

Cost Estimating Database Details

Design Manual
Chapter 21
Miscellaneous Topics
 Originally Issued: 05-31-12
 Revised: 09-02-16

This database was developed to serve two purposes: 1) to make estimates more consistent; and 2) to track the history of the estimates so that changes in the scope of the project are more clearly documented. The database was developed in the Office 2010 version of Access. Although the database will work in earlier versions of Office, portions of the programming may not function properly, so the Office 2010 version is recommended.

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Calculation of Average Costs

This database is a tool for developing cost estimates. Keep in mind that it cannot account for the special details in a project without the designer's input.

The base costs in this database are provided by the Office of Contracts and are calculated differently based upon the bid history available:

- For items that have been bid within the last two years, the price is the average price bid for projects on state routes within the last two years.
- For items that have not been bid within the last two years, the average is based upon bids for the past five years, which are inflated to present day by applying the inflation indexes.
- For items that have no bid history for the past seven years, the cost is listed as \$0.01. These costs will have to be adjusted either by using one of the factors described later in this document, or by entering a cost from another source. In either instance, an explanation of the adjustment is required.

Major bid items are a few bid items that commonly make up about 80% of project costs. These items are broken down to county specific cost averages to improve the cost estimate. The following groups of bid items are examples of major items:

SPECIAL BACKFILL	TON
EXCAVATION, CL 10, RDWY+BORROW,	CY
GRANULAR SUBBASE,	TON
GRANULAR SHLD, TYPE A,	TON
GRANULAR SHLD, TYPE B	TON
STD/S-F PCC PAV'T, "all "	SY

The cost information will be updated twice per year: in November to ensure current prices for the end of the year cost estimating; and in June to capture the large spring lettings.

The bid items and project numbers available in this program are periodically updated. If a bid item or project number is not available, it may indicate that the list needs to be updated. Please contact ODAC for assistance.

Opening an Estimate

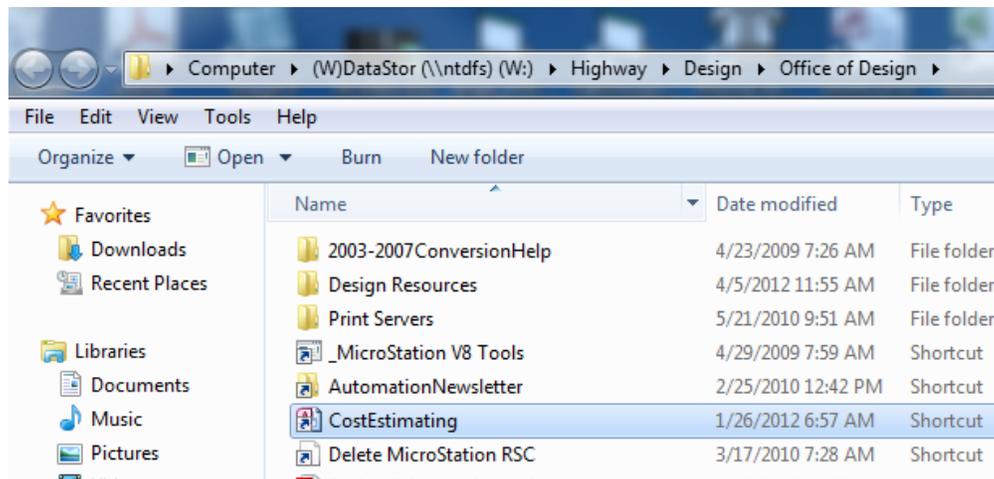
The database is essentially a hollow shell with programming. Data is received and transferred for storage via links to other databases. The working table that the user sees stores the data and is not viewed by managers. The working table only allows one working estimate per project number per office.

To make the information accessible for management, or for future review, the working estimate must be copied to the production table. This will be described with more detail later in this document. If the user updates the production table with changes or more information in a time period of 30 days or less than the last update, the new changes or information will replace the existing copy in the production table. You may have an unlimited number of copies of a project for each office within the production table if updates are being made more than 30 days apart.

