



Intelligent

Cost

Estimator

Manual



Civil Engineering Smart Solutions (CESS) LLC.

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1. INTRODUCTION

1.1 *What is Intelligent Cost Estimator?*

Intelligent Cost Estimator (ICE) is a smart and user-friendly engineering software that was exclusively developed for civil engineers by the civil engineers at CESS LLC. Unlike any other software packages that are currently in the marketplace serving similar purposes, ICE Software presents a groundbreaking approach in providing a reliable yet easy-to-use solution that integrates the cutting-edge computer engineering technologies with our extensive experience in the planning, design and construction of numerous civil engineering projects. The powerful features of ICE software have enabled us as well as our clients to maximize the efficiency and productivity in a timely and cost effective manner.

With a framework that was exclusively developed for cost estimation purpose based on local design standards and specifications as well as unit cost information, ICE Software offers users the flexibility to either use an existing CAD files or simply use the established template to effectively perform the quantity take-off of all pay items and provide the project cost estimates that reflect the local market conditions.

Additionally, with just one click, ICE Software can automatically generate customized reports, which not only streamline the process and save tremendous amount of time for manual inputting and formatting, but also ensure consistency and eliminate potential human errors through a highly automated process. Furthermore, with the same or higher level of automation, ICE Software enables users to check whether the design files are in compliance with the standards and specifications that are required for the project at hand. ICE Software can also be used for quick and rough estimates for funding programming or preliminary planning purposes. In such cases, users do not have to predetermine specific standards, which saves a significant amount of time and effort yet produces the cost estimates with an acceptable level of accuracy.

ICE Software is an effective and sophisticated tool for some of the most tedious and time-consuming tasks that are being performed regularly by engineering professionals in both public and private sectors. With some customized modifications to its generalized framework, ICE Software can be an even more powerful tool to be used in many areas of engineering practices and public works operations. In addition to establishing project specific cost estimates, ICE Software can also be used for project prioritization and funding programming related activities performed by a Metropolitan Planning Organization (MPO), State Department of Transportation, or any agency responsible for planning and programming the regional infrastructure improvements. For example, customized applications of ICE Software have been proven to be an effective tool to program the 10-year construction plan for regional flood control facilities, and to assess surety bonds and fee estimates for off-site improvements that were required for proposed private land development projects.

1.2 Features of Intelligent Cost Estimator (ICE)

Easy Data Input - Users can select either an existing CAD file or a built-in template, and use the easy-to-follow modules to complete the cost estimation task.

User-Friendly Design - The software is a very intuitive and easy to master even for infrequent users.

Concise and Efficient - Quantity take-off and cost estimation are completed in an efficient and highly automated fashion.

Automatic Data Update - The database is expanded and updated automatically every time when new information is entered, which not only keeps the information current but also ensures consistency and saves time for all future uses.

Fully Integrated with CAD Platforms - AutoCAD and MicroStation files can be used concurrently throughout a project specific cost estimation process.

Effortless Reporting - With just one click, an accurate and customized report can be automatically generated and easily updated to reflect the most recent changes in either unit costs or standards and specifications.

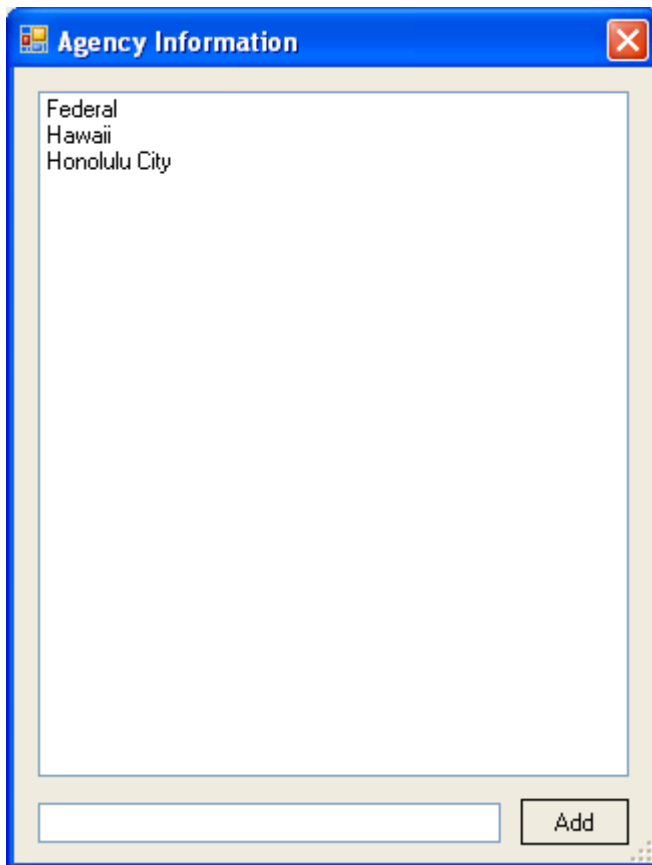
Flexible and Accurate - All criteria for quantity take-off and cost estimation can be set flexibly and tailored to satisfy user's specific needs or preferences. Any changes made throughout the process are automatically updated whenever design files are modified.

Quality and Consistency – The smart framework and built-in templates not only save users' time and effort, but also ensure quality and consistency of the final products of the cost estimation process.

2. GENERAL INFORMATION MODULE

2.1 Agency Information

The interface of Agency Information is shown in the picture below. In this interface, users can easily add, modify, or delete agency related information.



To add a new agency, simply type the agency name in Textbox at the bottom, and click the **Add** button, the new agency will become one of the choices in the ListBox above.

To delete an existing agency, select and double click the agency shown in the ListBox, and click **Yes** to delete or **No** to cancel once the confirmation window appears.

Note: After an agency is deleted, information related to the agency will remain in the database and do not need to be reentered whenever the agency is added back into ListBox.

2.2 Project Management

2.2.1 New Project

To add new project, click the **New Project** sub menu, then input new project information, and click the **Save** button once input is completed.

The screenshot shows the 'New Project' dialog box with the following fields and sections:

- Project Information:** Project Name, Location, City, District, Project No., Project Type (with 'New Type' button), Manager, Participators, Data Location (with 'Browse..' button), Estimate Range, Bid No., Labor Commission No., Net Length of Project, Type Code, and Description.
- Client Information:** Client Name, Manager, Participators, Project No., Standard Applied (with 'New' button), Project Funding, and Contract Number.
- Project Time Schedule:** Start Date, Construction Date, Date Advertised, Bid Date, Completion Time, and Current Status.

Buttons at the bottom: Save, Help, Close.

If a project type cannot be found in the database, click the **New** button to create new project type. Refer to the screenshot below for further details.

The screenshot shows the 'Project Type' dialog box with the following elements:

- Search bar at the top.
- Toolbar with buttons: New (pink), Save (green), Update (black), Delete (red).
- Table with columns: TypeID, TypeName, Description.
- Current data in the table: TypeID: 0, TypeName: (empty), Description: (empty).

To add a new project type, click the **New** button and type in the project type related information, including, type ID, type name and description, and then click the **Save** button. The information will be stored in the database from now on unless otherwise deleted by a user.

To delete a project type, select the company from the combo box on the top, and click the **Delete** button. Note that such an action will permanently delete the project type from the database.

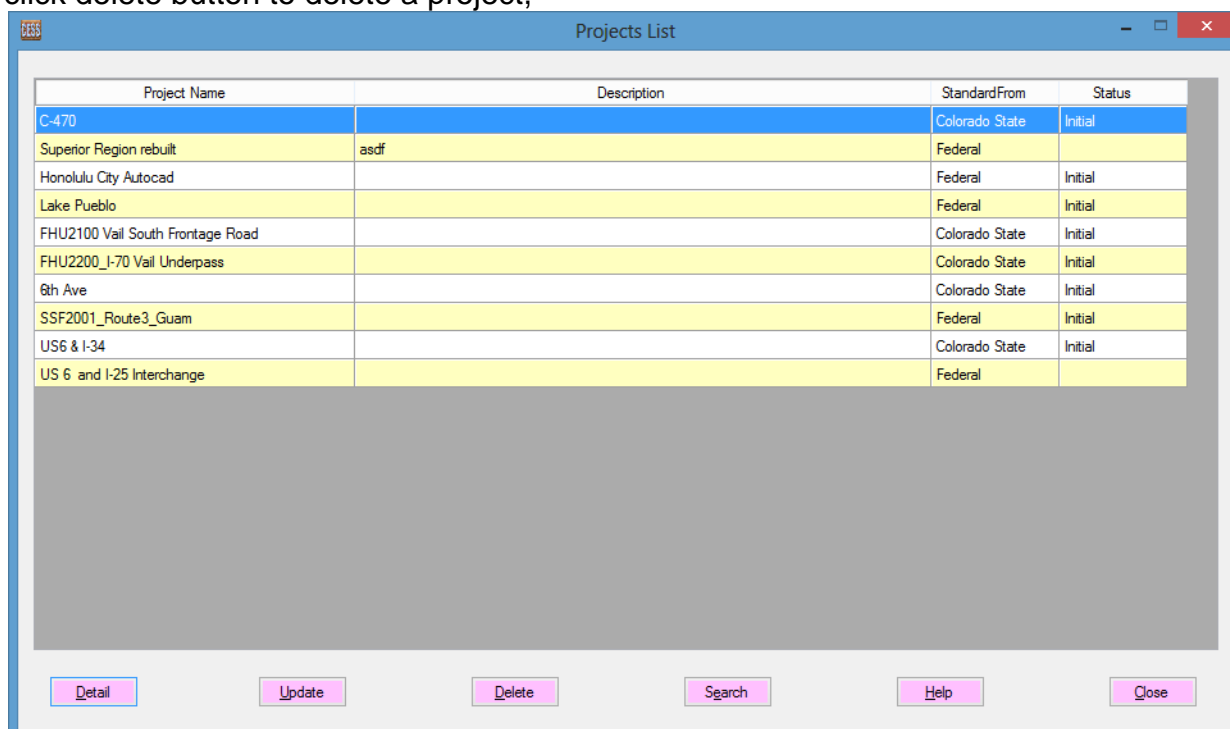
To change a project type, select the company from the combo box, make modifications, and then click the **Update** button.

To close the window, click the **Close** button.

Note: Due to the cost data and annual inflation built in the database, the Standards Applied and Estimated Construction Date are the most important parameters that have to be specified prior to proceeding to ensure a reliable outcome.

2.2.2 Project List

Click the project list sub menu, users can select the project in the data grid, and click detail button to see the detail of the project, or click update button to update project, or click delete button to delete a project,



2.3 Company Management

The interface is shown in the picture below. Users can use it to add, update, or delete company Information.

