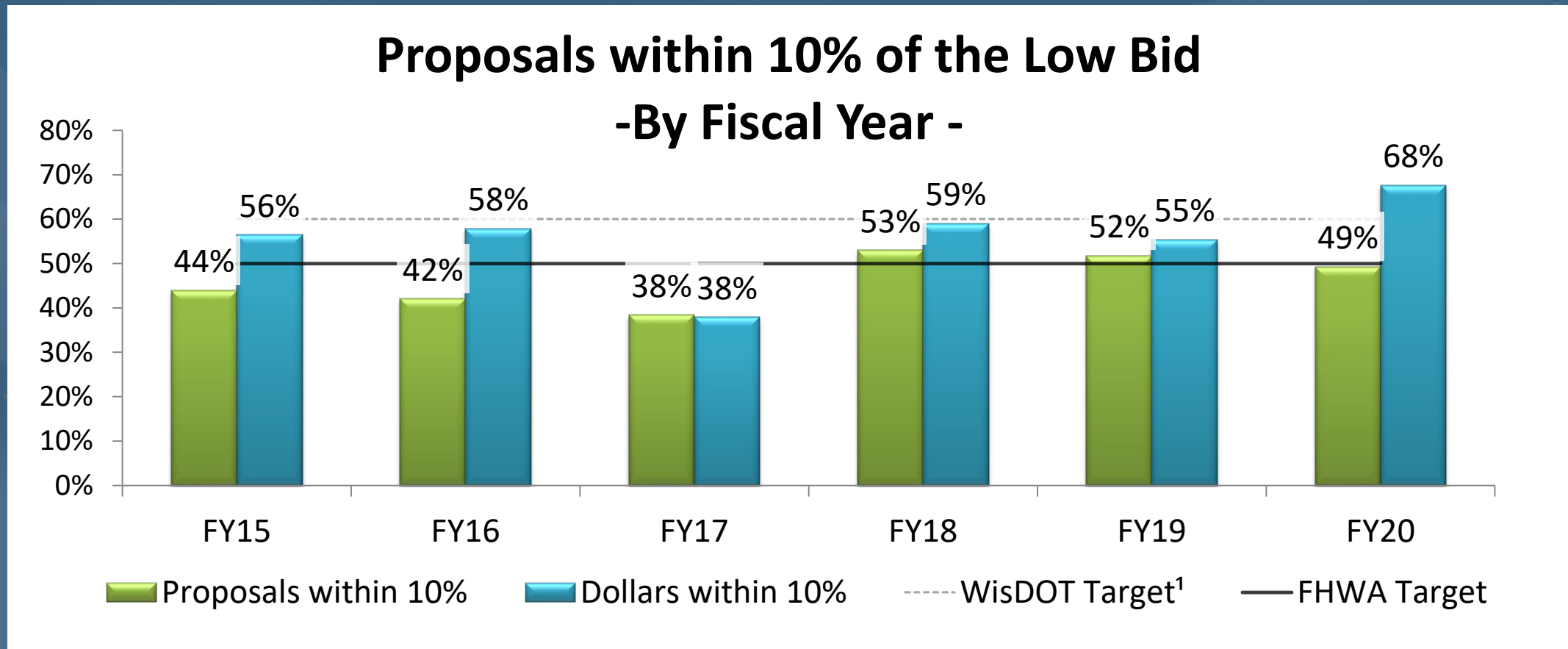
- Addenda

- Justifications

- Estimating Tools

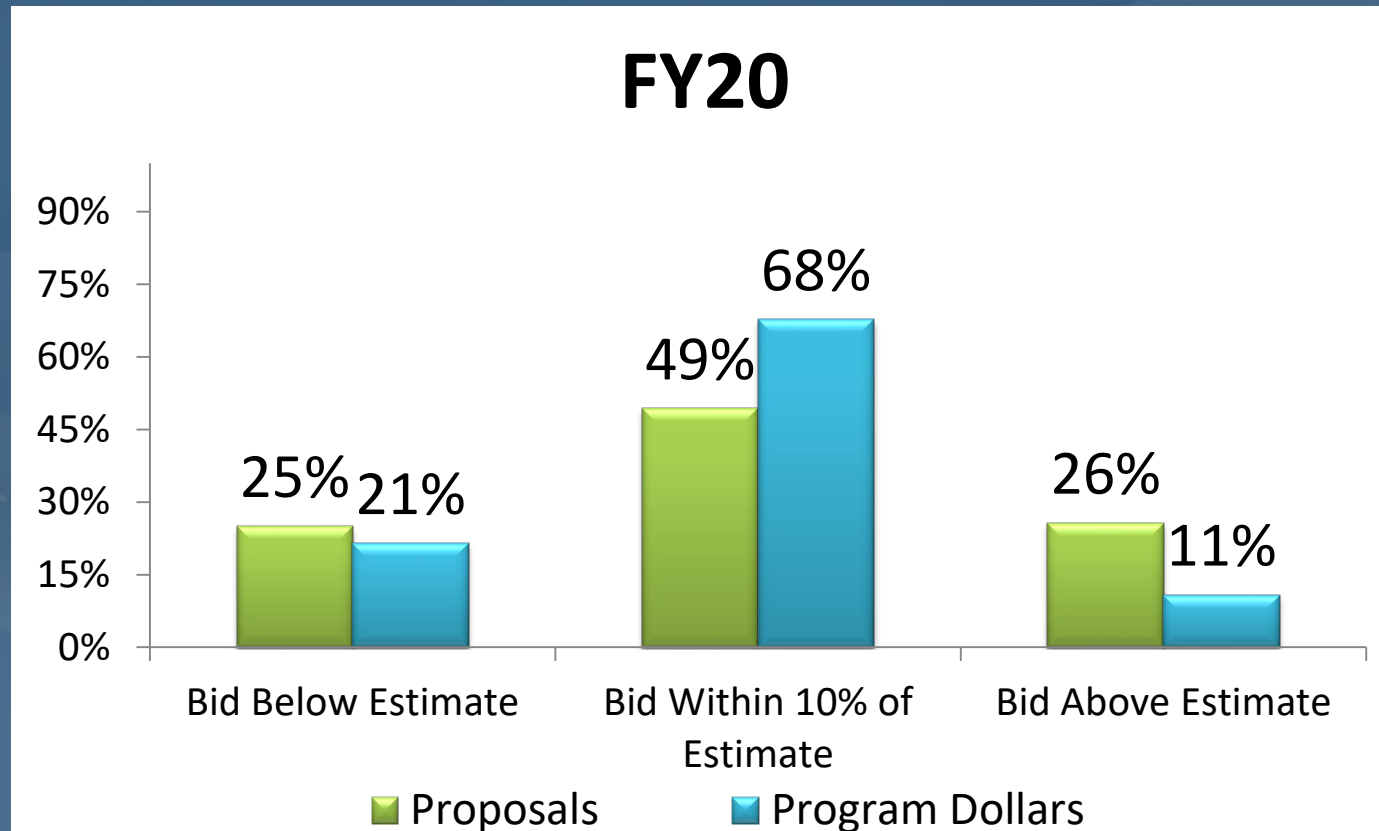Fred Schunke

Estimating Engineer

Estimate Accuracy

Let Savings

Estimate Accuracy

- How is the accuracy of the estimates?

Proposals within 10% of the Low Bid
-By Fiscal Year -

	FY15	FY16	FY17	FY18	FY19	FY20
Proposals within 10%	44%	42%	38%	53%	52%	49%
Dollars within 10%	56%	58%	38%	59%	55%	68%

Legend: ■ Proposals within 10% ■ Dollars within 10% ------ WisDOT Target[1] —— FHWA Target

Estimate Accuracy

- Estimate Accuracy so far in FY2020

FY20

Estimate Considerations

- Project Location
  - Is the project in an isolated area?
    - Haul distances
    - Availability of materials
    - Other work in the area
  - Is the project in a highly developed area?
    - Access to work site
    - Availability of borrow and waste sites.

Estimate Considerations

- Contract Schedule
  - Expedited Schedule
    - Overtime
    - Additional Equipment
    - Risk of Delays
  - Split Construction
    - Multiple mobilizations
    - Scheduling workforce while project work is restricted

- Nightwork
  - Reduced work hours
  - Need for Lighting
  - Access to work zone
- Liquidated Damages
  - Cost to contractor if the work is not completed on time
  - Potential for occurrence

Estimate Considerations

- Staging
  - Multiple Complex Stages
    - Traffic control shifts
    - Restricted work zones
    - Decreased production rates
  - Road Closed
    - More control of the work zone
    - Storage or equipment and materials

Estimate Considerations

- Bundling of Projects
  - Location
    - Cost savings are generally realized if projects are located within a mile of each other.
  - Similar project types
    - Contractors can reuse materials
    - Specialty Contracts
      - Pavement Marking
      - Signals

Estimate Considerations

- Blended Prices
  - If an item potentially involves multiple types of construction methods make sure you are using similar projects for cost estimating
    - Concrete curb and gutter
      - Is the handwork and machine placement quantities in a similar proportion
    - Concrete Masonry
      - Is the work for repairs repairs or construction of a new bridge.

Estimate Considerations

- Changes in Standard Specifications
  - Example: Pavement Marking
    - The thickness of the paint increased with the 2020 Standard Specification
    - Previous cost history would be invalid
- Additional Special Provisions - 6
  - Changes in materials
  - Changes in testing processes
  - Changes in payments

Estimates Updates

- When can estimates be updated?

  - Estimates are to be finalized prior to PSE
    - Costs should consider current industry trends not costs from 2 years ago

  - Updates can be made when the project is being reviewed.