The database may be accessed on the W drive:

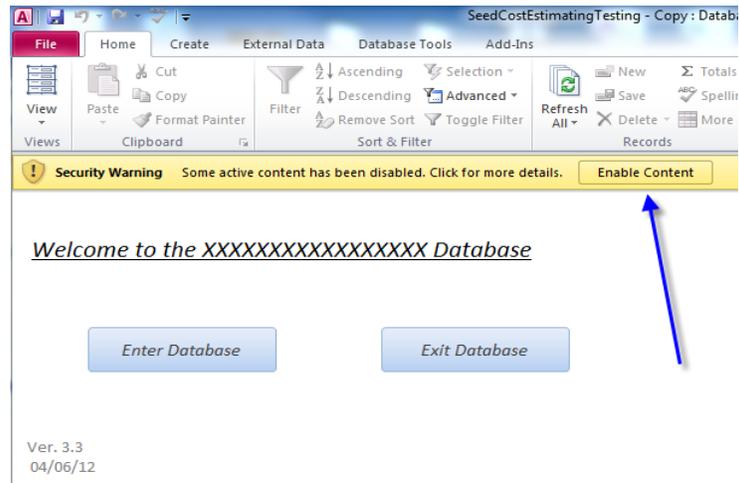
W:\Highway\Design\CADD\Access\SeedCostEstimating.accdb

It is also available through a short cut in the office of design folder:

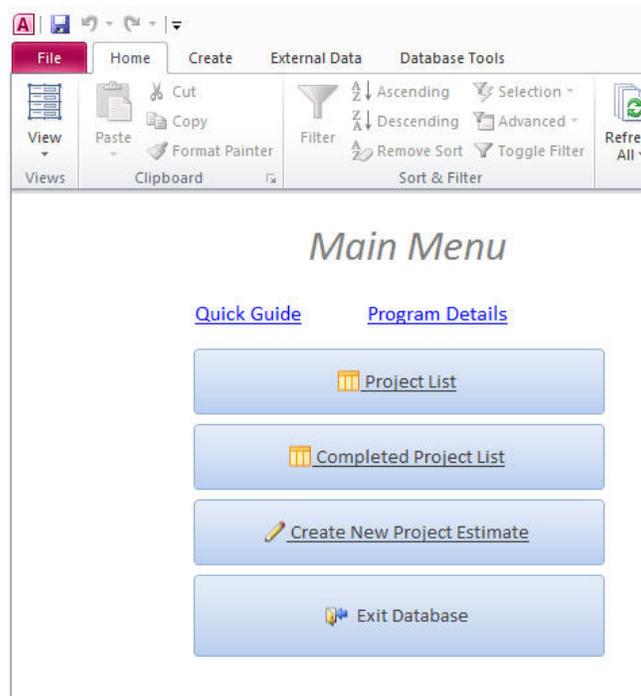


This location is for in-house designers only. The in-house file allows multi-user access to the data, but not the form itself. A read-only notification on the top of the database indicates that someone else has the project open. Designers exterior to the DOT will need to have a copy of the database made for them, including all required tables. Contact ODAC for assistance.

As you enter the database, you will need to enable the macros to make it work properly (blue arrow in the figure below).



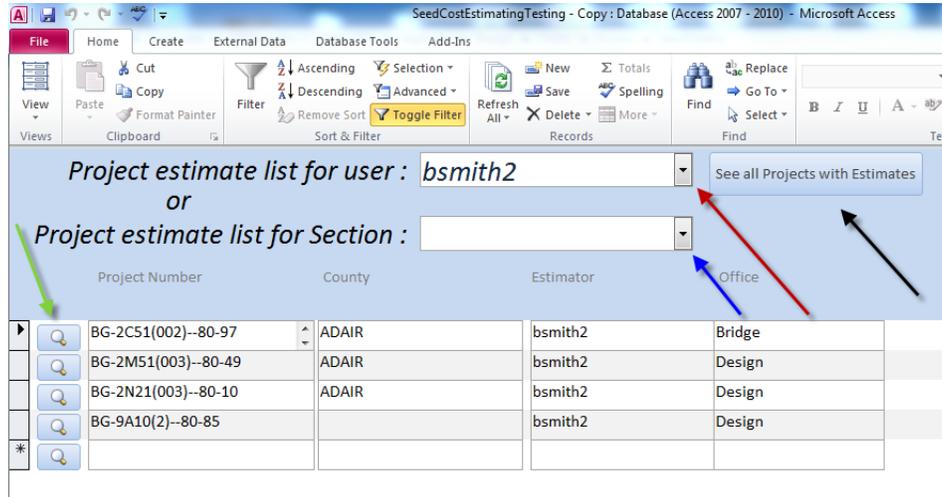
The main menu will have the four options shown below:



Review the Project List for an existing project prior to creating a new project. To prevent the user from adding a project that already exists, the option to create new projects will not show the projects that already have an estimate started for your office.