Name	MainPhone	AlterPhone	Fax	Website	ContactName	Title	Email	Description
Utah Pacific Bridge Steel	801-785-3557				Clark Olsen			Steel Girders
CMC Rebar	702-262-1801				Curus Van Norman			Reinforcing
Magco Drilling	602-455-3867				Bill Burton			Shoring
TAB Contractors, Inc	702-642-3033				Tony Rambur			Earthwork
Civil Engineering Firm 1								
CESS Inc	8083938286			www.cessinc.com	shenghong	Foundation	newyearfsh@gm...	

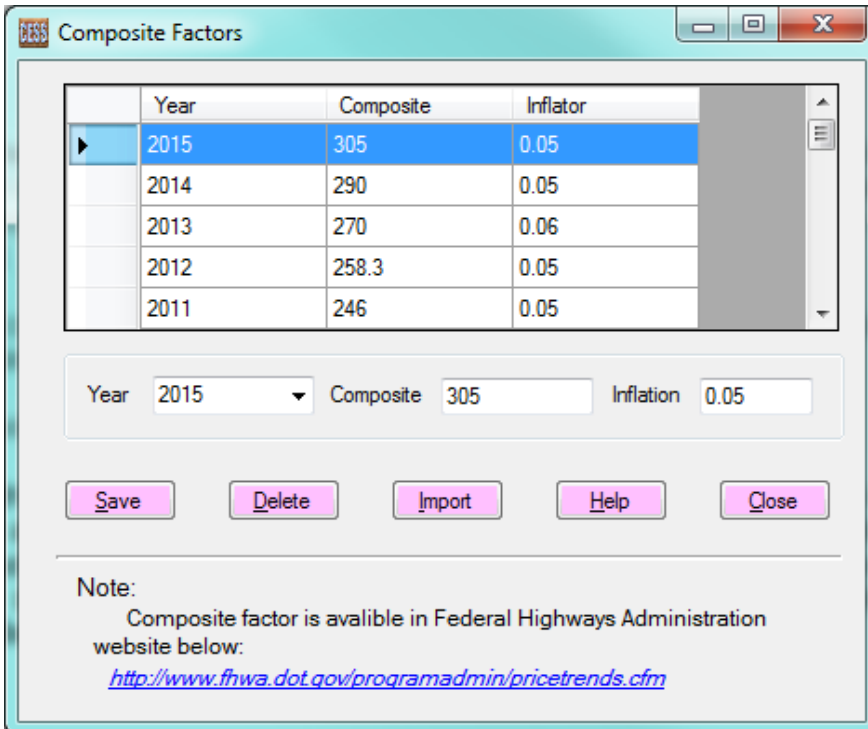
To add a new company, click the **New** button and type in the company related information, and click the **Save** button. All related information will be stored in the database from now on unless otherwise deleted by a user.

To delete company related information, select the company from the combo box on the top, and click the **Delete** button to permanently delete it from the database.

To change the company information, select the company from the combo box, make modifications, and then click the **Update** button.

2.4 Composite and Inflation Factors

In the *Composite Factor* window below, two parameters, i.e., composite and inflation factors have to be set for a specific year. It is recommended that users obtain localized composite and inflation data, and check the data against the numbers listed on Federal Highways Administration's website for comparison purposes.



The screenshot shows a window titled "Composite Factors" with a data grid and input fields. The data grid contains the following information:

Year	Composite	Inflator
2015	305	0.05
2014	290	0.05
2013	270	0.06
2012	258.3	0.05
2011	246	0.05

Below the grid, there are input fields for Year (2015), Composite (305), and Inflation (0.05). There are also buttons for Save, Delete, Import, Help, and Close. A note at the bottom states: "Note: Composite factor is available in Federal Highways Administration website below: <http://www.fhwa.dot.gov/programadmin/pricetrends.cfm>"

To save the information for a specific year, select a year from the data grid, then input composite and inflation values, and click the *Save* button. If the information for the selected year already exists, then it will be automatically replaced by the most recent data input. To delete composite and inflation information, select the row with a specific year in the data grid, and click the *Delete* button.

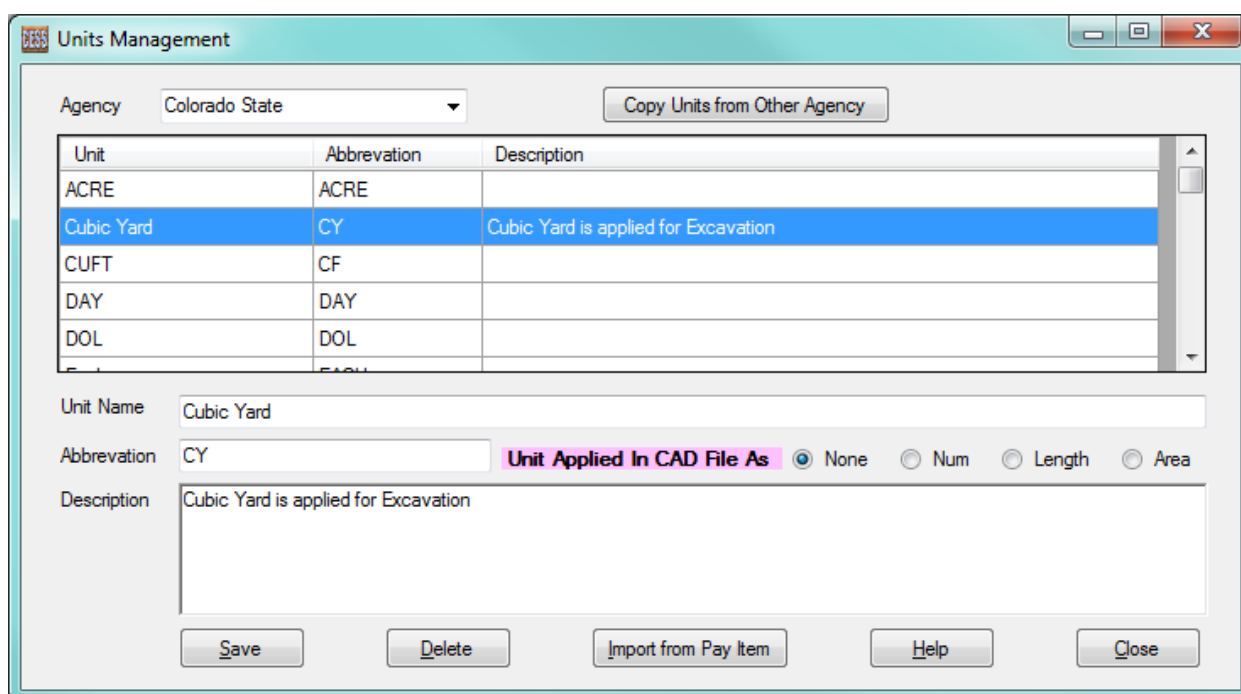
Users also can import composite information that is accumulated and available on the server of CESS LLC. Please note that such an action will replace the composite information currently saved in the user's database.

Note: Both composite and inflation factors should be updated as new information becomes available, especially for the current year as it has a significant impact on the end results of the cost estimation. The system is set to use the latest year's information that is saved in the database as the current year and compound annually with the inflation factor to reflect the estimated cost in the construction year.

3. PAY ITEMS MODULE

3.1 Units Management

Unit information can be entered directly in this module, or found from a database that was previously established for an agency. The later is recommended because such a database can be easily created from any spreadsheet files, which can save tremendous data input time for all future projects. In the case that a pre-established database is available, select an agency from the *combo box* on the top of the window as shown below, and all existing unit information as required by the selected agency will be available for use in the data grid.



To add new unit information for an agency, users can do through direct input process and click the **Save** button.

To edit or update any information related to an existing unit, select the unit in the data grid, revise it in the text box, and click the **Save** button.

To delete a unit, select the unit in the data grid and then click the **Delete** button.

Unit Name: Full name of a unit

Abbreviation: Abbreviation of the unit name. For example, the abbreviation of unit LINEAR FEET is LNFT, EACH is EA, etc.

Unit Applied in CAD File: There are three units commonly used in CAD files, including: 1) "EACH" which represents the number of blocks in *AutoCAD* or the number of Cells in *MicroStation*, 2) "LINEAR FEET" which represents the length of a line or arc, and 3) "SQUARE FOOT" which represents the size of an area. **It is vital to set all units correctly to ensure correct results.**

Description: a brief description of the specified unit.

If the unit specifications for an agency are similar to the ones used by another agency, such unit specifications can be effectively imported by click the **Copy Units from Other Agency** button. All units that are specified for the selected agency will be copied except the units that already exist in the database for the subject agency.

If it is desired to import pay items from the database provided by CESS LLC., units can be imported and updated automatically by clicking the **Import from Pay Item** button.

3.2 Unit Price Estimation

As stated previously, the ICE software package has a series of intelligent features to automatically store, expand and update its various databases as new data entered into the system. As a result, users of ICE software have an unlimited access to the latest local market data that can be useful for other engineering related purposes. The **Unit Price Calculator** is an interface that enables users to take advantage of the most recent unit prices of all pay items that have been submitted by bid companies for various projects. This interface also contains various filters to assist users to define the criteria of the data for their use in a particular project and/or effort. Once the desired filter conditions are defined, the unit price will be presented in the data grid accordingly. A screenshot of the interface is shown below.

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The screenshot shows the 'Unit Price Calculator' window. At the top, there is a 'Filter Condition' section with several input fields: 'Agency' (dropdown), 'Item Name' (text box), 'Project' (dropdown), 'Item No.' (text box), 'Bid Company' (dropdown), and 'Bid Date from' (dropdown) to '3/ 3/2013' (dropdown) with a 'to' field. A pink 'Search' button is to the right. Below this is a large data grid with a header row containing columns: 'Selected', 'Item No.', 'Name', 'Project Name', 'Unit', 'Unit Price', 'Bid Date', 'Current Price', 'Bid Company', and 'Won?'. The grid body is currently empty. At the bottom, there is a 'Methods' section with four radio buttons: 'Average', 'Maximum', 'Minimum', and 'Average without Maximum and Minimum'. To the right of these is a pink 'Current Unit Price' label and an empty text box. A pink 'Close' button is on the far right.

The procedure to use the **Unit Price Calculator** is summarized as follows:

Step 1: Set filter conditions based on the specific intent to use the data. Users can specify filter conditions by using the following six parameters:

Agency: Select an agency whose standards are required for the upcoming project. Please note that if no agency is selected, then the standards from all listed agencies will be used.

Item Name: Input partial or full name of pay items in the text box.

Project: Select a previous project, or leave it blank so that all previous projects will be considered.