  - Funding impacts the ability to modify estimates
    - Federally Funded projects are financed 8 weeks prior to let
    - State funded projects are case by case until the Ad Meeting

  - Once the Proposal is advertised estimate prices cannot be modified unless an addenda is issued

Addenda

- Addenda are processed on a first come, first serve basis
  - Exception – Federal Oversight projects will be given priority

- Quantity Revisions – follow addenda development form
  - The contractors see the quantities on a proposal basis
  - Quantities need to be modified in AWP by project and category

Revised Bid Item Quantities					
Bid Item	Item Description	Unit	Old Quantity	Revised Quantity	Proposal Total

Addenda

- Do not wait until 2:00 pm on the Thursday before the Letting
  - Issuing the addenda earlier allows more time for the contractor to adjust their bid.
  - If we do not have time to process all addenda received:
    - Emergency Addenda may be required – If ONE eligible bidder doesn't respond the project will be withdrawn from the letting
    - If the addenda cannot be processed, the impacts will be evaluated and the project could potentially be withdrawn

Justifications

- Justification Emails are sent to
  - Proposals that are 5% or more over estimate
  - Proposals that are 10% or more under estimate – check quantities
- Provide Justification by Noon the Thursday following the Letting
  - Explain discrepancies between the bid and the estimate
    - Focus on the items with significant discrepancies
    - Group items for comparison – grading items

Justifications

- Discuss issues with reletting the project
  - Completing work during planned construction year
  - Impacts to community events
  - Conflicts with future projects if delayed
  - Potential maintenance costs if project delayed
  - Funding issues

Estimating Tools and Resources

- FDM 19-5
- Estimating Website
- Estimator
- Bid Express
- Similar Projects Tool
- Asphalt Price Map
- WisDOT CCI
- Quantities to Plans
- Production Rate Tool

FDM 19-5

FACILITIES DEVELOPMENT MANUAL

- FDM 19-5-3: Bid Item Guidance
- FDM 19-5-5: Construction Estimates
  1. Estimate Components and Accuracy
  2. Tools and Resources
  3. Construction Estimate Development
- FDM 19-5-6: Construction Estimate Documentation
- FDM 19-5-7: Construction Estimate Review
  1. Independent Review
  2. Region Program Controls Review
  3. Central Office Review
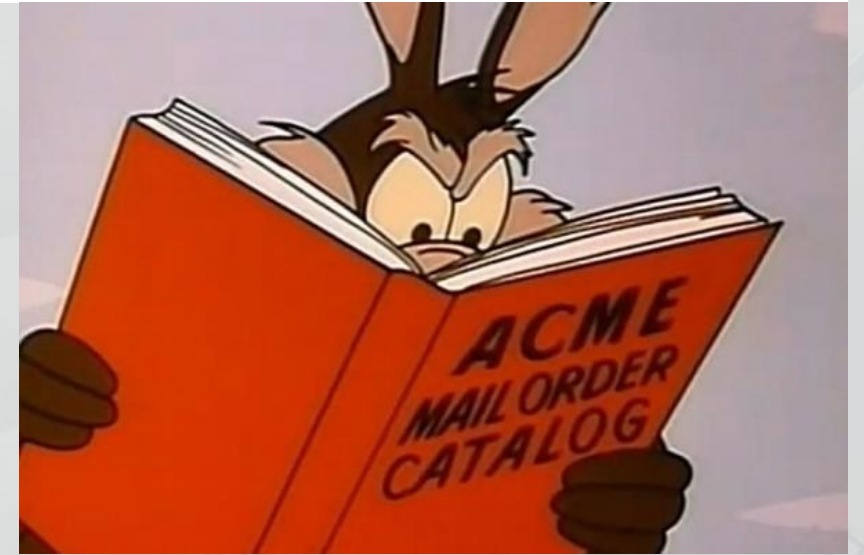
Estimating Website

- The goal of this website is to provide estimating tools and support for designers producing project estimates
- Contains the estimate information linked in the FDM
- FDM 19-5-5.2 has a link to Estimating Site

Estimating Website

- Go to wisconsindot.gov.

Estimating Website

- Structure and Roadway Resources Site
  - Estimating Resources are about halfway down the page
    - All main estimating webpages are shown

Estimating resources

- Estimate development
- Estimating highway construction projects
- Estimating tools
- Performance measures

Estimating tools

- Structure and roadway resources
- Estimating
- Performance measures
- Estimate development
- Estimating tools
- HCCI

- Estimating Websites
  - All main estimating webpages are shown on the left

Estimating Website

- Estimating (Estimating highway construction projects)
  - Confidentiality Memo
    - The Engineer's Estimate is always confidential, and the contractor's bid tab information is confidential until after the proposal is awarded.
  - Estimating User Group Members
- Performance Measures
  - Estimate Accuracy Report
  - On-budget Performance MAPSS

Estimating Website

- Estimate Development
  - Estimate Documentation
  - Past Presentations
  - Some Historic Bid Data
  - Miscellaneous
    - Justification Guidance
    - Production Rate Tool
    - Wisconsin DOT Chained Fisher Construction Cost Index
    - Recent Estimating Trends
    - Work Classifications

Estimating Website

- Estimating Tools
  - Bid Express
  - Estimator
  - Quantities 2 Plans
  - Asphalt Estimating Tools
  - Similar Projects Tool
  - Maintained by DTIM
    - Major Projects Estimating Tool
    - Project Estimating Tool
    - Backbone Estimating Tool

Estimator

- What is estimator?
  - Creates regression curves using bid history form the past 3 years
    - Based on multiple variables
      - Region
      - Work Type
      - Quantity
  - Preferred method for selecting an initial estimated price for standard bid

Estimator

- Links to AASHTOWare Preconstruction Knowledgebase
    - FDM 19-5-5.2 Tools and Resources
    - FDM 19-5-10
    - Estimating Tools Site

Estimator

Items

- Estimator provides the reliable regression prices of measurable bid items.
  - More common items have more reliable regression prices.
- Lump sum items including Mobilization and Traffic Control bid items, and SPVs cannot estimated using Estimator.
  - You may get Estimator regression prices, but the number provided is not a good estimate.
  - Other tools such as Bid Express are needed to estimate these items.

Estimator

Regression Curves

- Estimator regression prices are generated from the past 3 years of bid history.
- If there is enough data, regression curves account for the following project attributes:
  - Quantity – The higher the quantity, the lower the price.
  - Base Date – Prices are inflated or deflated from historic dollars to current dollars.
  - Season – Summer and spring let projects are more expensive than fall and winter.
  - District (Regions)
  - Work Type
- The most basic regression price model only uses quantity.
- Otherwise, only the average price is provided.

Estimator
Regression Curves
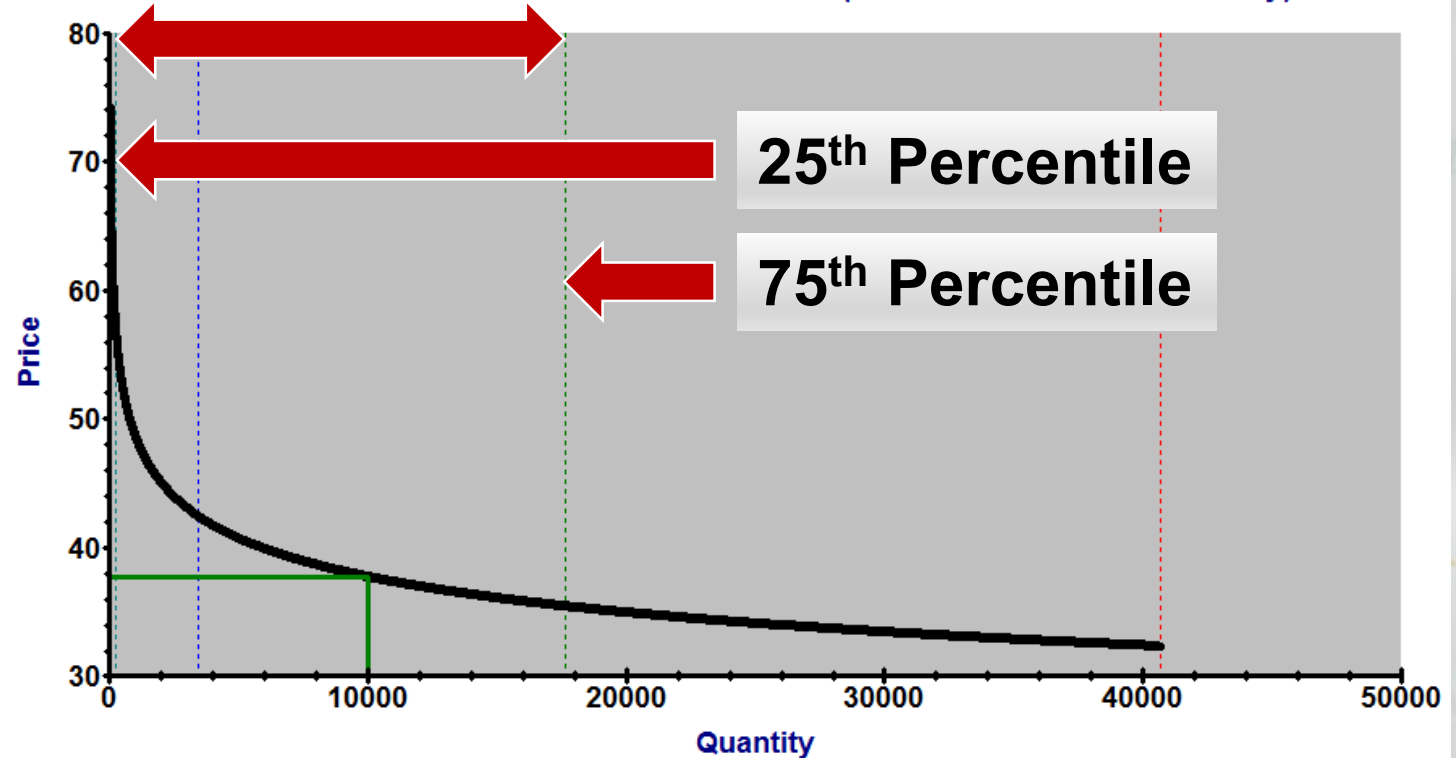
Estimator

Tips and Tricks

- If your quantity is above 75th percentile, adjust the quantity to the 75th percentile quantity for a more reliable regression price.
  - These prices are typically low and continue to decrease in price.
    - Actual prices typically have a minimum price as quantities increase.
  - These items are likely a significant item.
    - Other tools such as Bid Express should be used.

Estimator

Tips and Tricks

- If your quantity is below the 25th percentile, you are likely done estimating this item!
  - Prices vary significantly with small quantities.
  - These items are likely not a significant item.
  - If item is significant, use Bid Express.

Estimator

Tips and Tricks

- Round regression prices.
  - Rarely do you need more than 2 or 3 leading numerical digits.
- With 2 mobilizations, divide the quantity in half to get a regression price for a likely maximum unit price.
  - The regression price of the smaller, divided quantity may be more accurate.
- Combine similar items for a likely minimum unit price.