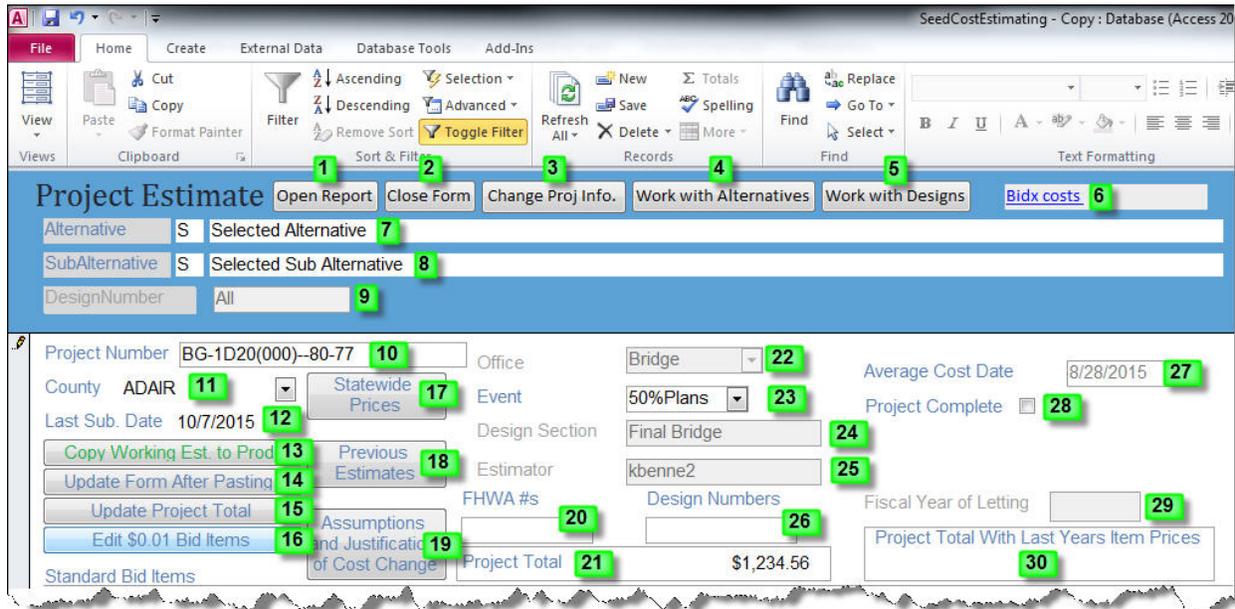
Several options are available for filtering the list of existing projects. By default, it filters based on the username. The user can select another user (red arrow below), filter by the Design Section (blue arrow below), or list all projects with estimates (black arrow below).

Select a project by clicking the magnifying glass button on the left edge of that row (green arrow below). The project estimate will open for reviewing or updating.



Description of Fields

The numbers below describe the function of each portion of the header portion of the database.



1. Opens a printable version of the information for the project.



To keep the output as concise as possible, not all of the table columns are shown.

2. Returns the user to the project list.
3. Allows the user to edit the project number or the design section (described later in this document).
4. Allows the user to add and remove Alternatives (described later in this document).
5. This button only displays when “Bridge” is listed as the office. It allows the user to break down a project to specific Design Numbers (described later in this document).