Item No.: Input partial or full pay item numbers.

Bid Company: Select a company, or leave it blank so that all bid companies will be considered.

Bid date: Specify a previous bid date to limit the data within a given time period.

Step 2: Click the **Search** button, all available records will be listed in the data grid. Click header of each column, the records will be sorted by the values in this column.

Step 3: Select the records that are applied for unit price calculation of a pay item. Right click on the data grid; a menu of three functions appears. Using these functions, users can select all records at one time, and unselect the specified records or all records.

Step 4: Click one of the four methods listed on the screen, the item unit price will be calculated and shown in the text box.

In the data grid, the unit prices of pay items from past years are converted to the current date prices based on past bid prices and associated bid dates as well as the built-in inflation factors. This interface also provides users with the option to recalculate the unit prices based on actual inflation rate reported for the area to better reflect the local market conditions if so desired.

The window below is an example of a defined search on bid prices as well as the details related to the search results.

The screenshot shows the 'Unit Price Calculator' window. At the top, there are search filters: Agency, Item Name, Project, Item No. (63613), Bid Company, and Bid Date from (3/ 3/2003) to (3/ 3/2013). A 'Search' button is on the right. Below the filters is a table with the following data:

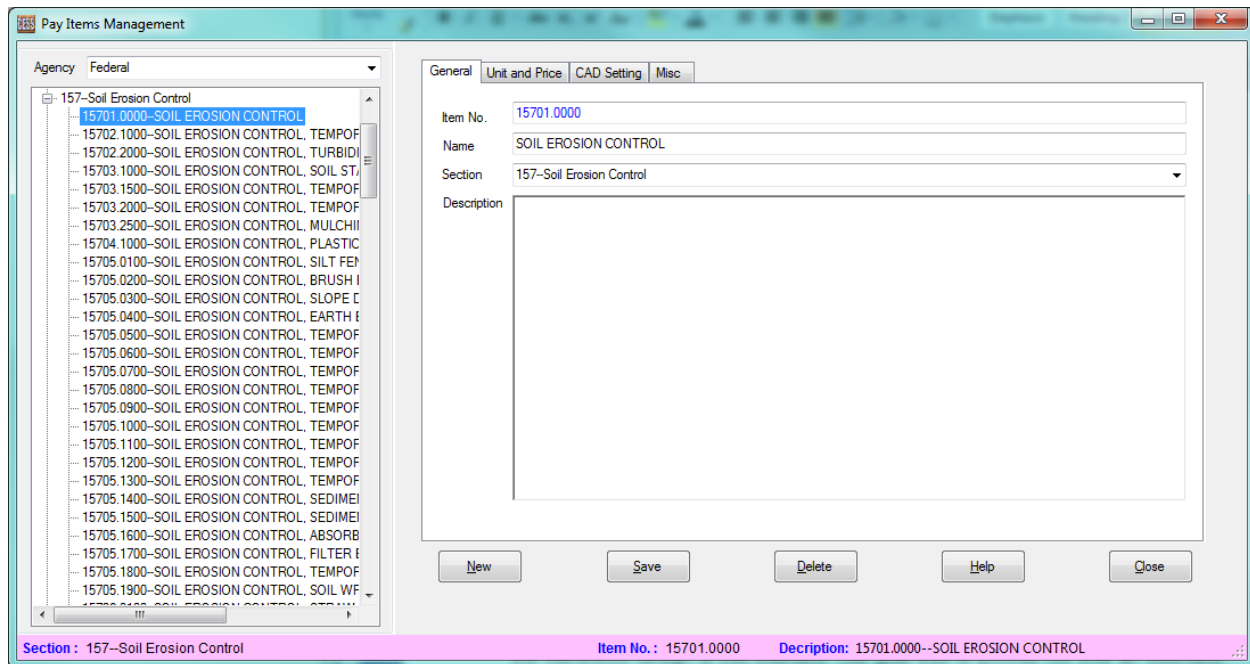
Selected	Item No.	Name	Project Name	Unit	Unit Price	Bid Date	Current Price	Bid Company	Won ?
<input checked="" type="checkbox"/>	63613.0000	SIGNAL HEAD	Interchange 1		\$2,500.00	6/24/2012	2613.24	...rating, Inc	No
<input checked="" type="checkbox"/>	63613.0000	SIGNAL HEAD	Interchange 1		\$2,857.14	6/24/2012	2986.56	...r, Ltd	No
<input checked="" type="checkbox"/>	63613.0000	SIGNAL HEAD	Interchange 1		\$5,285.71	6/24/2012	5525.13	...Corporation	Yes
<input checked="" type="checkbox"/>	63613.0000	SIGNAL HEAD	Interchange 1		\$6,000.00	6/24/2012	6271.78	...Corporation	No

At the bottom, there are 'Methods' radio buttons: Average, Maximum, Minimum, and Average without Maximum and Minimum (which is selected). A 'Current Unit Price' field shows 4255.85, and a 'Close' button is on the right.

3.3 Pay Items Management

The following window depicts the **Pay Items Management** interface, in which users can specify an agency as well as the pay items applicable to a specific project. Although direct input is allowed in this interface whenever preferred or necessary, the use of the pre-established database is recommended to not only save time for data input but also ensure accuracy and consistency. Users can create a new pay item, or select, add, or modify the pay item in the existing database. The ICE Software system performs automatic updates whenever new information is entered and saved.

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To take a full advantage of the pre-established database, users can select an agency from the combo box, and the pay items previously specified for the agency will appear in the **Tree View** window. Select by double clicking a pay item from the list, the pre-defined information related to the selected item will be shown on the right side of the window. Users can add, change, or delete the information whenever an update is needed. Our firsthand experience in engineering cost estimation played a critical role in the framework design of this interface. The primary goal was to provide not only an extensive database to ensure efficiency and consistency, but also an intuitive and easy-to-follow process flow. The procedure is very similar to what is used in the **Units** interface as described in Section 3.1.

There are four tabs provided in the **Pay Item Input** module, including **General**, **Unit and Price**, **CAD Setting**, and **Misc**. Specifically, the **General** tab specifies the item number, name, section and description of a pay item as shown below:

General	Unit and Price	CAD Setting	Misc
Item No.	63401.0100		
Name	PAVEMENT MARKINGS, TYPE A, SOLID		
Section	634--Permanent Pavement Markings		
Description			

Item No.: the number that is uniquely used for a specific pay item.

Name: the name of a pay item.

Section: the section that contains the pay item in the specifications.

Description: a brief description of a pay item.

The **Unit and Price** tab is shown below

General Unit and Price CAD Setting Misc

Unit In CAD File EACH Unit In Real EACH Factor 1 Hide Factors

Factor list (double click to select a factor) Factor Management

Factor Name	Original Unit	Final Unit	Factor	Notes
ABC CF to Ton	SF:SQFT	TON	0.0665	for ABC, the weight is 133 lbs for each Cubic Feet, for 133/20
Antistrip Additive	SF:SQFT	TON	1	1% of superpave pavement
Asphalt Binder	SF:SQFT	TON	1	Asphalt Binder (PG 64-28) 6.0% of superpave pave

Unit Price

Index	Min. Quantity	Max. Quantity	Price	Year
1	1	20	275.38	2013
2	21	30	250	2013

Edit... Refresh

New Save Delete Help Close

Unit in CAD File: the unit used in a CAD file. For example, the unit is LNFT for pavement striping and EACH for pavement marker.

Unit in Proposal: the unit that is used in the proposal or cost estimation report.

Factor: the factor used to convert numbers from the unit used in a CAD File to the unit used in a cost estimation proposal.

It is crucial to set the correct units for the **Unit in CAD File**. All available units for **Unit in CAD File** are listed in the combo box. If a unit is unavailable in the combo box, users can add it by going back to the **Unit** input module (Section 3.1). It is recommended that users do not manually input any unit in this module because a unit that is newly added here may not be recognized during the automated quantity takeoff process, which could result in errors and/or inaccuracy in the results of the cost estimation process.

The system also provides the interface to manage the factors for different units. Users can save the factor in the database. Once the CAD unit and unit in proposal are selected, the factor will be obtained automatically if it can be found in the database.

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To add factor into the system, click Factor Management button, and the interface is shown below:

The Factor Management window displays a table of factors and input fields for adding a new factor.

Factor Name	Original Unit	Final Unit	Factor	Notes
ABC CF to Ton	SF;SQFT	TON	0.0665	for ABC, the weight is 133 lbs for each Cubic Feet, for 133/2000=0.0665 T
Antistrip Additive	SF;SQFT	TON	1	1% of superpave pavement
Asphalt Binder	SF;SQFT	TON	1	Asphalt Binder (PG 64-28) 6.0% of superpave pavement
Asphalt Square Feet to Ton	SF;SQFT	TON	0.0061111	by asphalt,(Ton) = Square Yard X 110 lbs X Inch / 2000 , so square feet per
CFL Rates and Weights for ...	SF;SQFT	TON	10	
Emulsified Binder	SF;SQFT	TON	0.0001991	Emulsified Binder (0.43 gal/sy) 240 gal/ton
Fog Seal	SF;SQFT	TON	4.63E-05	Fog Seal (0.10 gal/sy)240 gal/ton
Pt to Mile	LF;LNFT	MILE	0.00018...	

Input fields for adding a new factor:

Factor Name:
Original Unit: ... Final Unit: ... Factor:
Notes:

Buttons: New, Save, Delete, Help, Close

First of all, input factor name, then select Original Unit, Final Unit, Factor, and Notes. Finally click the Save button, the factor is saved.

To delete Factor, select the factor from the data grid, and then click the Delete button.

Users can also set the different unit price according to the quantity of the pay item. Below is the interface to set the price for the pay item.

The Unit Price Management window displays a table of unit prices and input fields for adding a new unit price.