Estimator

Estimator Files from Bureau of Structures

- BOS commonly uses Estimator.
- Estimator files can be merged.
  - See the Estimating Tools Site.
  - Merge Estimator files if multiple individuals work on estimate.

What is Bid Express?

- Online, searchable database.
- Search using a variety of criteria.
  - Specific bid items
  - Key word(s) in item description
  - Proposal ID
  - County(ies)
  - Let dates range
  - Quantity range
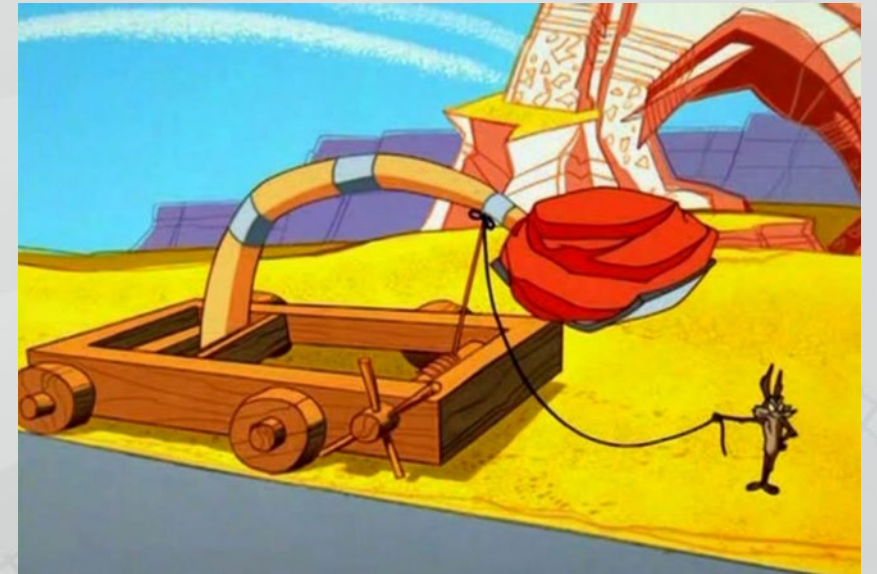
Bid Express

- Additional Bid Express information found at:
  - FDM 19-5-5.2 Tools and Resources
  - Estimating Tools Site
    - User guide on the Estimating Tools Site.
- The site is fairly intuitive, and straightforward.
- Contains the results from every bidder in all awarded contracts.

Bid Express

Bid Tab Analysis

- Multiple criteria can be selected separated by commas.
  - Items
  - Counties
  - And others
- Low bidder parameter does not always mean winning bid.

Bid Express

Additional Tips

- Can be used for preliminary estimates for most bid items that do not have regression prices.
- Can be used for final estimates on items that do not have regression prices and as a second check for significant items with regression prices.

- Should not be used for estimating Mobilization and the Traffic Control bid item.
  - The Similar Projects Tool is ideal for estimating these two items.

Bid Express
Using Excel

- Export CSV is limited.
- Use Excel and Create a Regression Curve
  - Include all data within Date Range.

Export (csv) | Export (tab)

Item ▲	Description	Average	High	Low	Unit	Bid Count
— 305.0120	Base Aggregate Dense 1 1/4-Inch	$18.26	$53.89	$0.01	TON	300 Bids

Letting Date	Proposal	County	Proposal Average	Proposal High	Proposal Low	Quantity	Proposal Bid Count
	001 - 20200211001	Jefferson	$11.80	$14.52	$9.08	11,922.00000 TON	2 Bids
	003 - 20200211003	Dodge	$13.20	$14.09	$12.35	20,400.00000 TON	3 Bids

Bid Express

Export (csv) | Export (tab)

Item ▲	Description	Average	High	Low	Unit	Bid Count
— 305.0120	Base Aggregate Dense 1 1/4-Inch	$18.26	$53.89	$0.01	TON	300 Bids

Letting Date	Proposal	County	Proposal Average	Proposal High	Proposal Low	Quantity	Proposal Bid Count
	001 - 20200211001	Jefferson	$11.80	$14.52	$9.08	11,922.00000 TON	2 Bids
	003 - 20200211003	Dodge	$13.20	$14.09	$12.35	20,400.00000 TON	3 Bids
	004 - 20200211004	Rock	$15.75	$15.75	$15.75	705.00000 TON	5 Bids
	005 - 20200211005	Dodge	$13.96	$18.23	$12.55	1,543.00000 TON	5 Bids
	006 - 20200211006	Richland	$12.53	$12.53	$12.53	1,994.00000 TON	1 Bid
	041 - 20191210041	Douglas	$14.25	$14.25	$14.25	7,434.00000 TON	3 Bids
	042 - 20191210042	Rusk	$22.40	$22.50	$22.00	771.00000 TON	5 Bids
Total Quantity:						**852,735.00000 TON**	

Bid Express

Bid Express

Bid Express

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1			Item Ascer	Descriptio	Average A	High Asce	Low Ascer	Unit Ascer	Bid Count	Ascending Sort Arrow		Descending Sort Arrow		
2			Loading.											
3			305.012	Base Aggr	$17.82	$190.00	$0.01	TON	1647 Bids	Loading.				
4			Result Details											
5	Item		Descriptio	Letting Dat	Proposal	County	Proposal A	Proposal H	Proposal L	Quantity	Proposal Bid Count			
6	305.012	Base Aggr	2/11/2020	001 – 2020	Jefferson	$11.80	$14.52	$9.08	11,922.000	2 Bids				
7	305.012	Base Aggregate Dens	003 – 2020	Dodge	$13.20	$14.09	$12.35	20,400.000	3 Bids					
8	305.012	Base Aggregate Dens	004 – 2020	Rock	$15.75	$15.75	$15.75	705.00000	5 Bids					
9	305.012	Base Aggregate Dens	005 – 2020	Dodge	$13.96	$18.23	$12.55	1,543.000	5 Bids					
10	305.012	Base Aggregate Dens	006 – 2020	Richland	$12.53	$12.53	$12.53	1,994.000	1 Bid					
11	305.012	Base Aggregate Dens	012 – 2020	Waukesha	$51.20	$52.40	$50.00	564.00000	2 Bids					
12	305.012	Base Aggregate Dens	014 – 2020	Milwaukee	$41.16	$50.00	$32.31	500.00000	2 Bids					
13	305.012	Base Aggregate Dens	015 – 2020	Waukesha	$24.88	$35.00	$14.75	1,188.000	2 Bids					
14	305.012	Base Aggregate Dens	016 – 2020	Waukesha	$16.02	$17.28	$14.75	7,540.000	2 Bids					
15	305.012	Base Aggregate Dens	017 – 2020	Racine Wa	$17.33	$20.86	$13.80	4,037.000	2 Bids					
16	305.013	Base Aggregate Dens	018 – 2020	Kenosha F	$22.00	$22.00	$22.00	3,842.000	2 Bids					
17	305.013	Base Aggregate Dens	020 – 2020	Walworth	$14.05	$15.87	$12.00	5,850.000	4 Bids					
18	305.013	Base Aggregate Dens	023 – 2020	Sheboygan	$12.10	$12.10	$12.10	3,300.000	2 Bids					
19	305.013	Base Aggregate Dens	024 – 2020	Brown	$17.56	$18.90	$16.28	500.00000	3 Bids					
20	305.013	Base Aggregate Dens	025 – 2020	Brown	$12.48	$14.95	$10.00	5,807.000	2 Bids					
21	305.013	Base Aggregate Dens	027 – 2020	Adams Wo	$19.50	$23.00	$16.00	658.00000	2 Bids					
22	305.013	Base Aggregate Dens	028 – 2020	Langlade	$20.15	$24.25	$18.35	904.00000	4 Bids					
23	305.013	Base Aggregate Dens	029 – 2020	Marathon	$25.69	$28.10	$17.25	580.00000	5 Bids					
24	305.013	Base Aggregate Dens	032 – 2020	Trempeale	$21.15	$23.00	$17.44	430.00000	3 Bids					