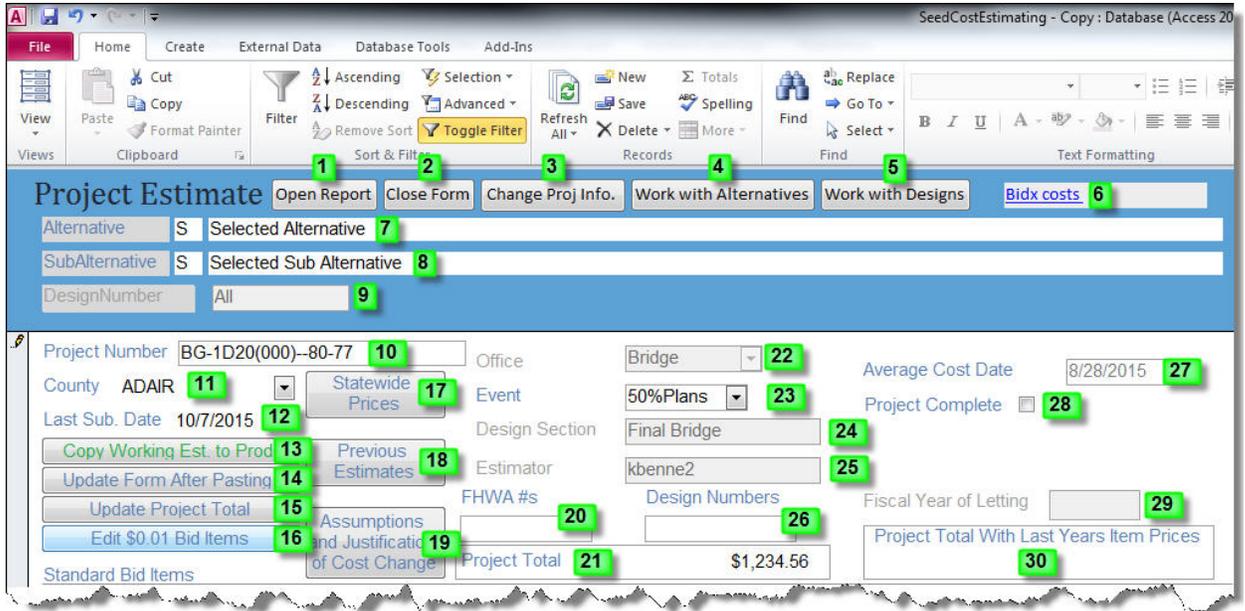
6. Opens the awarded contract unit price average for bid items.
7. Description of the alternative shown. By default, the form opens to the selected alternative. Cost estimates submitted are based upon the selected alternative.
8. Description of the sub-alternative (described later in this document) shown. By default, the form opens to the selected sub-alternative. Cost estimates submitted are based upon the selected sub-alternative.
9. Shows the design number by which the estimate is filtered. By default, this is set to "All".
10. Displays the project number. The user must return to the project list to select a different project number.
11. This list allows you to select the county for the project and controls the county specific costs for the project. If 'Statewide' is selected, the average costs for the state will be set for the project. Do not leave this field blank or county specific costs will be incorrect.
12. Indicates the last time that this estimate was submitted to the production database for long term storage and management review.
13. Allows the user to copy the current estimate to the production database table. If the previous submittal was less than 30 days ago, the previous submittal will be deleted and replaced with this information. This will copy out all alternatives and design numbers for this project. Sorts the bid items to the appropriate locations with and assures the costs for the selected county are applied.
14. Sorts the bid items to the appropriate locations and assures the costs for the selected county are applied.
15. Updates totals for all portions of the estimate. Run after any changes to see the updated project total.

This will reassign your user name to the project.

16. Opens form to select which \$0.01 you would like to edit.
17. If the county field is set to a specific county, bid items that have a statewide average will be displayed.
18. Allows the user to view previous submittals from the production database table. See button 13 above.
19. Allows the user to enter justifications and assumptions (described later in this document). As a rule, all significant cost or scope changes will be documented here.
20. Contains the FHWA numbers associated with this project.

These numbers must be entered by hand and should be separated by commas.

21. Displays the project total in today's dollars. Press 'Update Project Total' (15) to assure that it includes all recent changes.
22. Displays the office associated with this estimate.
23. Shows the design event associated with this estimate.



- 24. Indicates the design section associated with this estimate.
- 25. Is the username that last updated this estimate.
- 26. This field only shows for projects with Bridge as the office. It is a summary of all the design numbers for this project.

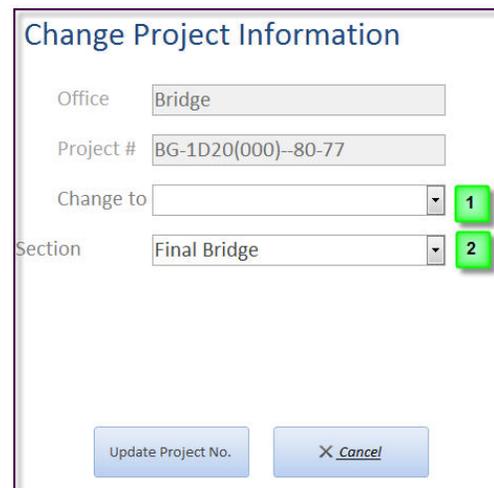


These numbers must be entered by hand as four digit numbers separated by commas (Example: 0123, 0012, 0178).