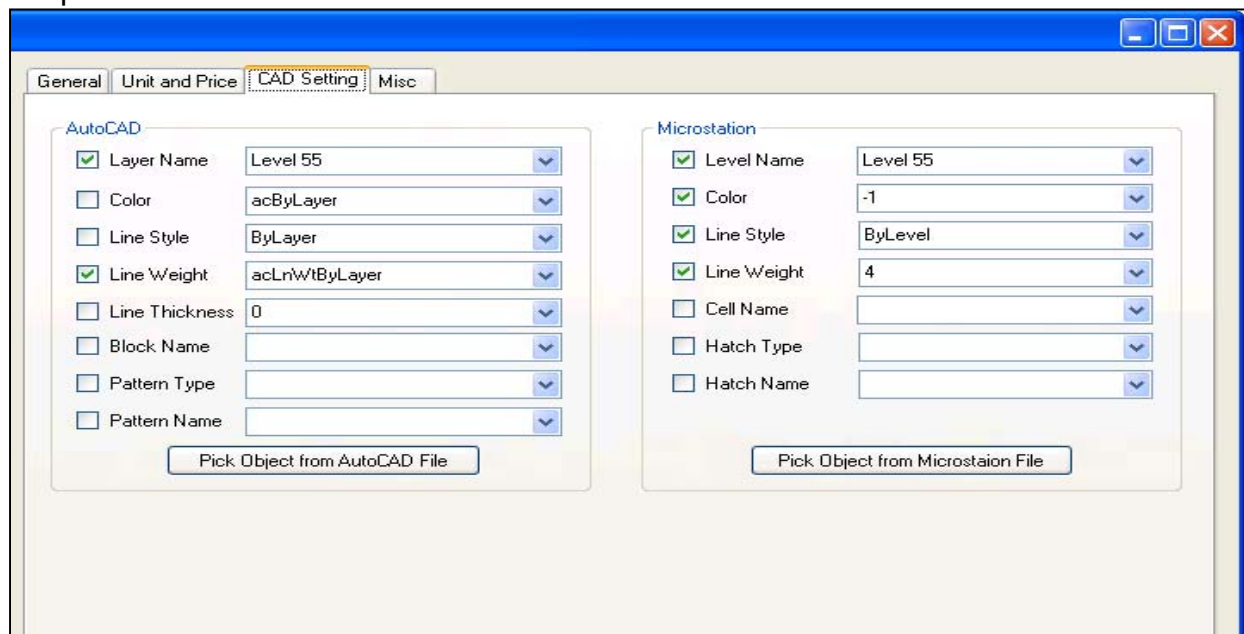
Item Name:
Item No.: Unit:

Index	Min. Quantity	Max. Quantity	Price	Year
1	1	20	275.38	2013
2	21	30	250	2013

Quantity Min. Max. Price
Year

Buttons: Add, Change, Delete, Save, Help, Close

The **CAD Settings** tab specifies the settings that were used to create the drawings in *AutoCAD* or *MicroStation*. The specific attributes of the **CAD Settings** tab are listed in the picture below for users' convenience:

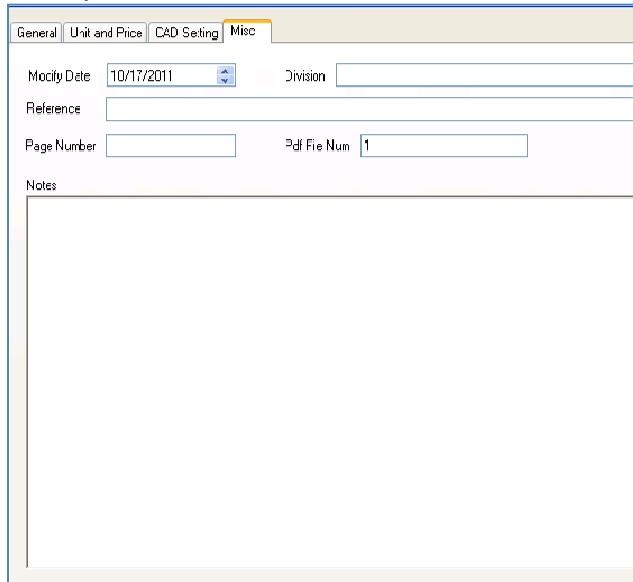


CAD settings indicate properties of a pay item shown in a CAD file. These properties can be set either manually or obtained from a sample object in a CAD file. Obtaining from a sample object in a CAD file is recommended as it is less error-prone. To set *AutoCAD* properties, click the **Pick Object from AutoCAD File** button and move mouse to select a sample object in an existing *AutoCAD* file. The properties of the sample object will be obtained and set for the pay item. Click the **Save** button to save the properties of a pay item into database.

Comparing to *AutoCAD*, it is slightly more difficult to set these properties in *MicroStation*. Within the *MicroStation* framework, a sample object has to be selected in the *MicroStation* file initially, and then click the **Pick Object from MicroStation File** button in this module as shown above to obtain the properties of the pay item. Click the **Save** button to save properties into the database.

By default, if the CAD properties of an object are obtained by selecting an object from a CAD file, all properties related to the object will be applied in the automated quantity takeoff process. However, users can choose to ignore one or more properties by clicking the **Checkbox** as shown in the window above, and only allow the selected properties be applied to the pay item in the cost estimation process. For example, as shown in the window above, **Layer Name** and **Line Weight** are applied to determine which object is considered as **Pavement Markings** in an *AutoCAD* file. **Level Name**, **Color**, **Line Style**, and **Line Weight** are applied to identify **Pavement Markings** in a *MicroStation* file.

The **Misc** tab allows users to input any miscellaneous properties of a pay item as shown in the pictures below:



Modify Date: the latest date that a pay item is added or modified in the specifications

Division: the division responsible for the changes related to the pay item

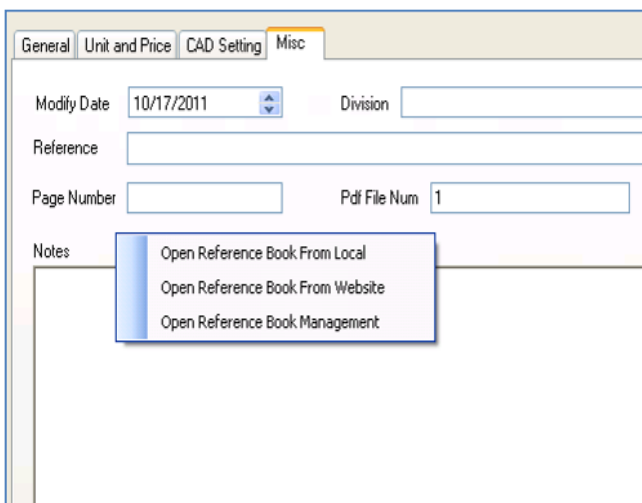
Reference: the reference book for the pay item

Page Number: the page number in the reference book that contains the pay item related information

Pdf File Num: the number in the PDF file that contains the pay item related information

Note: additional information related to the pay item

As shown below, a menu with three functions will appear by right clicking in a blank place within the window screen:



Open Reference Book from Local: a reference book is opened if it is saved on a local disk.

Open Reference Book from Website: a reference book is opened if it can be found on a website.

Open Reference Book Management: a reference book management is opened for users to make revisions.

3.4 Import Pay Items from Excel Files

Importing pay items directly from a spreadsheet file is one of the most efficient features of ICE Software as it not only eliminates manual input and human errors, but also performs an automated checking and verification function. Specifically, this interface allows users to import pay items from any spreadsheet files through a five-step process as described below:

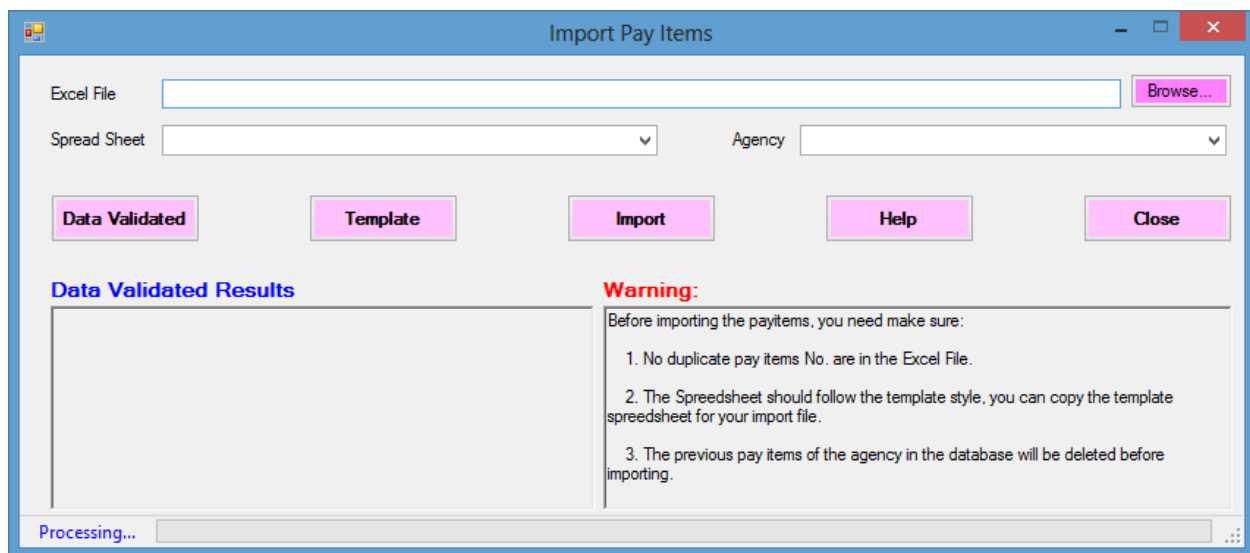
Step 1: Click the **Browse...** button, select the name of an Excel file that contains the pay item information to be imported. All sheets in the selected Excel file will be loaded in the **Spread Sheet** combo box.

Step 2: Select the Excel file that contains the pay item information to be imported. Please note that the spreadsheet file should follow the format of the **Template** in which the first row is the column name header, and the first column is the pay item code and followed by item description, section, and notes.

Step 3: Select an agency from the **Agency** combo box.

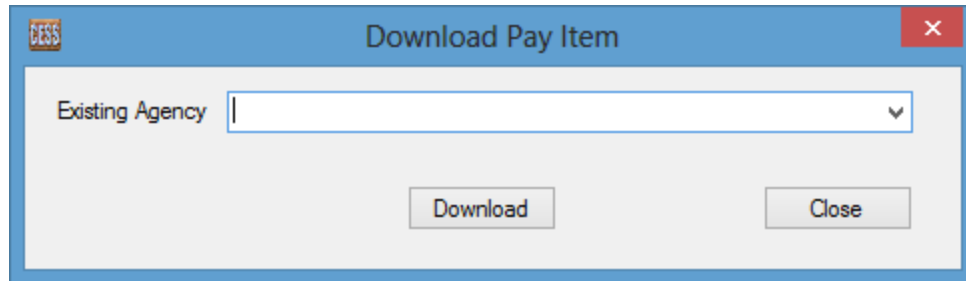
Step 4: Click the **Data Validated** button to verify if all data in the selected spreadsheet are correct and no duplicated pay item numbers are being used in the spreadsheet file.

Step 5: Once favorable results are shown in the **Data Validation Results** window as shown below, click the **Import** button to import the pay items from the selected Excel file into the ICE database.