Bid Express

	Item	Description	Letting Date	Proposal	County	Proposal Average	Proposal High	Proposal Low	Quantity	Proposal Bid Count
1	Item	Description	Letting Date	Proposal	County	Proposal Average	Proposal High	Proposal Low	Quantity	Proposal Bid Count
2	305.0120	Base Aggregate Dense 1 1/4-Inch	2/11/2020	001 - 20200211001	Jefferson	$11.80	$14.52	$9.08	11,922.00000 TON	2 Bids
3	305.0120	Base Aggregate Dense 1 1/4-Inch		003 - 20200211003	Dodge	$13.20	$14.09	$12.35	20,400.00000 TON	3 Bids
4	305.0120	Base Aggregate Dense 1 1/4-Inch		004 - 20200211004	Rock	$15.75	$15.75	$15.75	705.00000 TON	5 Bids
5	305.0120	Base Aggregate Dense 1 1/4-Inch		005 - 20200211005	Dodge	$13.96	$18.23	$12.55	1,543.00000 TON	5 Bids
6	305.0120	Base Aggregate Dense 1 1/4-Inch		006 - 20200211006	Richland	$12.53	$12.53	$12.53	1,994.00000 TON	1 Bid
7	305.0120	Base Aggregate Dense 1 1/4-Inch		012 - 20200211012	Waukesha	$51.20	$52.40	$50.00	564.00000 TON	2 Bids
8	305.0120	Base Aggregate Dense 1 1/4-Inch		014 - 20200211014	Milwaukee	$41.16	$50.00	$32.31	500.00000 TON	2 Bids
9	305.0120	Base Aggregate Dense 1 1/4-Inch		015 - 20200211015	Waukesha	$24.88	$35.00	$14.75	1,188.00000 TON	2 Bids
10	305.0120	Base Aggregate Dense 1 1/4-Inch		016 - 20200211016	Waukesha	$16.02	$17.28	$14.75	7,540.00000 TON	2 Bids
11	305.0120	Base Aggregate Dense 1 1/4-Inch		017 - 20200211017	Racine Walworth	$17.33	$20.86	$13.80	4,037.00000 TON	2 Bids
12	305.0120	Base Aggregate Dense 1 1/4-Inch		018 - 20200211018	Kenosha Racine	$22.00	$22.00	$22.00	3,842.00000 TON	2 Bids
13	305.0120	Base Aggregate Dense 1 1/4-Inch		020 - 20200211020	Walworth	$14.05	$15.87	$12.00	5,850.00000 TON	4 Bids
14	305.0120	Base Aggregate Dense 1 1/4-Inch		023 - 20200211023	Sheboygan	$12.10	$12.10	$12.10	3,300.00000 TON	2 Bids
15	305.0120	Base Aggregate Dense 1 1/4-Inch		024 - 20200211024	Brown	$17.56	$18.90	$16.28	500.00000 TON	3 Bids
16	305.0120	Base Aggregate Dense 1 1/4-Inch		025 - 20200211025	Brown	$12.48	$14.95	$10.00	5,807.00000 TON	2 Bids
17	305.0120	Base Aggregate Dense 1 1/4-Inch		027 - 20200211027	Adams Wood	$19.50	$23.00	$16.00	658.00000 TON	2 Bids
18	305.0120	Base Aggregate Dense 1 1/4-Inch		028 - 20200211028	Langlade	$20.15	$24.25	$18.35	904.00000 TON	4 Bids
19	305.0120	Base Aggregate Dense 1 1/4-Inch		029 - 20200211029	Marathon	$25.69	$28.10	$17.25	580.00000 TON	5 Bids
20	305.0120	Base Aggregate Dense 1 1/4-Inch		032 - 20200211032	Trempealeau	$21.15	$23.00	$17.44	430.00000 TON	3 Bids
21	305.0120	Base Aggregate Dense 1 1/4-Inch		033 - 20200211033	Jackson	$26.38	$28.00	$21.52	240.00000 TON	4 Bids
22	305.0120	Base Aggregate Dense 1 1/4-Inch		035 - 20200211035	Barron	$22.40	$22.40	$22.40	730.00000 TON	2 Bids
23	305.0120	Base Aggregate Dense 1 1/4-Inch		036 - 20200211036	Rusk	$32.50	$32.50	$32.50	190.00000 TON	2 Bids
24	305.0120	Base Aggregate Dense 1 1/4-Inch		038 - 20200211038	Kenosha	$15.17	$18.81	$13.52	134,470.00000 TON	4 Bids
25	305.0120	Base Aggregate Dense 1 1/4-Inch		039 - 20200211039	Monroe	$53.89	$53.89	$53.89	9.00000 TON	2 Bids
26	305.0120	Base Aggregate Dense 1 1/4-Inch	1/14/2020	004 - 20200114004	Lafayette	$17.00	$17.00	$17.00	224.00000 TON	3 Bids
27	305.0120	Base Aggregate Dense 1 1/4-Inch		005 - 20200114005	Rock	$17.50	$17.50	$17.50	400.00000 TON	3 Bids
28	305.0120	Base Aggregate Dense 1 1/4-Inch		007 - 20200114007	Walworth	$12.98	$15.58	$9.81	50,500.00000 TON	3 Bids
29	305.0120	Base Aggregate Dense 1 1/4-Inch		008 - 20200114008	Racine	$9.65	$16.88	$0.01	42,615.00000 TON	6 Bids

Bid Express

=LEFT(I2,FIND(".",I2)+2)*1

H	I	J	K
oposal Low	Quantity	Proposal Bid Count	QTY Amount
$9.08	11,922.00000 TON	2 Bids	11922
$12.35	20,400.00000 TON	3 Bids	20400

=LEFT(text, [num_chars])
=FIND(find_text, within_text)
- "+2" indicates number of decimal values
- "*1" causes Excel to register value as a number

Bid Express
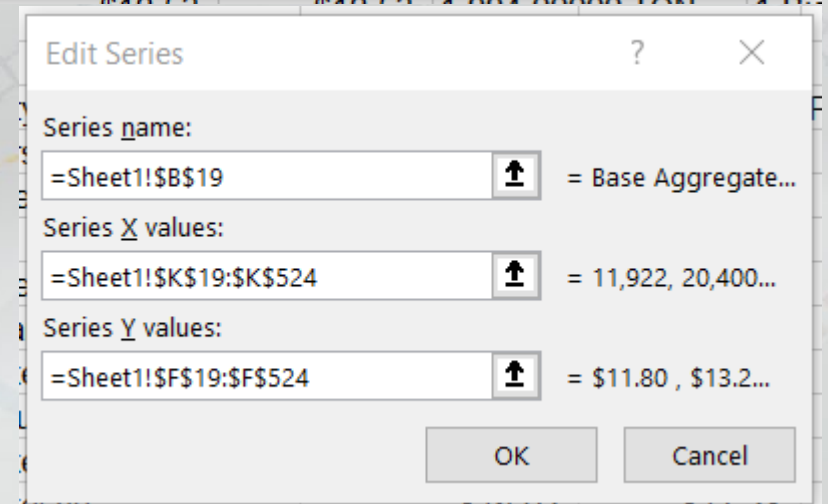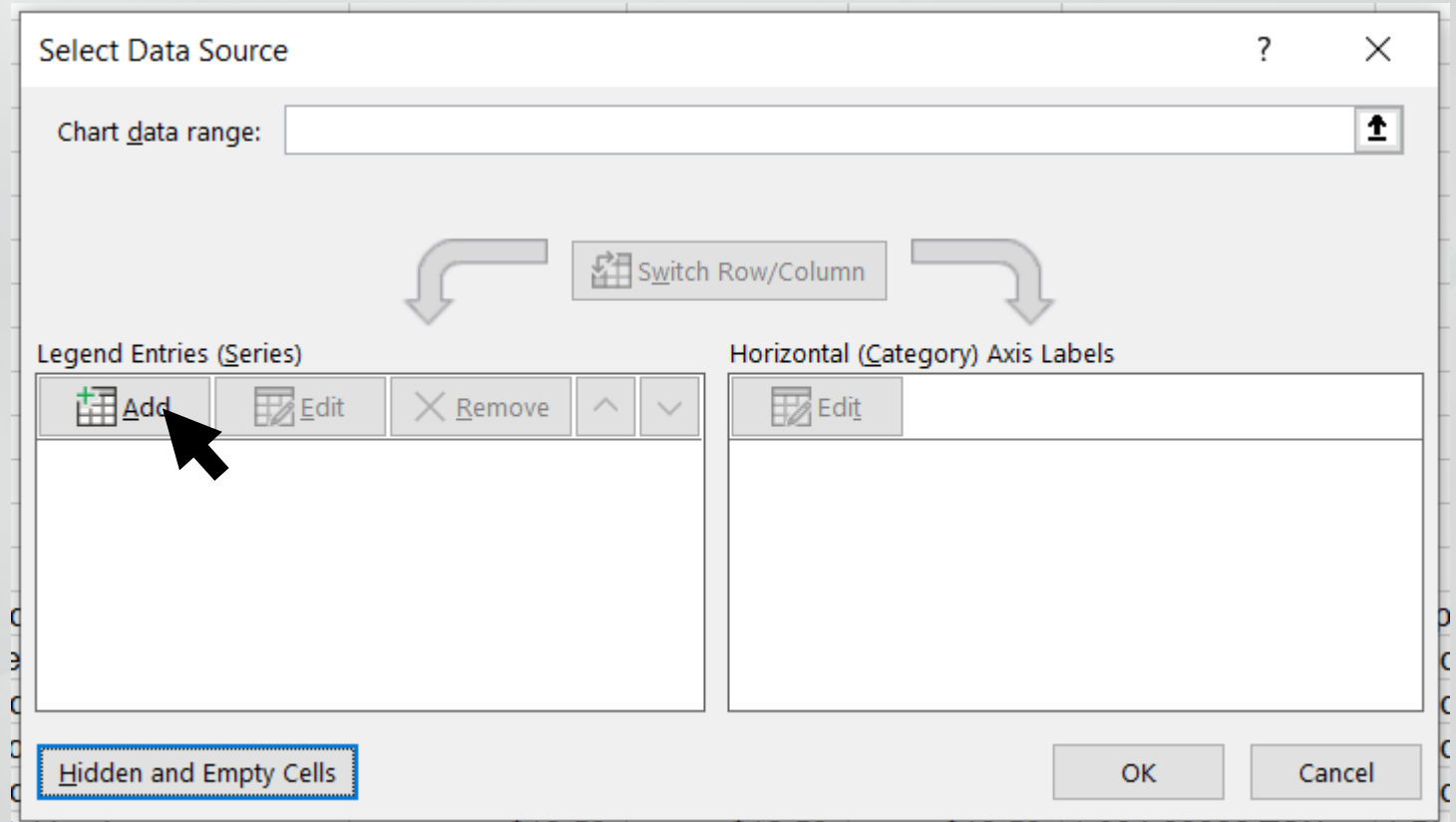
Using Excel