- 27. Shows the date the cost information was last updated.
- 28. If checked, the project will no longer display in the project list (page 4). Project estimate can be accessed by selecting “Completed Project List” from the main menu.
- 29. The fiscal year of the latest download from project scheduling. The PSS information is normally updated monthly by the ODAC group.
- 30. This field gives the user an indication of the changes to the estimate as a result of inflation. The value is calculated by applying cost information from the previous year to the current items and quantities. Accuracy may be affected by items that did not have cost information previous year. In a future upgrade, the last year’s submitted estimate will be displayed above the project total.

Change Project Information

- 1. The project number associated with the estimate can be edited by selecting the new project number from the drop-down list.
- 2. If the design section working on the project changes, the design section for the estimate can also be edited. Select the appropriate section from the drop-down list.



Working with Alternatives

The screenshot shows the 'SeedCostEstimating : Database' application window. The interface includes a ribbon with 'File', 'Home', 'Create', 'External Data', and 'Database Tools'. The main form area is divided into several sections, each highlighted with a red box and a numbered callout (1-7). Section 1 contains project information fields. Section 2 is for creating new alternatives. Section 3 is for renumbering alternatives. Section 4 is for deleting alternatives. Section 5 is for changing the selected alternative. Section 6 is for copying bid items. Section 7 is a table for managing alternatives.

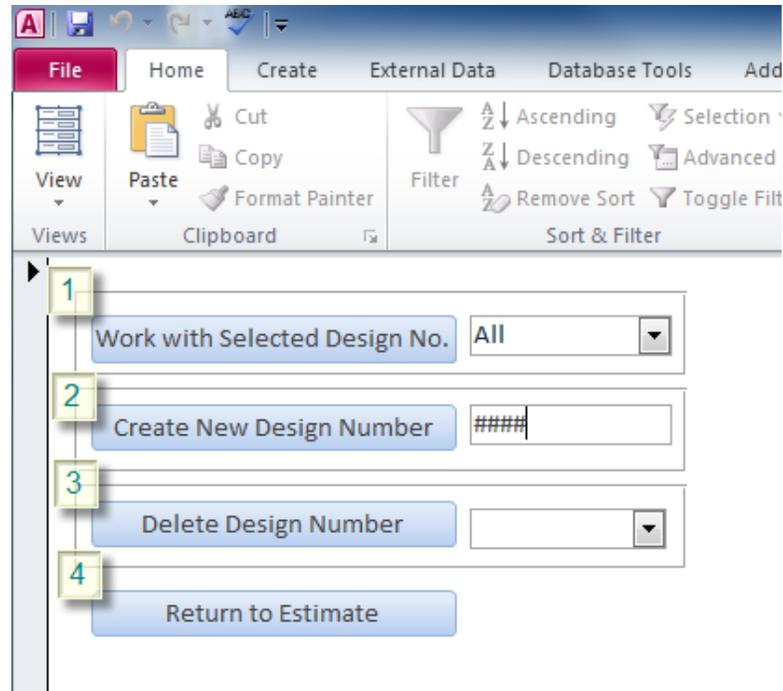
Alt.	Alternative Description	Sub Alt	Sub Alternative Description
01	1	a	1d
S	Selected Alternative	S	Selected Sub Alternative

1. Read only information about the project. This information is used to filter the program to the correct project.
2. These fields are used to create new alternatives. Filters prevent users from duplicating alternatives. Descriptions for the alternative and the sub alternative are required. To keep alternatives organized, start alternative descriptions with a number and the sub alternative descriptions with a letter.
3. These fields allow alternatives to be renumbered. It does not allow duplicate alternatives.
4. Allows alternatives to be deleted. Before an alternate is deleted, the user will be asked to confirm the decision.
5. Allows the user to change the selected alternative. The selected alternative is the one that will be used for project cost tracking. The selected alternative is indicated by a capital 'S' in both the alternative and sub alternative fields.
6. Copies all bid items from the selected alternative to another alternative. This will append to any existing items you may already have for that particular alternative.
7. This area allows the user to work with the alternatives. By default, new alternatives will not have any bid items applied.