3.5 Download Pay Items from CESS LLC. Server

In the event that the information of an agency's pay items has been saved in a server, users can download the information and then copy to the ICE database directly to save time and effort for future use. Note that such an action will replace the previous data of the subject agency with the pay items that are copied from the ICE database available on the CESS LLC. server.



4. QUANTITY TAKEOFF MODULE

The *Quantity Takeoff Module* contains five sub-modules with each following one of the five methods that are offered for quality takeoff in the ICE system. With the powerful features associated with these methods, users have the flexibility to choose the most effective tools to perform quantity takeoff tasks under various scenarios. Table 1 below provides a comparison of the five quantity takeoff methods.

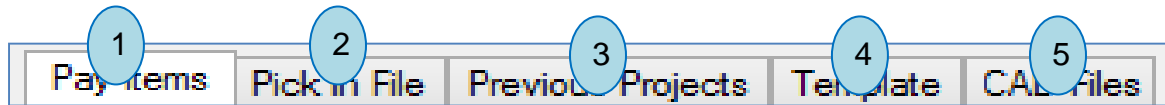
Table 1: Comparison of Five Quantity Takeoff Methods

QUANTITY TAKEOFF METHODS	References Included to analyze	Multiple File	Pay Item Standards Preset	Details Included	Quantity Tabulation	Cost Estimation	Applied to AutoCAD File	Applied to MicroStation File	Need to select Pay Item First?
Method 1: Quality Takeoff with Pay Items from Multiple CAD Files (<i>AutoCAD & MicroStation</i>)	N	Y	Y	N	N	N	Y	Y	Y
Method 2: Quality Takeoff with Pay Items from <i>AutoCAD</i> Files	Y	N	Y	Y	Y	Y	Y	N	Y
Method 3: Quick Quality Takeoff for Items in <i>AutoCAD</i> Files	N	N	N	N	N	N	Y	N	N
Method 4: Quality Takeoff with Pay Items Imported from <i>MicroStation</i> Files	Y	N	Y	Y	Y	Y	N	Y	Y
Method 5: Quick Quality Takeoff for Items in <i>MicroStation</i> Files	N	N	N	N	N	N	N	Y	N

4.1 Compile Pay Items for a Project

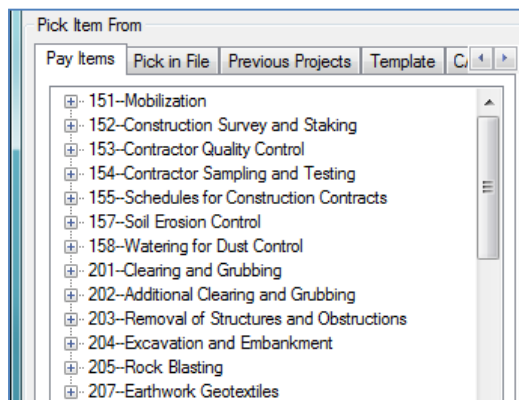
With improving work quality and efficiency as the ultimate goals, this interface offers users with five different procedures to import pay items using previous work products, including, import from an existing list of pay items, and pick and choose from existing CAD files, import from previous projects, using a pre-established template, or import

directly from CAD files. The procedures of importing pay items from the above mentioned sources are summarized below:



Procedure 1: Import Pay Items from Existing List (Pay Items)

This procedure is very intuitive and can be used when CAD properties are not previously set for pay items, or by users who are not very familiar with the CAD operations. The system provides all commonly used pay items in the tree view window as shown below. Users can find a pay item that is needed for a project and double click to include the pay item for the project.



Select a pay item from the list by double clicking it. The pay item will be shown in the data grid view once imported.

Right click on a pay item, a menu with four functions will appear as shown below:

Expand All: All pay items will expand and appear in this window.

Collapse All: Fold all pay items.

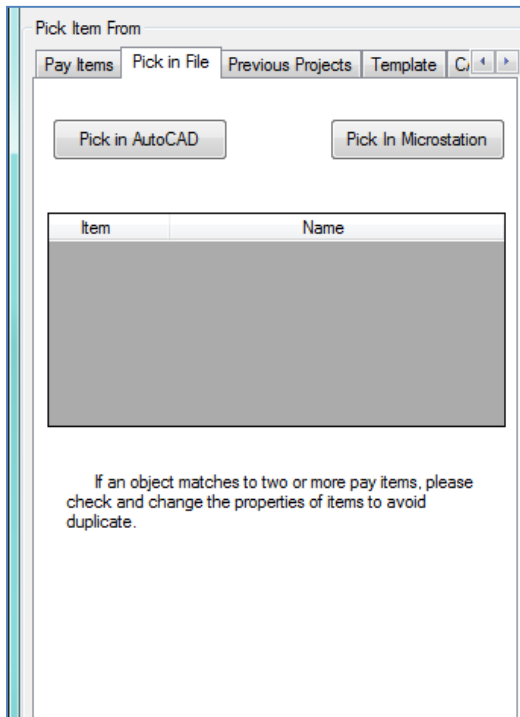
Item Detail: All data related to a pay item will appear in the window, including basic information, its properties that are defined in *AutoCAD* and/or *MicroStation*.

Open Item Reference: Open the reference book that contains the selected pay item.

Search Pay Item: Open Search Pay Item Window, and input part of the pay item name, all pay items contain the those letter will be listed, double click a pay item, it will be imported to datagrid.

Procedure 2: Pick Pay Items from CAD Files (Pick in File)

This procedure is used when CAD properties are set for all pay items but only some of the objects from CAD files are needed for a project. Users can just select and import the objects that are needed from CAD files. The system can identify the object and import all pay items related to the object into a new project.



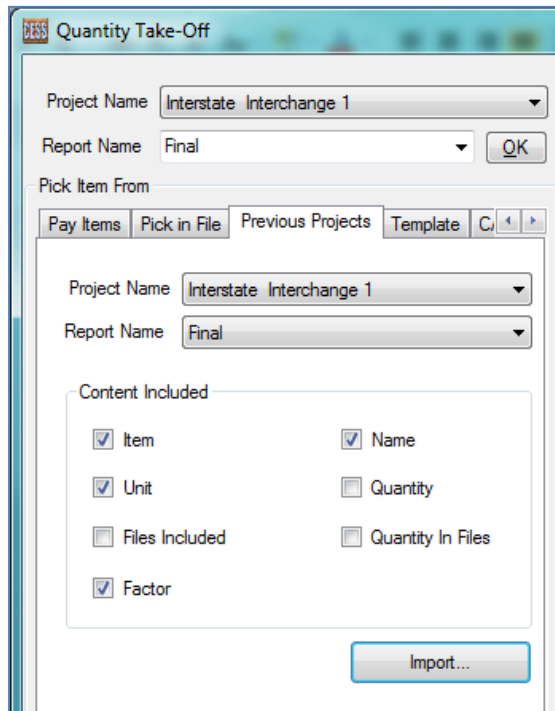
1. Click the **Pick in AutoCAD** button, move the mouse to an AutoCAD drawing and select an object. If the object contains one pay item, then the pay items will be automatically imported to the data grid.

Select an object in a *MicroStation* file, then Click **Pick in MicroStation** button, if the object contains one pay items, then the pay items will be automatically imported to the data grid.

In the event that an object contains multiple pay items, all related pay items will be listed in the data grid for users to select from the list.

Procedure 3: Import Pay Items from Previous Projects (Previous Projects)

This procedure is used when the current project is similar with previous projects. Users can simply select the previous projects and all pay items applied in the project will be imported to the current project. This procedure can be conveniently and effectively applied for projects with multiple phases. The pictures below demonstrate how it works.



Select the name of a previous project and report.

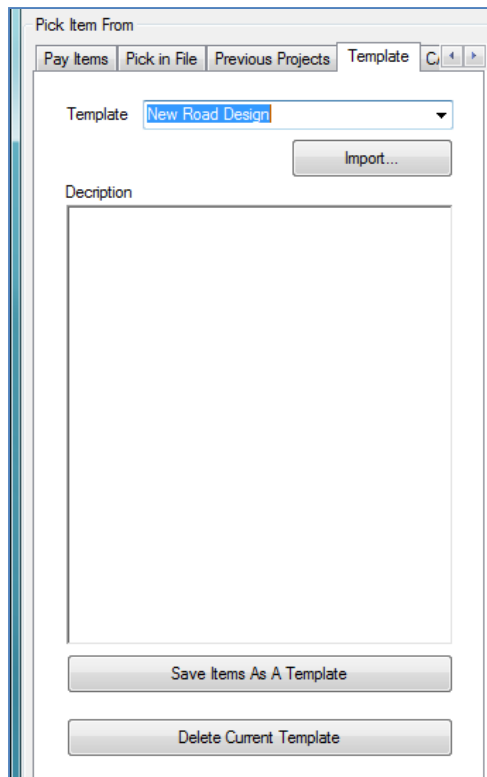
Select the content to be imported for the new report. Note that the default setting includes items, name, unit, and factor.

Click the **Import** button, all items will be automatically imported and included in the new report.

In the event that multiple pay items are needed, switch to the **All Items** tab and import one item at a time by double clicking the item. Repeat the process until all needed pay items have been imported.

Procedure 4: Import Pay Items from Established Templates (Template)

Users can make templates for different types of projects to ensure consistency and save time for future use. The pictures below demonstrate the process to make this work.



Select a template from the drop down box, and click the **Import** button. All items in the template will be imported and included in the new report with the descriptions of the selected template displayed in the text box.

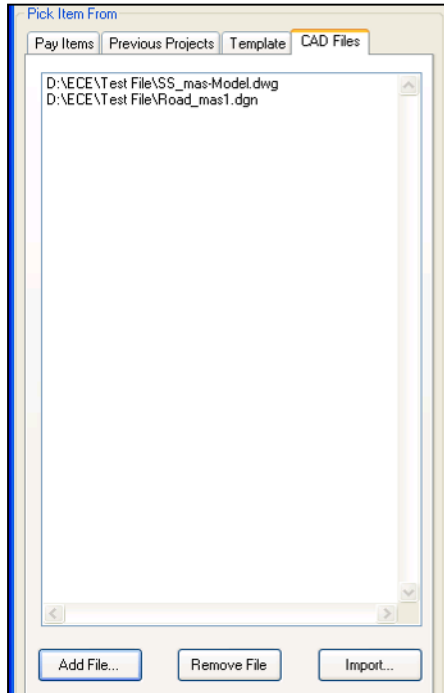
In the event that multiple pay items are needed, users can either input directly, or switch to the **All Items** tab and then select the pay items accordingly.

Save Items As a Template: All items listed in the data grid can be set as a new template for future uses. Specify a name for the new template in the text box before performing this function.