- Filter Data
  - Highlight all data
  - Select Filter in the Data Ribbon
- Insert a Graph
  - Insert 17 rows above Row 1
  - Select an empty cell
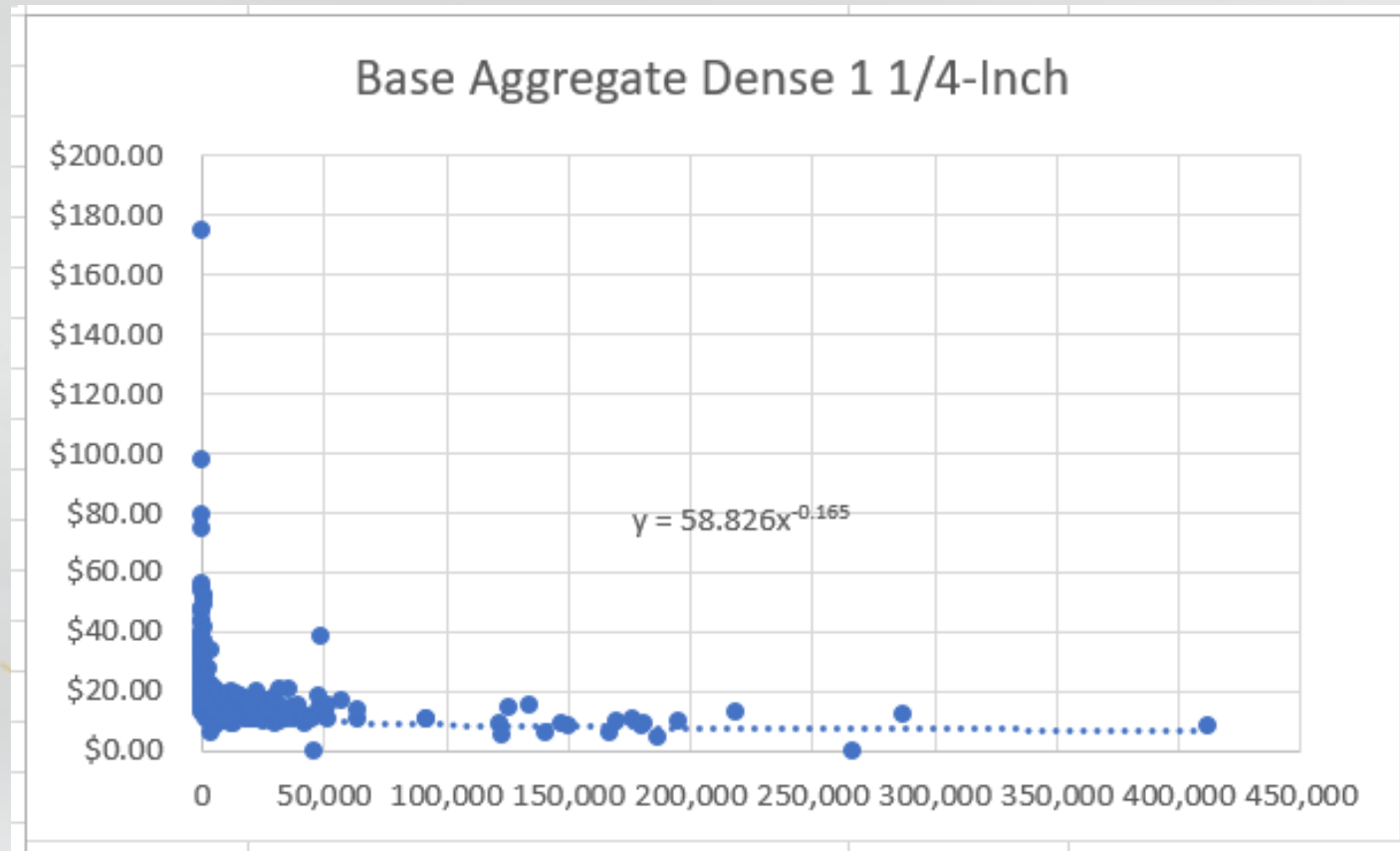 - Insert an X-Y Scatter in the Insert Ribbon

Bid Express

Item	Description	Letting Date	Proposal	County	Proposal Average	Proposal High	Proposal Low	Quantity	Proposal Bid Count	QTY Amount
305.0120	Base Aggregate Dense 1 1/4-Inch	2/11/2020	001 - 20200211001	Jefferson	$11.80	$14.52	$9.08	11,922.00000 TON	2 Bids	11922
305.0120	Base Aggregate Dense 1 1/4-Inch		003 - 20200211003	Dodge	$13.20	$14.09	$12.35	20,400.00000 TON	3 Bids	20400
305.0120	Base Aggregate Dense 1 1/4-Inch		004 - 20200211004	Rock	$15.75	$15.75	$15.75	705.00000 TON	5 Bids	705
305.0120	Base Aggregate Dense 1 1/4-Inch		005 - 20200211005	Dodge	$13.96	$18.23	$12.55	1,543.00000 TON	5 Bids	1543
305.0120	Base Aggregate Dense 1 1/4-Inch		006 - 20200211006	Richland	$12.53	$12.53	$12.53	1,994.00000 TON	1 Bid	1994
305.0120	Base Aggregate Dense 1 1/4-Inch		012 - 20200211012	Waukesha	$51.20	$52.40	$50.00	564.00000 TON	2 Bids	564
305.0120	Base Aggregate Dense 1 1/4-Inch		014 - 20200211014	Milwaukee	$41.16	$50.00	$32.31	500.00000 TON	2 Bids	500
305.0120	Base Aggregate Dense 1 1/4-Inch		015 - 20200211015	Waukesha	$24.88	$35.00	$14.75	1,188.00000 TON	2 Bids	1188
305.0120	Base Aggregate Dense 1 1/4-Inch		016 - 20200211016	Waukesha	$16.02	$17.28	$14.75	7,540.00000 TON	2 Bids	7540
305.0120	Base Aggregate Dense 1 1/4-Inch		017 - 20200211017	Racine Walworth	$17.33	$20.86	$13.80	4,037.00000 TON	2 Bids	4037
305.0120	Base Aggregate Dense 1 1/4-Inch		018 - 20200211018	Kenosha Racine	$22.00	$22.00	$22.00	3,842.00000 TON	2 Bids	3842
305.0120	Base Aggregate Dense 1 1/4-Inch		020 - 20200211020	Walworth	$14.05	$15.87	$12.00	5,850.00000 TON	4 Bids	5850

Bid Express

- Select Data
  - Add Series
    - Series Name:
      Item Description
    - X-values: Quantities
    - Y-values: Proposal Averages

Bid Express

- Add a Trendline
  - Click on the chart data
  - Right-click and select Add Trendline…
- In Trendline Options
  - Select Power
  - Display Equation on chart

Bid Express

Base Aggregate Dense 1 1/4-Inch

$$y = 58.826x^{-0.165}$$

Item		Description		Letting Da		Proposal		County		Proposal Averag	Proposal Hi	Proposal L		Quantity		Proposal Bid Cou	QTY Amou
305.0120		Base Aggregate Dense 1 1/4-Inch		2/11/2020		001 - 20200211001		Jefferson		$11.80	$14.52	$9.08		11,922.00000 TON		2 Bids	11,922
305.0120		Base Aggregate Dense 1 1/4-Inch				003 - 20200211003		Dodge		$13.20	$14.09	$12.35		20,400.00000 TON		3 Bids	20,400
305.0120		Base Aggregate Dense 1 1/4-Inch				004 - 20200211004		Rock		$15.75	$15.75	$15.75		705.00000 TON		5 Bids	705

Bid Express

Using Excel

- Not worthwhile for non-significant items
- Recommended for significant items with a lot of bid history
- SPV Items
- Same items with different units
  - Use Excel to convert quantities and prices
  - Base Aggregate Dense in TONS or CY

- https://wisdot.box.com/v/bidx-example

Similar Projects Tool

What is the Similar Projects Tool?

- Developed and maintained by Bureau of Project Development.
- A filtering tool that contains a large table of various proposal characteristics.
- Helps designers to find similar projects using various filters.
  - Data includes awarded proposals from the last five years.
- Replacement of the Mobilization Calculator.
  - More characteristics to choose.
  - Easier filtering methods.
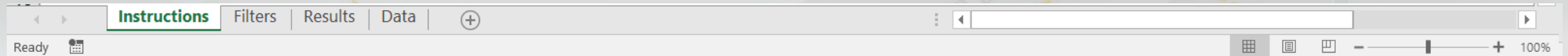 - More information in the results summary.

Similar Projects Tool

- The file can be found at the following locations.
    - Estimating Tools Site
    - FDM 19-5-5.2

Similar Projects Tool

Inside the Similar Projects Tool

- Excel file has four sheets.
  - Instructions
  - Filters
  - Results
  - Data

| ◄ | ► | **Instructions** | Filters | Results | Data | ⊕ |

Ready 100%

Similar Projects Tool

Filters Sheet

- The Filters Sheet contains 9 visual filters (Slicers).
- Some visual filters are directly related to others and only one needs to be used.
  - Improvement Concept or Improvement Concept Code.
  - Contract Work Type or Work Rating Code.
  - Region or County
- Other filters include Project Size, Urban/Rural, and Route.
- The visual filters automatically update available options for the rest of the filters when one is selected.

Similar Projects Tool

Filters Sheet

1. Criteria being filtered
2. Allows the ability to select or unselect multiple selections
3. Removes the filter selected
4. Scroll to find the appropriate criteria
5. Clickable Tab that filters results
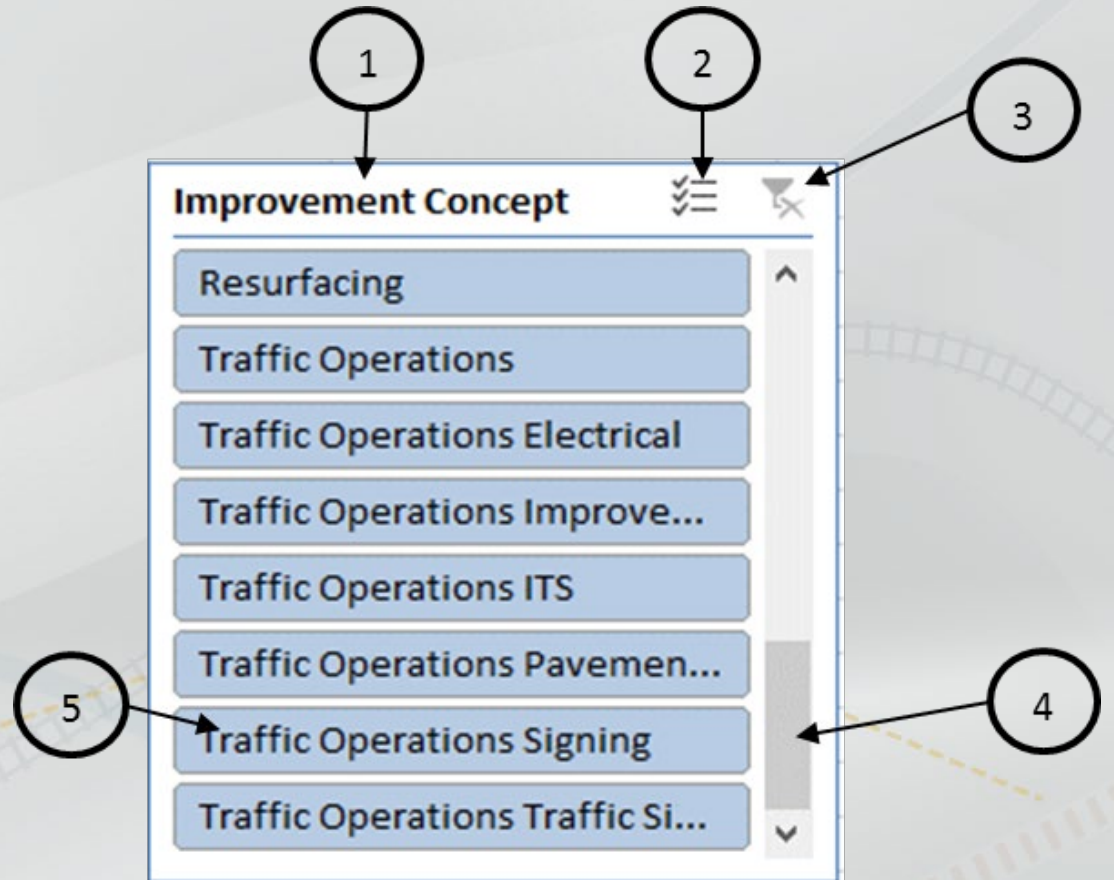
Similar Projects Tool

Results Sheet

- Percentages based on total bid.
- Mobilization, Traffic Control, and average number of bidders are included.
- Sample Size – number of proposals that satisfy applied filters.
- Typical Middle Value – Median.
- Expected Ranges - 1st and 3rd quartiles.
- Mobilization and Traffic Control Projects can be estimated with this tool.