Working with Design Numbers

This tool is for working with multiple design numbers within a single project number. Design numbers can be applied to individual bid items within a project allowing the estimate to be filtered to a single design number. This may generate the same bid item multiple times within an estimate. When the user exits the estimate form, the design number resets to "All" and the project is retotaled. This prevents accidentally submitting costs for only one of the design numbers.

Using percentage based items in conjunction with multiple design numbers is not recommended because the percentage calculation is based upon the entire project cost. For example, if a 5% mobilization item is added to each of two design numbers, the result will be a 10% mobilization for the entire project when the items are combined in the overall estimate. Fixed cost items can be used rather than the percentage based items in these situations.



1. Allows the user to work with a selected design number.
2. Allows the user to add new design numbers to the estimate. Design numbers must be 4 digits.
3. Deletes design numbers that are no longer needed.
4. Returns the user to the last estimate that was open.

Entering Bid Items

Within an individual estimate, the bid items are grouped as follows:

Standard Bid Items

This is the first section of the bid items area. These items have adequate cost history to provide acceptable base costs. Items with lump sum unit, items with a 2599-** item code, and any items with a unit cost of \$0.01 are excluded from this item list.

To adjust unit costs of items within this area, adjust either the risk or quantity factor. The number within the risk or quantity factor column is multiplied by the unit cost to increase or decrease the unit price. An explanation is required any value other than 1.0 is entered in these fields.

Non Lump Sum Special Bid Items

This section includes all 2599-** series bid items that do not have a unit of lump sum, plus any standard bid item with a unit cost of \$0.01. The unit costs can be adjusted by the user by using the “Edit \$0.01 Bid Items” button. Once an item with a unit cost of \$0.01 has been changed, it will be listed with the Standard Bid Items the next time the estimate is opened or after the “update Project Total” button is selected. These items cannot be set as a percentage of the overall project cost.

Special Bid Items All Lump Sum Items other than Unquantified

This section works with all lump sum items other than the “Unquantified” bid items. The user may use a quantity and unit cost, or a percentage of the total costs of the bid items above. If a percentage is placed in a row, it takes precedence over the unit price and quantity. To use the unit price and quantity, delete the percentage and leave the percentage field blank.

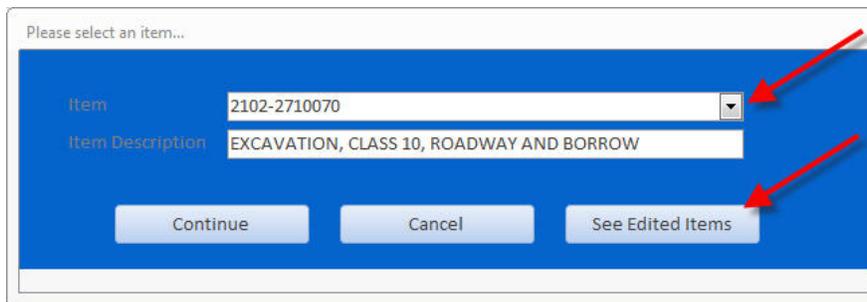
Unquantified Bid Items

This section is setup to account for items that do not have detailed information at the time of the estimate. Only one item is available and it is intended to cover all of the unquantified items. These costs were previously included in a contingency item. However, "unquantified items" is a better descriptor of the actual costs. The item cost is intended to be a percentage, but can be used as a lump sum amount if required.

Editing \$0.01 Bid Items

Many bid items, including earthwork, PCC, HMA, and 2599-** series bid items, will have a unit cost of \$0.01. Designers will have to determine a calculated cost for these items based on similar project work type, location within the state, and/or quantity.

Select the bid item you would like to edit from the drop-down list. By default, the drop-down list will only contain any items that have not been edited. If you need to change an item you already adjusted, *click* the "See Edited Items" button. This will change the drop-down list to previously adjusted items only. Press the button again and it changes the list back.



If there is any price history in the last 4 years for the selected bid item, it will be shown in the bottom half of the form. This information can be sorted, rearranged, and filtered to aid the designer in calculating an appropriate unit cost.