Delete Current Template: To delete an existing template, select the template and click the **Delete Current Template** button. Caution: This action will delete the template permanently.

Procedure 5: Import Pay Items from Existing CAD Files (CAD Files)

This procedure is used when a user chooses to use existing CAD files which contain the pay items that are needed for quality take-off. The system will search all pay items information and applied to the current project. This procedure typically requires more time than the other four procedures that are described above.



Click the **Add File...** button and select the CAD files (*.DWG, *.DXF and *.DGN) that contain the pay items for the cost estimation. All existing files are provided in the list box.

Click the **Import...** button, all pay items that are contained in the CAD files will be automatically imported to the data grid.

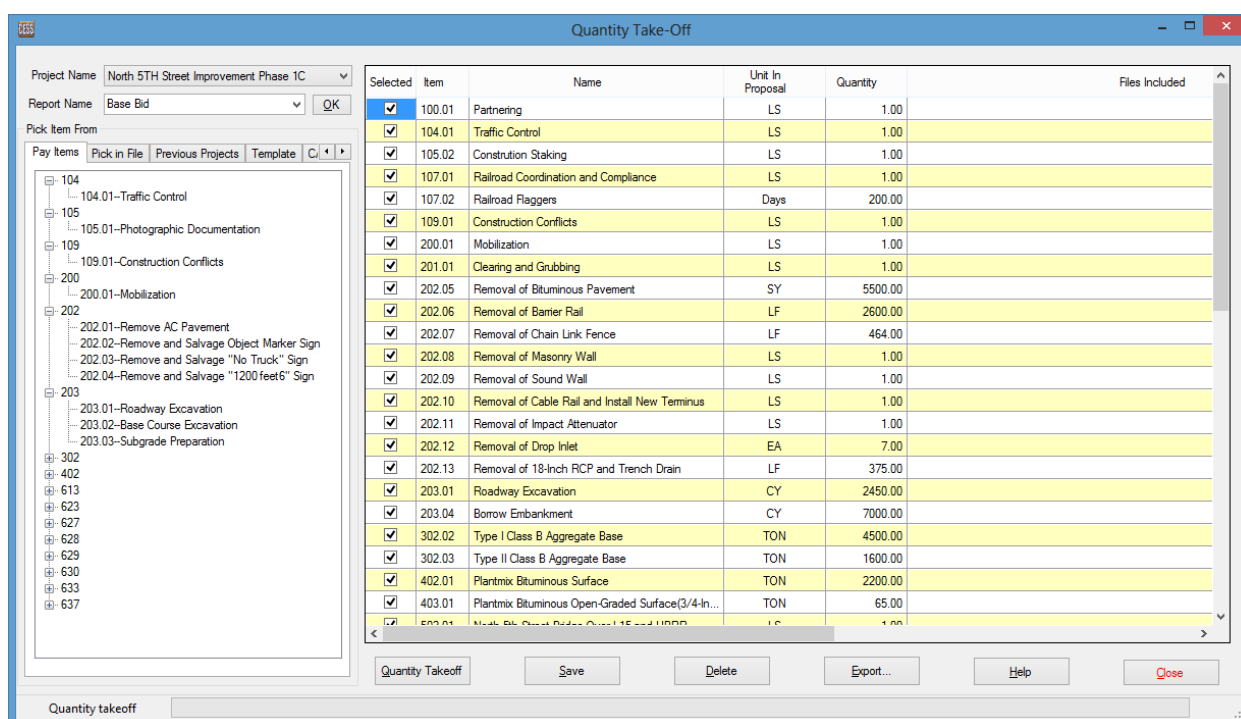
To remove a file from the list box, select the file from the list box, and then click the **Remove File** button.

Note: This is the most efficient way of importing data if all pay items in the CAD files follow the standard format.

4.2 Method 1: Quantity Takeoff with Pay Items Imported from Multiple CAD Files

4.2.1 Seven-Step Procedure

In this sub-module, users can import pay items that are contained in *AutoCAD* and *MicroStation* files concurrently. Setting the unit and properties of pay items is a critical step, and once set, the quantity takeoff is practically effortless from users' perspective as the task is accomplished through a highly automated process. The window below depicts the quantity takeoff interface when pay items are imported from multiple CAD files:



The preparation effort for quantity takeoff is very straight forward and can be achieved by following the seven-step procedure as summarized below:

Step 1: Select a project name from the drop down combo box. Once a project is selected, all possible pay items allowed by the specified agency are listed in the tree view window.

Step 2: Select or input the report name. For an existing report, select the report from the drop down combo box, all pay items included in the report will be listed in the data grid. To create a new report, type the report name, and then press **Enter** key or click **OK** button. Whenever necessary, a quantity takeoff report can also be deleted by clicking the **Delete** button.

Step 3: Select the pay items that are needed to generate a new cost estimate report, or change the pay items to revise an existing cost estimate report. Users can remove an unnecessary pay item from the data grid view by double clicking the item. By default, all pay items are selected to proceed to the next step. However, this interface allows users to exclude the unnecessary pay items for quantity takeoff by clicking the check box in the first column of the table as shown below.

Step 4: Select CAD files for each pay item, following show how to add, delete files for each pay item.

a). Click the **Add...** button and select file for each pay item.

Selected	Item	n :al	Quantity	Files Included	Select File	Delete	Unit In CAD	Quantity in files	Factor
<input checked="" type="checkbox"/>	30202.0500		0		Add...	Del...	SQYD	0	1.00
<input checked="" type="checkbox"/>	63401.0900		0		Add...	Del...	LNFT	0	1.00
<input checked="" type="checkbox"/>	63406.0300		0		Add...	Del...	EACH	0	1.00
<input checked="" type="checkbox"/>	63502.0800		0		Add...	Del...	EACH	0	1.00

b). Click the **Del...** button to remove files for a pay item.

Selected	Item	n :al	Quantity	Files Included	Select File	Delete	Unit In CAD	Quantity in files	Factor
<input checked="" type="checkbox"/>	30202.0500		0		Add...	Del...	SQYD	0	1.00
<input checked="" type="checkbox"/>	63401.0900		0		Add...	Del...	LNFT	0	1.00
<input checked="" type="checkbox"/>	63406.0300		0		Add...	Del...	EACH	0	1.00
<input checked="" type="checkbox"/>	63502.0800		0		Add...	Del...	EACH	0	1.00

c). Click the column header **[Select File]** as shown in the screenshot below, the selected file will be applied for all pay items listed in the data grid.

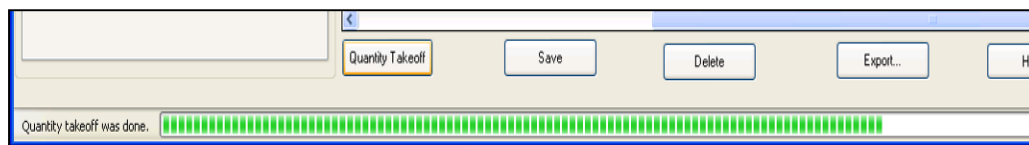
Selected	Item	n :al	Quantity	Files Included	Select File	Delete	Unit In CAD	Quantity in files	Factor
<input checked="" type="checkbox"/>	30202.0500		0		Add...	Del...	SQYD	0	1.00
<input checked="" type="checkbox"/>	63401.0900		0		Add...	Del...	LNFT	0	1.00
<input checked="" type="checkbox"/>	63406.0300		0		Add...	Del...	EACH	0	1.00
<input checked="" type="checkbox"/>	63502.0800		0		Add...	Del...	EACH	0	1.00

d). Click the column header **[Delete]** as shown in the screenshot below, all files are removed for all pay items.

Selected	Item	n :al	Quantity	Files Included	Select File	Delete	Unit In CAD	Quantity in files	Factor
<input checked="" type="checkbox"/>	30202.0500		0		Add...	Del...	SQYD	0	1.00
<input checked="" type="checkbox"/>	63401.0900		0		Add...	Del...	LNFT	0	1.00
<input checked="" type="checkbox"/>	63406.0300		0		Add...	Del...	EACH	0	1.00
<input checked="" type="checkbox"/>	63502.0800		0		Add...	Del...	EACH	0	1.00

Step 5: Once files are selected for all pay items, click the **Quantity Takeoff** button, and the system will analyze the data automatically with the progress bar indicating the status as shown in the screenshot below:

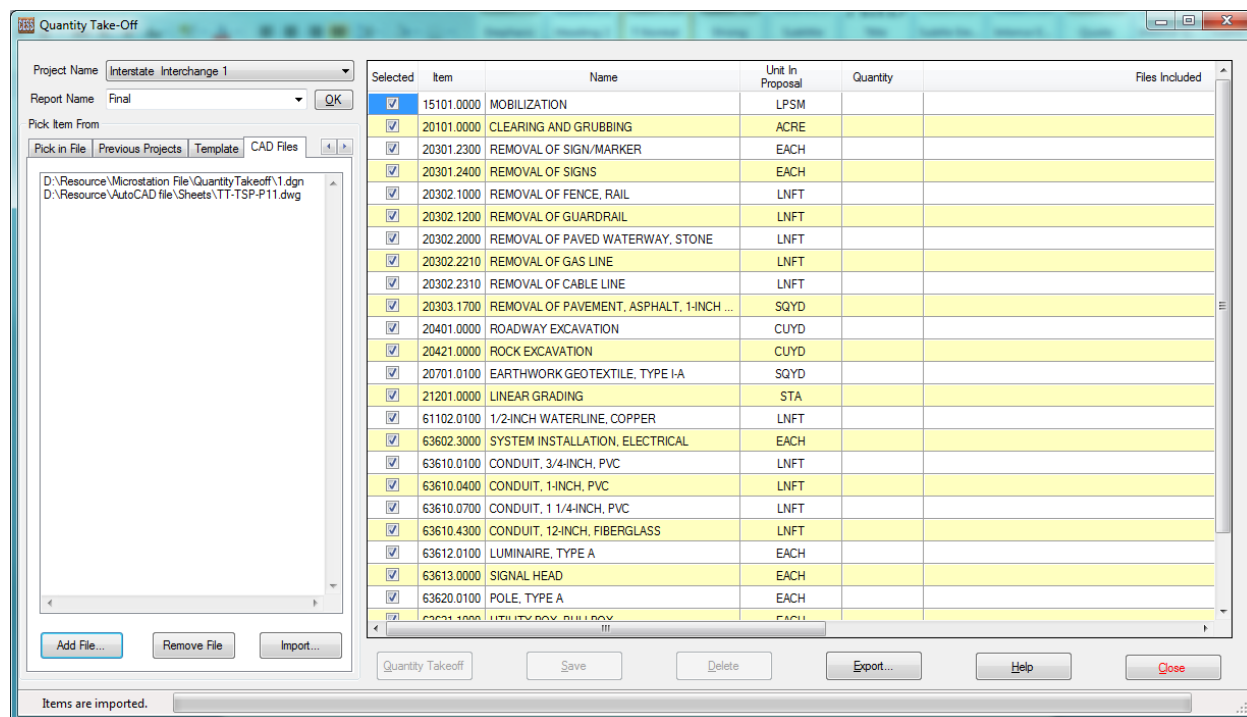
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Step 6: Once the quantity takeoff process is completed, a confirmation window will appear. Click the **Yes** button to save the results. Users also have the option to save the results later.