Mobilization Results	
Sample Size:	17
Expected Range (lower limit):	6.3%
Typical Middle Value:	7.6%
Expected Range (upper limit):	8.7%

Traffic Control Project Results		
Sample Size:	17	
Expected Range (lower limit):	0.2%	$1,500
Typical Middle Value:	0.3%	$2,000
Expected Range (upper limit):	0.7%	$3,950

Average Number of Bidders	3.4

Similar Projects Tool

Results Sheet

- Item Classification Totals are included
- Middle Value is selected by default, but the Lower Limit or Upper Limit can be selected
- Contingency Items can be estimated for preliminary estimates

Item Classification Totals		
Expected Range:	Lower Limit / Middle Value / Upper Limit	
Item Class	Middle Value	Item Class Code
SPVs (Default)	0.0%	AAA
Asphalt	6.5%	ASPH
Base Aggregate	3.2%	BASE
Bridge Painting	0.0%	BRPT
Concrete	0.5%	CONC
Curb & Gutter, Sidewalk	0.0%	CURB
Drainage Culverts Conduits	0.5%	DRNG
Electrical	0.0%	ELEC
Erosion Control	5.7%	EROC
Earthwork	6.9%	ERTH
Gates and Fences	0.0%	FENC
Beamguard	3.0%	GDRL
Intelligent Transportation Systems	0.0%	ITS
Landscaping	0.3%	LSCP
Lighting	0.0%	LTNG
Miscellaneous or Specialty Work	1.5%	MISC
Mobilization	7.6%	MOBL
Pavement Marking	0.5%	PVMK
Removal Asphalt Pavement	0.0%	RMVA
Removal Old Structures	3.8%	RMVB
Removal Concrete Pavement	0.0%	RMVC
Removals	0.0%	RMVL
Signs	0.2%	SIGN
Structures	52.2%	STRC
Survey	0.4%	SURV
Traffic Control Permanent	0.0%	TRFP
Traffic Control Temporary	1.2%	TRFT

Similar Projects Tool

Data Sheet

- The Data Sheet contains a lot of columns.
- Project and proposal information is available in the Data Sheet.
  - The filtered list of projects can be used for reference of what other projects are similar to the current project.
- Look up past projects with limited information.
  - Example:
    - Recent, large STH 23 project in Sheboygan County
    - Proposal 20190409017, Project 1440-13-76

Similar Projects Tool

Data Sheet

- More filters available if you really need to dial down.
  - The filters in the Data Sheet are linked with the visual filters in the Filters Sheet.
    - The filters applied in the Filters Sheet have been applied to the Data Sheet.
    - Additional filters applied in the Data Sheet will update options available in the visual filters in the Filters Sheet.
  - The Results Sheet automatically update when additional filters are applied.

Similar Projects Tool

Example

- Example for calculating Mobilization and Traffic Control:
  - $2 million of known items
  - Mobilization is estimated at 5%
  - Traffic Control is estimated at 1% of the **total construction estimate**.
- $Total = \ (known\ items) + \ (5\% \times Total) + (1\% \times Total)$
- Rearranged:
  - $Total = \dfrac{(known\ items)}{(1-\sum percentages)} = \dfrac{\$2\ million}{1-(0.05+0.01)} = \dfrac{\$2\ million}{0.94}$
 - $Total = \$2,127,659.57$

Similar Projects Tool

Example

- Mobilization
  - $Mobilization = 5\% \times \$2{,}127{,}659.57$
  - $Mobilization = \$106{,}382.98 \; or \; \$110{,}000 \; rounded$
- Traffic Control
  - $Traffic\ Control = 1\% \times \$2{,}127{,}659.57$
  - $Traffic\ Control = \$21{,}276.60 \; or \; \$21{,}000 \; rounded$
- This equation may also be used with allowance items in preliminary plans using percentages found in the similar projects tool.

Asphalt Price Map

- ArcGIS Online estimating tool
- Uses historic HMA bid prices
  - Unit prices are combined HMA pavement prices for each contract
  - >1,300 tons of total HMA
  - Prices are adjusted using the WisDOT CCI
- Geographic location of the project has a larger factor in HMA unit prices than mix design
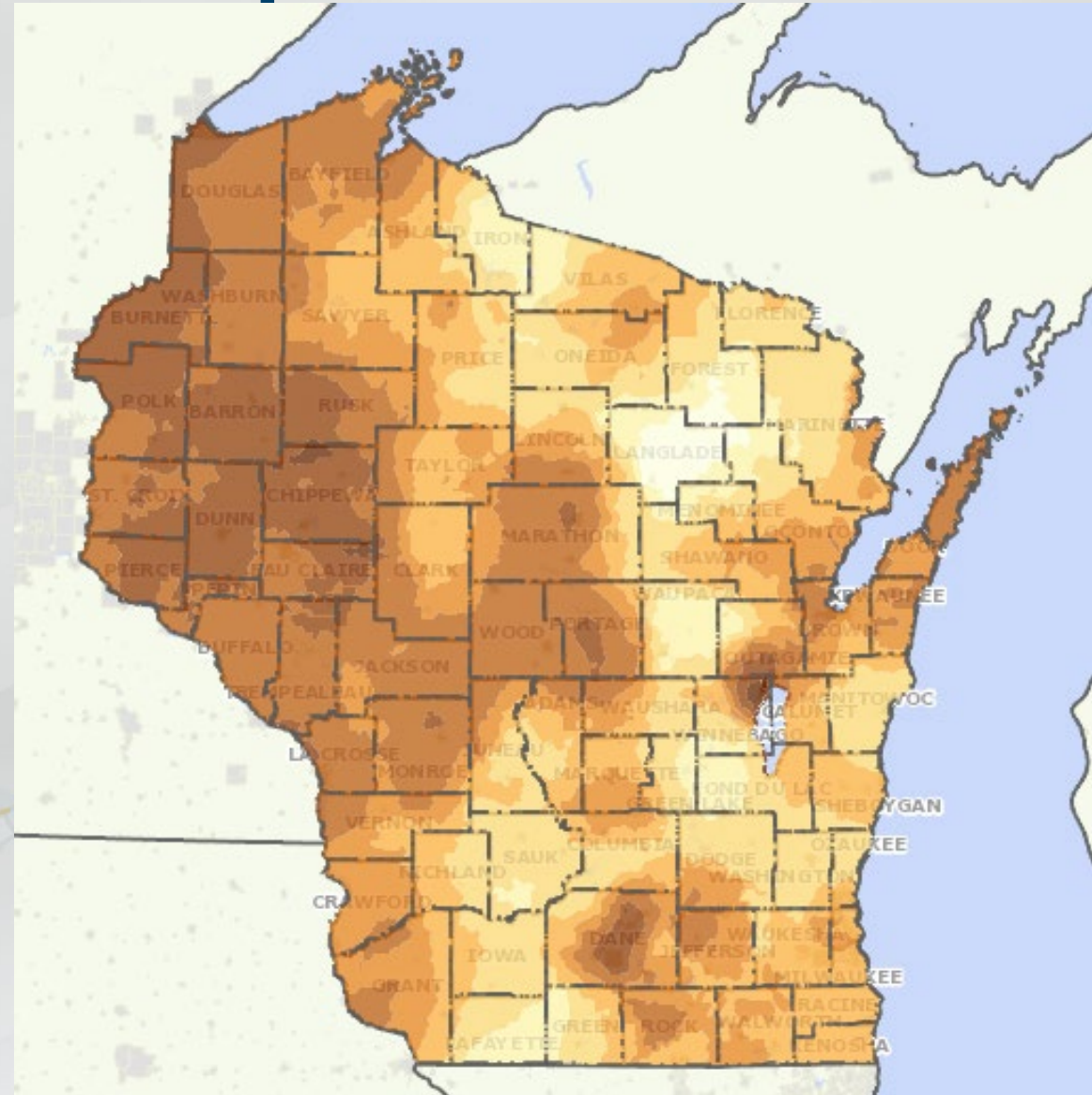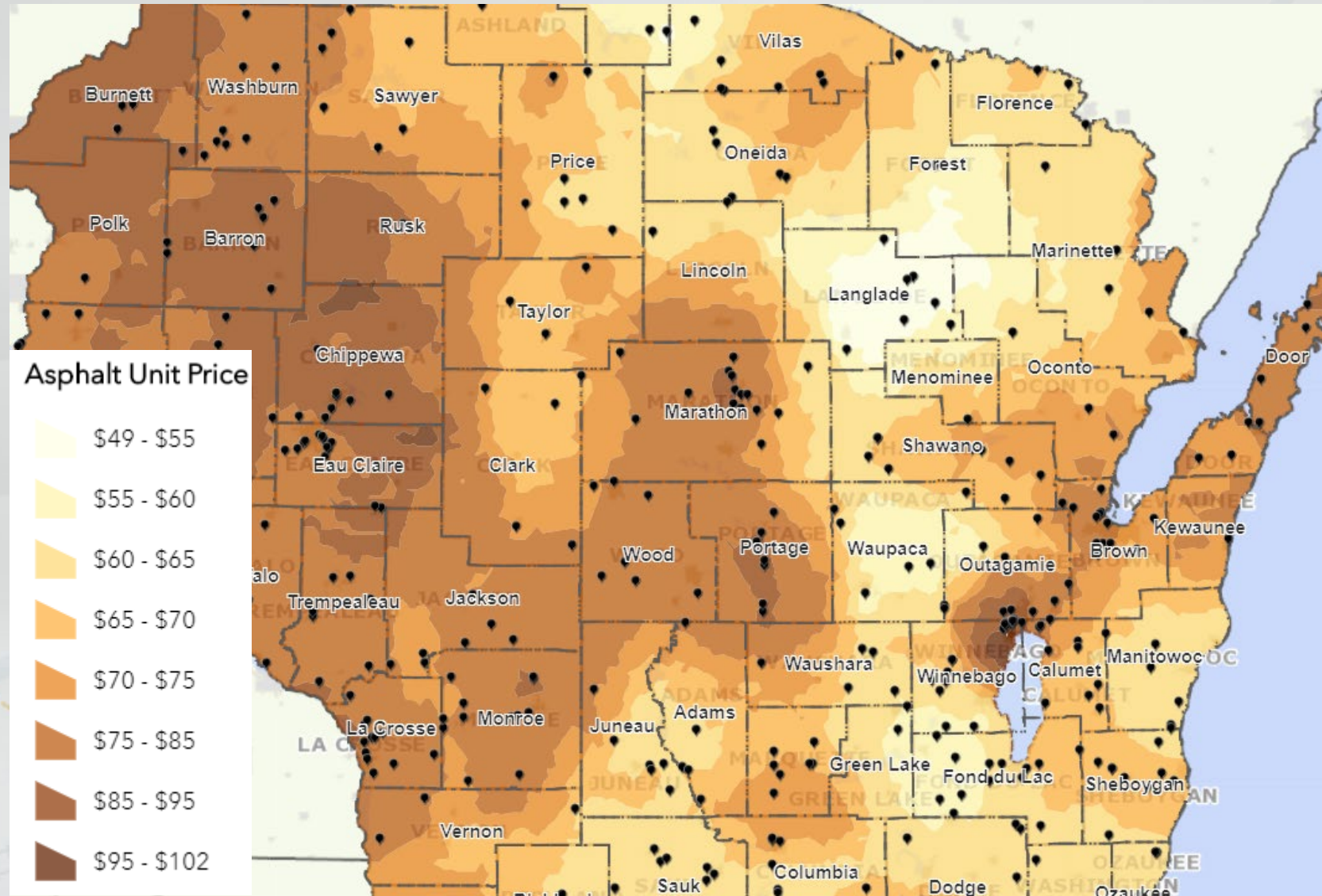
Asphalt Price Map
How do I find it?