Bid Item History

Item	2102-2710070	EXCAVATION, CL 10, RDWY+BORROW	Units	CY	Quantity
Designer Adjusted Cost	\$0.01	Average Cost Last Year	\$4.69	4 Year Average	\$4.69
Extended Cost					
Justification					

Project Number	Letting Date	WorkType	Bid Price	County	Inflation Factor	Adjusted Price	Bid Quan	Project Description
ISSN-035-2(309)45--1T-91	10/19/2010	BRIDGE & APPROACH	\$11.30	WARREN	2.38	\$26.89	2177	OVER SOUTH RIVER 1.5 MILES SOUTH OF G-64(NBL)
ISSN-035-2(394)45--1T-91	10/19/2010	BRIDGE & APPROACH	\$11.30	WARREN	2.38	\$26.89	2834	OVER SOUTH RIVER, 1.5 MILES SOUTH OF G-64(SBL)
BRFMX-029-6(164)124--14-	1/19/2011	BRIDGE AND APPROA	\$10.00	MONONA	1.55	\$15.50	1963	OVER ROBINSON DITCH, 3.1 MILES S. OF WOODBURY CO. LINE(NBL)
MX-029-5(208)108--02-67	1/19/2011	BRIDGE AND APPROA	\$10.00	MONONA	1.55	\$15.50	3985	OVER CLEGHORN CREEK, 4.4 MILES S. OF IOWA 175(NBL/SBL)
MX-029-1(81)33--02-65	3/15/2011	BRIDGE AND APPROA	\$8.00	MILLS	1.55	\$12.40	19937	NB I-29 OVER SOUTH JUNCTION US 34
BRF-006-1(114)--38-78	2/15/2011	BRIDGE AND APPROA	\$6.50	POTTAWATTAM	1.55	\$10.08	6542	OVER KEG CREEK 0.4 MILE E. OF SR L52
BRF-092-2(36)--38-15	4/16/2013	BRIDGE AND APPROA	\$8.00	CASS	1.32	\$10.56	3611	OVER SMALL STREAM 1 MILE W. OF IA. 148
BRF-218-7(227)--38-07	6/18/2013	BRIDGE AND APPROA	\$13.90	BLACK HAWK	1.32	\$18.35	2576	IN THE CITY OF LA PORTE CITY OVER WOLF CREEK
BRFN-098-1(7)--39-89	9/17/2013	BRIDGE AND APPROA	\$3.00	VAN BUREN	1.32	\$3.96	1000	OVER DES MOINES RIVER 1.5 MILES S. OF IA. 16
BRFN-098-1(7)--39-89	9/17/2013	BRIDGE AND APPROA	\$5.06	VAN BUREN	1.32	\$6.68	18327	OVER DES MOINES RIVER 1.5 MILES S. OF IA. 16
BRF-218-3(67)--38-92	12/17/2013	BRIDGE AND APPROA	\$25.00	WASHINGTON	1.32	\$33.00	21	OVER E. FORK CROOKED CREEK 1.1 MILES N. OF HENRY CO. LINE
BRF-034-7(137)--38-90	5/19/2015	BRIDGE AND APPROA	\$7.10	WAPELLO	1	\$7.10	2512	OVER BEAR CREEK 3.6 MILES W. OF US 63
MP-018-2(708)214--78-34	2/15/2011	BRIDGE APPROACH R	\$42.00	FLOYD	1.55	\$65.10	31	IOWA 14 INTERCHANGE AT CHARLES CITY BY-PASS
BRFN-059-5(42)--39-24	1/18/2012	BRIDGE DECK OVERL	\$80.00	CRAWFORD	0.9	\$72.00	15	OVER ABAND. R.R. 0.5 MILE N. OF S. JCT. IA. 141
HDP-004-2(38)--71-37	12/20/2011	BRIDGE NEW - PPCB	\$5.75	GREENE	1.55	\$8.91	14209	IN THE CITY OF JEFFERSON OVER UP R.R.
NHSX-065-4(127)--3H-77	1/16/2013	BRIDGE NEW - PPCB	\$5.40	POLK	1.32	\$7.13	35487	OVER DES MOINES RIVERSOUTH OVERFLOW SE OF DES MOINES(NBL)
NHSX-065-4(135)--3H-77	1/16/2013	BRIDGE NEW - PPCB	\$4.15	POLK	1.32	\$5.48	43082	OVER DES MOINES RIVERMIDDLE OVERFLOW SE OF DES MOINES(NBL)
NHSX-065-4(138)--3H-77	1/22/2014	BRIDGE NEW - PPCB	\$4.20	POLK	1.27	\$5.33	53532	OVER DES MOINES RIVERMIDDLE OVERFLOW SE OF DES MOINES(SBL)
NHSX-065-4(137)--3H-77	1/22/2014	BRIDGE NEW - PPCB	\$5.40	POLK	1.27	\$6.86	53537	OVER DES MOINES RIVER SOUTH OVERFLOW SE OF DES MOINES(SBL)
NHSX-061-3(72)--3H-58	10/21/2014	BRIDGE NEW - PPCB	\$11.40	LOUISA	1.27	\$14.48	3148	OVER DME R.R. 0.8 MILE S. OF MUSCATIE CO. LINE