Note that users can also choose to manually edit the data in the data grid to reflect a special condition and/or preference. However, it is not recommended as manual editing could potentially introduce inconsistency and/or human errors.

For demonstration purposes, the window below shows a sample report of the quantity takeoff process:

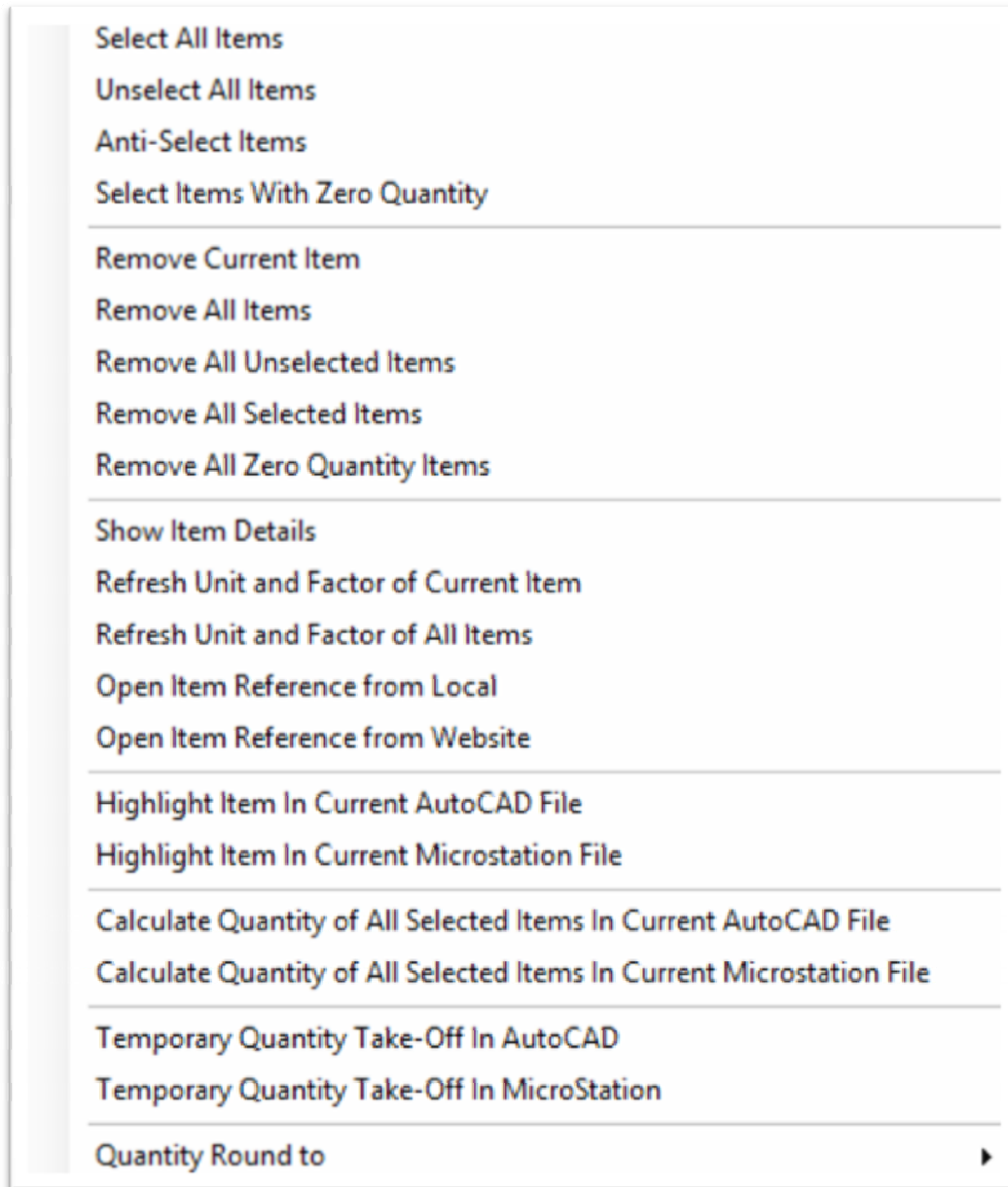


Step 7: To improve efficiency and avoid human errors, ICE Software package provides users with an automated feature to export all quantity takeoff results into an Excel file by clicking the **Export...** button.

4.2.2 Additional Functions

CESS, LLC. is committed to improving efficiency and serving its clients' unique needs through a constant effort to continue to enhance the features and functionalities of its software solutions. As a result, additional features and functions are being developed

and added to our smart solutions as our clients and ICE Software related applications continue to grow over the years. Currently, there are 15 such additional functions included in the **Calculation & Analysis Module**. Users can right click on the data grid to access these additional functions from the window shown below:



With these additional functions, users can easily and effectively select or remove pay items, obtain pay item information, perform quantity takeoff for individual pay items, or highlight selected pay items in CAD files. Additionally, these functions can also help users to perform quick and rough cost estimates for engineering planning, funding programming, and/or preliminary analysis purposes.

For the purpose of assisting users to take advantage of the full potential of the ICE Software, an intuitive and easy-to-follow process is developed and implemented in this interface. Most of these functions are self-explanatory except the ones listed below:

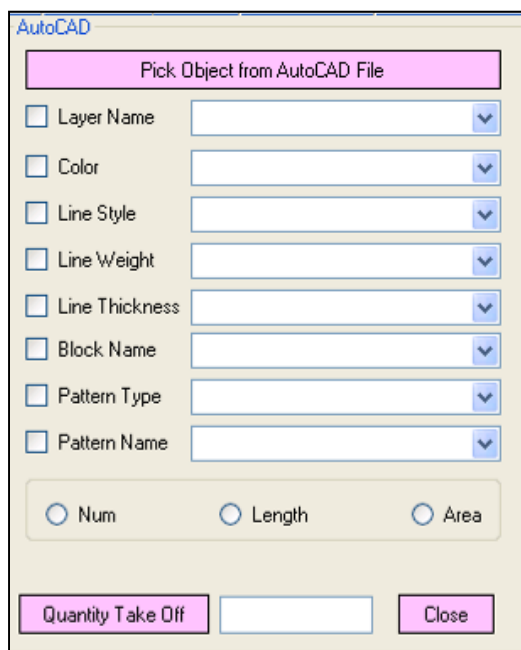
Highlight Item in Current AutoCAD File - This function can be used to highlight an item in an active *AutoCAD* file, or to check for conformity of the item with the set standards.

Highlight Item in Current MicroStation File - This function can be used to highlight an item in an active *MicroStation* file, or to check for conformity of the item with the set standards.

Calculate Quantity of All Selected Objects in Current AutoCAD File - Even if the properties of the objects are not set in *AutoCAD*, this function enables users to quickly calculate the quantity of the selected objects.

Calculate Quantity of All Selected Items In Current MicroStation File - Even if properties of items are not set in *MicroStation*, this function enables users to quickly calculate the quantity of the selected items.

Quick and Rough Quantity Takeoff in AutoCAD Files



The screenshot shows a dialog box titled "AutoCAD" with a pink header bar that says "Pick Object from AutoCAD File". Below the header are eight rows, each with a checkbox and a dropdown menu: "Layer Name", "Color", "Line Style", "Line Weight", "Line Thickness", "Block Name", "Pattern Type", and "Pattern Name". At the bottom of the dialog are three radio buttons labeled "Num", "Length", and "Area". At the very bottom are three buttons: "Quantity Take Off", a text input field, and "Close".

Click the Pick Object from AutoCAD File button.

Determine which properties will be applied to identify the object in the quantity takeoff.

Select the type of quantity, i.e., number, length, or area. Once an object is selected, the type of quantity is set by the system.

Click the **Quantity Takeoff** button, the result will show in the Text Box.

Click the **Close** button to close the window.

Quick and Rough Quantity Takeoff in MicroStation Files

The screenshot shows a dialog box titled "Microstation" with a pink header bar containing the text "Pick Object from Microstation File". Below the header, there are seven rows of checkboxes and dropdown menus: "Level Name", "Color", "Line Style", "Line Weight", "Cell Name", "Hatch Type", and "Hatch Name". Each row has a checkbox on the left and a dropdown menu on the right. Below these rows, there are three radio buttons labeled "Num", "Length", and "Area". At the bottom of the dialog, there are three buttons: "Quantity Take Off" (pink), a white text box, and "Close" (pink).

Select an object in *MicroStation*, and then click the **Pick Object from MicroStation File** button.

Determine which properties will be applied to identify the object in the quantity takeoff.

Select the type of quantity: i.e., number, length, or area.