- Links are at the following locations:
  - FDM 19-5-5.2 Tools and Resources
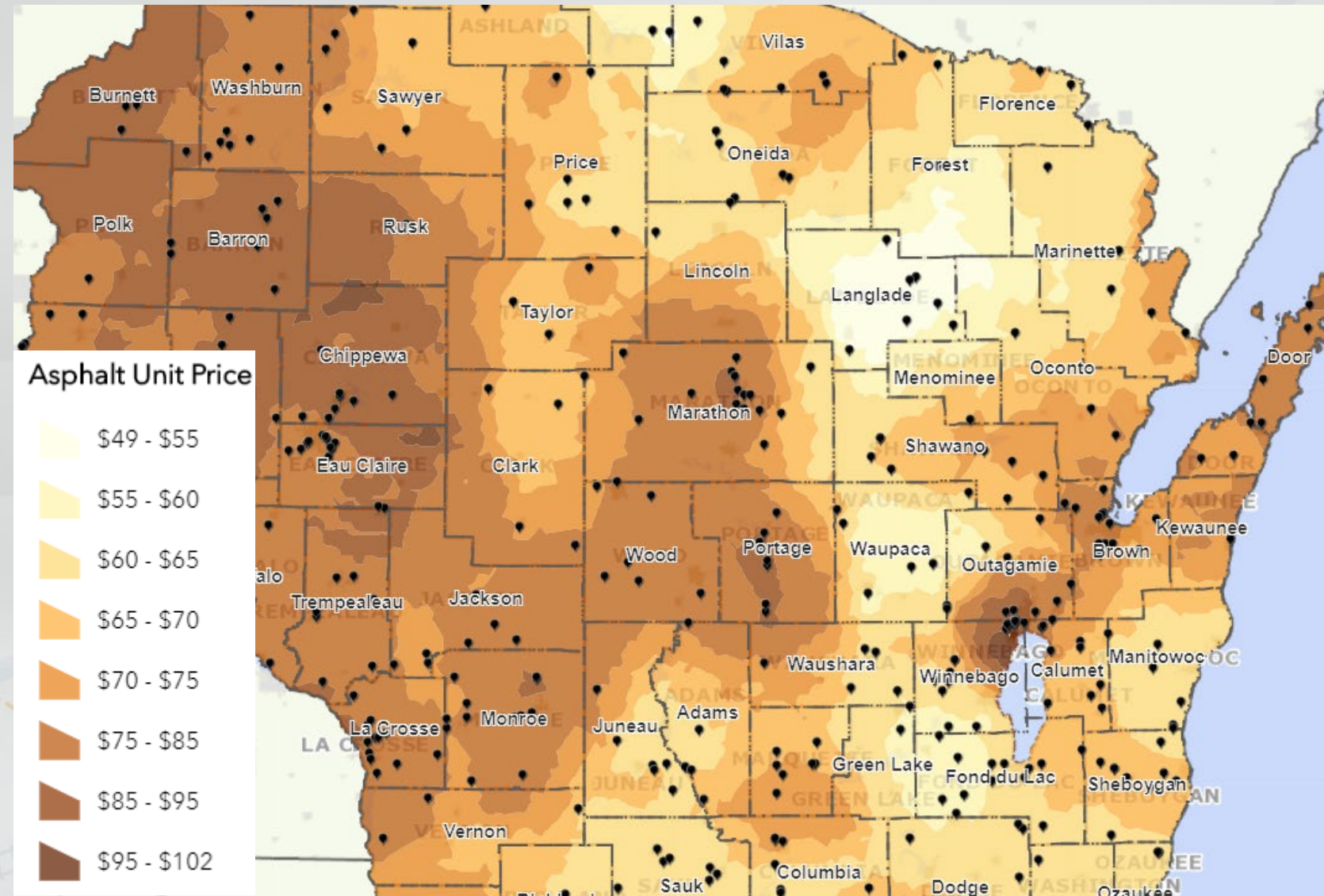 - Estimating Tools Site
  - wisdot.maps.arcgis.com

Asphalt Price Map

- Proposals used are marked on the map
- Price rages at $5 to $10 intervals
- Not accurate where there are few projects

Asphalt Price Map

- Use with Bid Express and Asphalt Estimating Tool to find similarly priced counties.

Asphalt Price Map

- Considerations
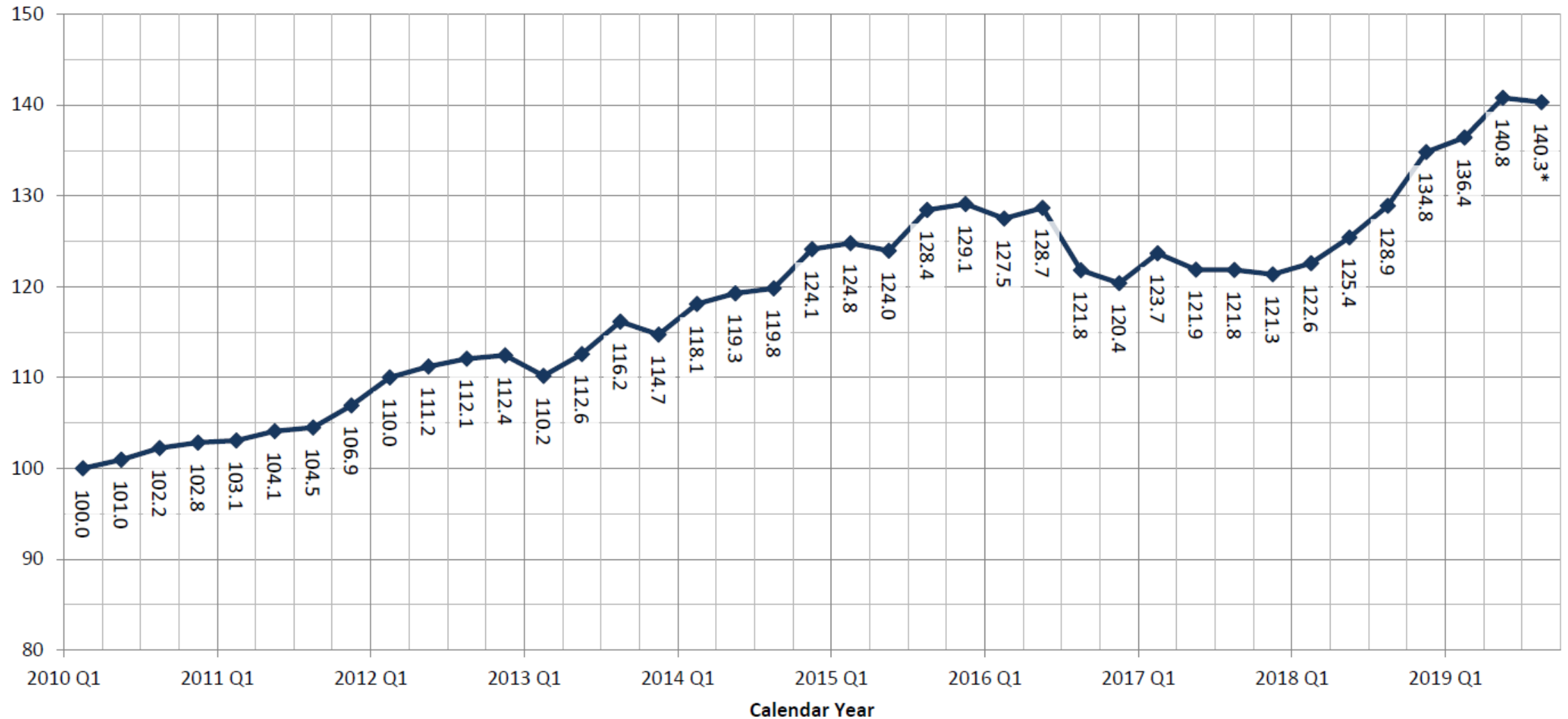 - Mix design
  - Staging
  - Urban
  - >1,300 tons

WisDOT Chained Fisher Construction Cost Index

Adjusting Prices into Current Dollars

- FDM 19-5-5.3.7 Adjusting Prices into Current Dollars
- An indicator of construction cost escalation over time
- Can be used to convert past bid history into current dollars
- Has a base year of 2010
- Updated each quarter by calendar year
- Uses a basket of about 100 bid items

WisDOT CCI

Post Date: 10/9/2019

* Value is estimated.