IL-080-6(320)244--13-52	2/17/2015	BRIDGE NEW - PPCB	\$4.20	JOHNSON	1	\$4.20	6952	IN THE CITY OF IOWA CITY ALONG DUBUQUE ST FROM FOSTER RD NOR
MX-090-2(220)85--02-01	9/18/2012	BRIDGE NEW - STEEL	\$4.50	ADAIR	0.9	\$4.05	983	I80 OVER MIDDLE RIVER 1.4 MILES W. OF IA. 25(E/L)
MBIN-080-4(51)335--0H-78	12/18/2012	BRIDGE REHABILITAT	\$20.00	POTTAWATTAM	0.9	\$18.00	653	OVER SILVER CREEK 5.1 MILES W. OF US 59(W/L)
MIN-380-7(123)73--0E-07	5/21/2013	BRIDGE REHABILITAT	\$20.00	BLACK HAWK	1.32	\$26.40	240	IN THE CITY OF WATERLOO AT THE SAN MARNAN DR. INTERCHANGE (S
FSSN-151-1(27)--3T-48	2/15/2011	BRIDGE REPLACEMEN	\$7.00	IOWA	1.55	\$10.85	880	US 151 OVER MILL RACE CREEK 0.4 MILES SOUTH OF IA 220
FSSN-075-3(47)--3T-84	2/15/2011	BRIDGE REPLACEMEN	\$10.08	SIoux	1.55	\$15.62	5287	OVER BURR OAK CREEK 3.1 MILES N. OF THE N. JCT. US 18
FSSN-187-1(27)--3T-33	3/15/2011	BRIDGE REPLACEMEN	\$12.00	FAYETTE	1.55	\$18.60	3560	OVER MAQUOKETA RIVER 2.1 MILES NORTH OF IA 3
MX-029-2(63)34--02-65	3/15/2011	BRIDGE REPLACEMEN	\$8.00	MILLS	1.55	\$12.40	2648	OVER JESUP AVE. 1 MILE N. OF S. JCT. US 34(NBL)
STP-130-2(14)--2C-16	9/18/2012	BRIDGE REPLACEMEN	\$4.75	CEDAR	0.9	\$4.28	4798	OVER SUGAR CREEK 1.9 MILES E. OF TPTON
BRF-012-3(6)--38-84	12/18/2012	BRIDGE REPLACEMEN	\$8.00	SIoux	0.9	\$7.20	3422	OVER SIX MILE CREEK 2 MILES N. OF CO. RD. C-12
BRF-034-3(37)--38-02	2/18/2014	BRIDGE REPLACEMEN	\$8.00	ADAMS	1.27	\$10.16	3747	OVER PLATTE RIVER 1.3 MILES W. OF IA. 25

Record: 1 of 476

Buttons: Cancel, Save and Close

Justifications and Assumptions

The Justifications and Assumptions form is created to help designers explain their estimates. Any assumptions made during estimating should be noted here (Example: No staging was assumed for this project).

The justifications portion is to document changes to the scope of the project, the amount that the change added or removed from the estimate, and why the change was need. The justification also needs to include who approved for the change, the date that the change was approved, and any additional comments. Normally changes will be approved at Project Review or by the District Engineer.

Reviewing Production Estimates

This form allows the user to review projects that have been submitted to the production database. To access this form, **click Previous Estimates** from the project estimate screen, then select a project by clicking the folder button on the left edge of that row. The project estimate will open for reviewing. More complete reporting for these projects will be added as time allows.

Event	Submittal Date	Alternative	SubAlternative
D00	10/7/2015	01	h
D00	10/7/2015	S	S

Chronology of Changes to Design Manual Section:

021M-046 Cost Estimates Program Details

9/2/2016	Revised Revisions to various subsections related to changes in the cost estimation database.
1/7/2016	Revised Documented process on how \$0.01 items are handled Also added the ability to change project numbers themselves.
5/31/2012	NEW New.