WisDOT Chained Fisher Construction Cost Index

Adjusting Prices into Current Dollars

- **Do not forecast prices past the current date**
- Used to convert past prices into current dollars without recent bid history
- Adjusting prices using the WisDOT CCI is approximate
  - But will provide a better estimate of inflated
- Recent price trends for bid items will always be more reliable

WisDOT Chained Fisher Construction Cost Index

Adjusting Prices into Current Dollars

- Use a ratio from past and current WisDOT CCI values to convert past prices into current dollars

- $$\frac{Current\ Index\ Value}{Past\ Index\ Value} \times Past\ Bid\ Price = Current\ Bid\ Price$$

- Example:

  - March 2011 price = $870/LF.

  - Past Index Value = 103.1

  - Current Index Value = 140.3

  - $$\frac{140.3}{103.1} \times \$870 = \$1,184\ or\ \$1,200\ rounded$$

WisDOT Chained Fisher Construction Cost Index

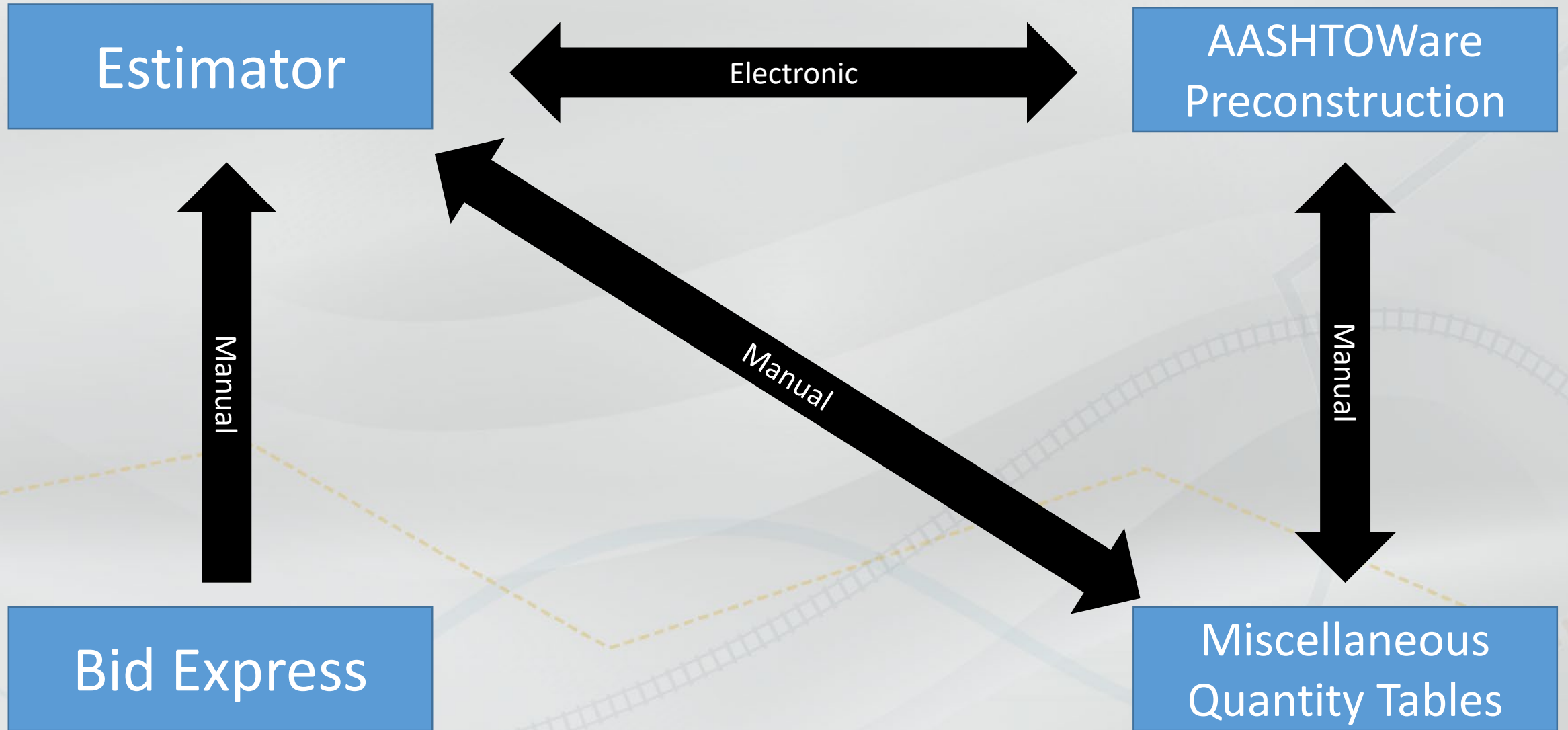## Adjusting Prices into Current Dollars

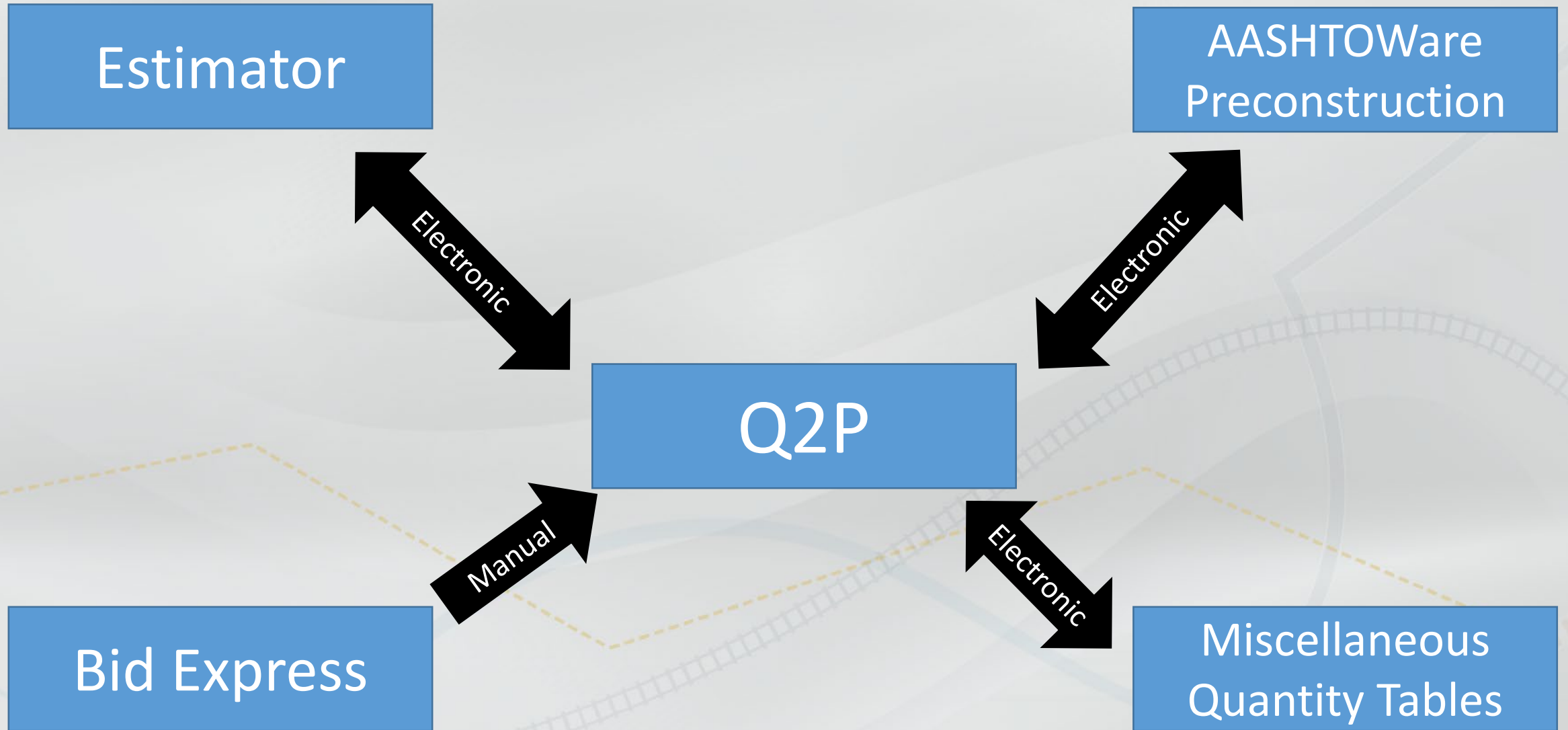- Estimator prices do not need to be adjusted

Quantities 2 Plans

- Acronym: Q2P
- Excel Add-in
- Assists with:
  - Quantity computations
  - Bid price comparisons
  - Miscellaneous quantity tables
  - Construction Estimate

Quantities 2 Plans

- Does not replace any estimating tools
- Organizes miscellaneous quantity tables and construction estimates
- Guidance for using Q2P is on the Estimating Tools Website
- Information found at:
  - FDM 19-5-5.2
  - Estimating Tools Site

Production Rate Tool

- Developed by UW Madison
- Populated with past projects
- Use current production
  - Production rates impact unit prices
- Average Production Rate Table uses Production Rate Tool Data
- The tool and table can be found at the following locations:
  - FDM 19-10-30.3
  - Estimate Development Site

Production Rate Tool

- Information provided in Introduction Sheet
  - Select Launch Tool
- Main Menu opens
- Choose a category:
  - Bridge Construction
  - Earthwork
  - Asphalt Paving
  - Concrete Paving
  - Miscellaneous Activities
  - Other Considerations

Production Rate Tool

Advantages of this tool

- Production rates can be updated regularly
- Variety of project characteristics automatically considered
  - The Production Rate Table does not consider project characteristics
- More accurate contract time schedules in the design phase
- Identify when estimate prices should be increased or decreased

Thank You

?? Questions ??

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