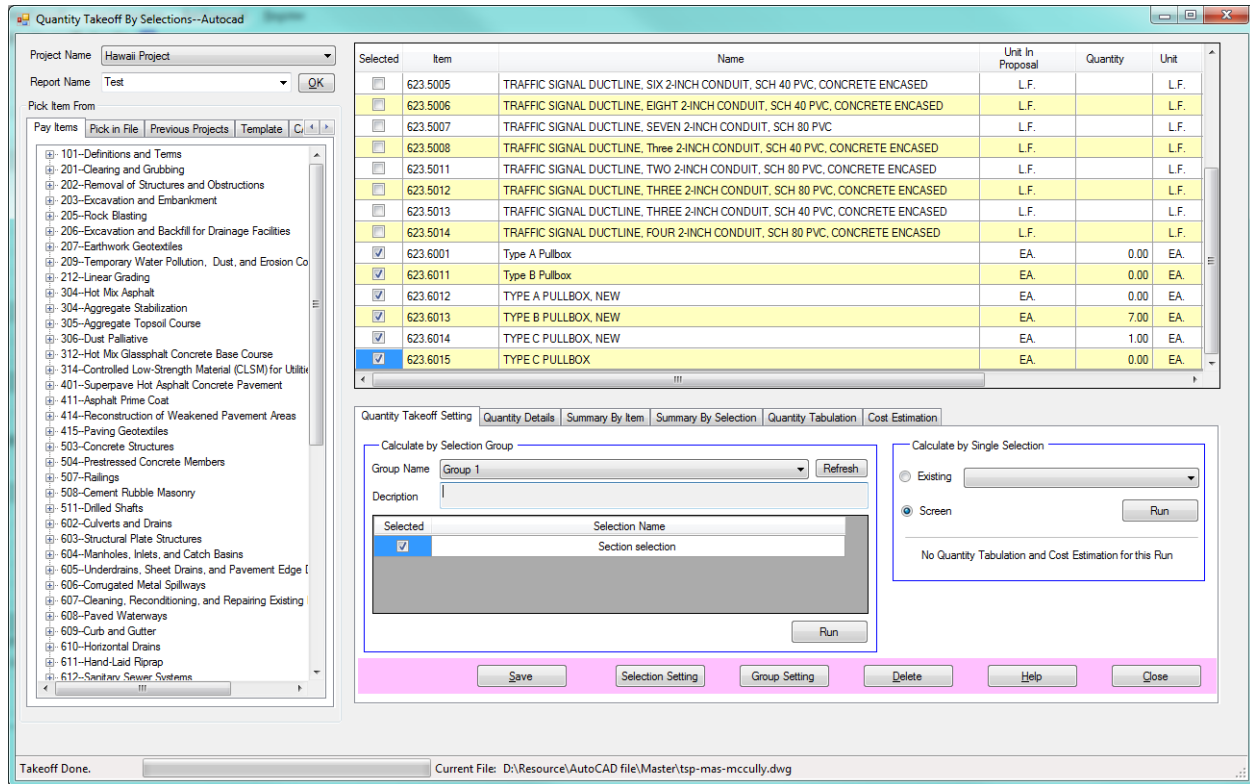
Click the **Quantity Takeoff** button, the result will show in the text box.

Click the **Close** button to close the window.

It is important to note that, only items in the design file will be counted, and items in the references will not be counted, and all counted item will be highlighted.

4.3 Method 2: Quantity Takeoff with Pay Items Imported from AutoCAD Files

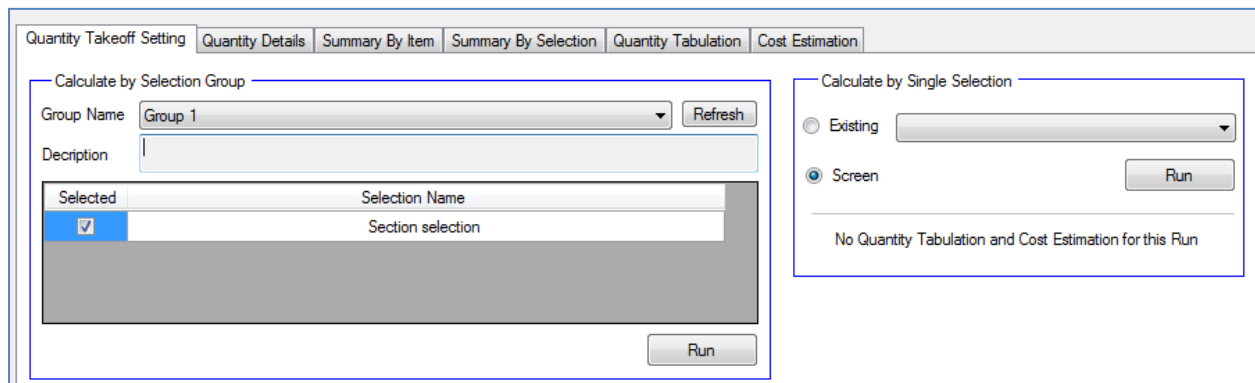
In this sub-module, users can perform the quantity takeoff task based on the selection or range in an *AutoCAD* file. The main interface of this sub-module is shown below:



Unlike the interface described in the previous section, this sub-module includes six tabs: Quantity takeoff setting, Quantity Details, Summary by Item, Summary by Selection, Quantity Tabulation, and Cost Estimation.

NOTE: UCS (i.e., User Coordinate System) of AutoCAD file needs to be set as WORLD before analysis.

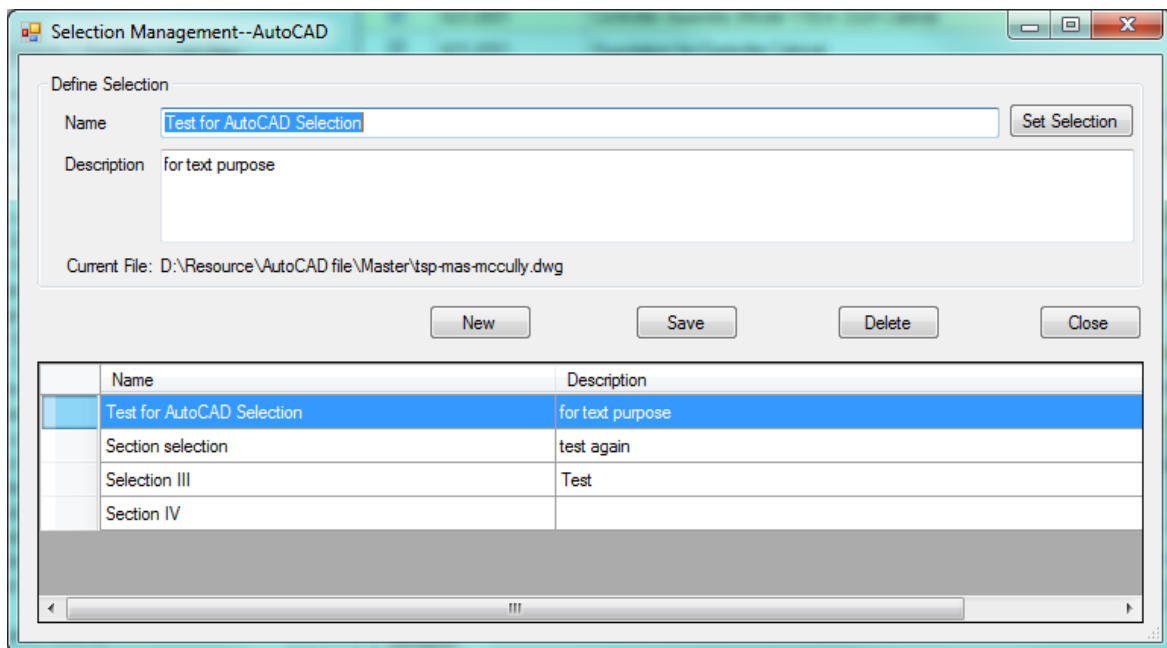
The picture below is the screenshot for the **Quantity Takeoff Setting** tab:



Under this tab, users can determine the calculation based on either single or group selections. A selection has to be created prior to initiating the quantity takeoff process. Summarized below are the procedures for creating single and group of selections.

A) Create Single Selection

Click the **Selection Setting** button to create or update single selection.

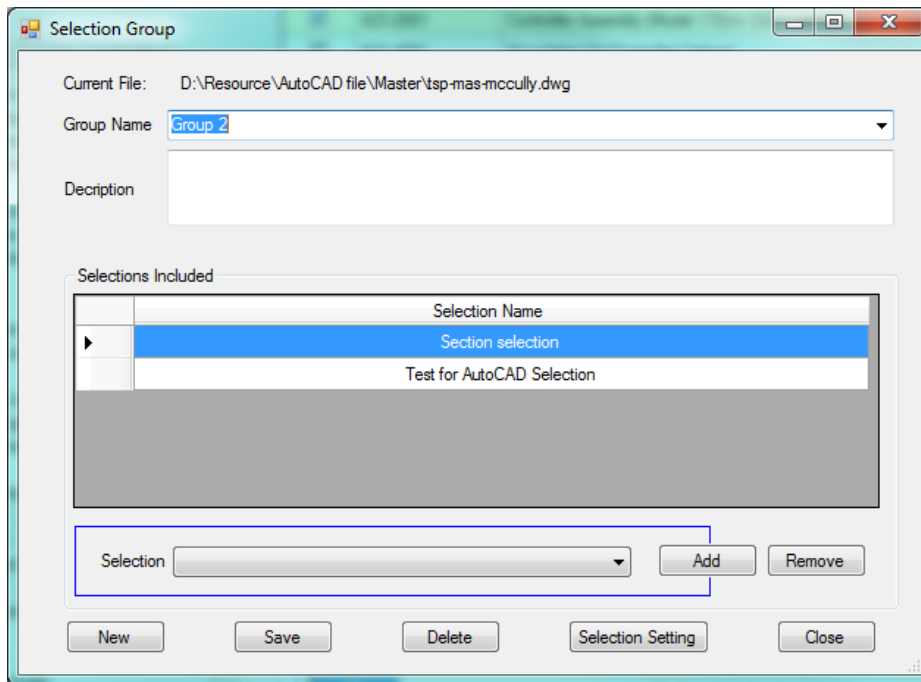


Click the **New** button and input the selection name. Click the **Set Selection** button, move the mouse to an *AutoCAD* file and select a closed polygon. Click the **Save** button to save the changes.

To delete the existing selection, click the selection in the data grid, then click the **Delete** button.

B) Create Group Selection

Click the **Group Setting** button and the group setting interface appears as shown below:



Click the **New** button to create a new selection group, and input the group name and descriptions.

Select the selection from the combo box, click the **Add** or **Remove** button in the data grid to make revisions.

Click the **Save** button to save the changes for the group.

Click the **Delete** button to delete selection group.

Click **Selection Setting** button to open the selection interface.

When the selection group is selected, click the **Run** button to initiate the quantity takeoff process.

Shown below is the screenshot for **Quantity Details** tab:

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Quantity Takeoff Setting						
Quantity Details						
Summary By Item						
Summary By Selection						
Quantity Tabulation						
Cost Estimation						
Item	Name	Quantity	Unit	Selection Name	East of BeginPoint (X)	
623.6013	TYPE B PULLBOX, NEW	1.00	EA.	Section selection	244.544	
623.6013	TYPE B PULLBOX, NEW	1.00	EA.	Section selection	266.784	
623.6013	TYPE B PULLBOX, NEW	1.00	EA.	Section selection	176.960	
623.6013	TYPE B PULLBOX, NEW	1.00	EA.	Section selection	180.660	
623.6013	TYPE B PULLBOX, NEW	1.00	EA.	Section selection	271.360	
623.6013	TYPE B PULLBOX, NEW	1.00	EA.	Section selection	247.753	
623.6013	TYPE B PULLBOX, NEW	1.00	EA.	Section selection	199.222	
623.6014	TYPE C PULLBOX, NEW	1.00	EA.	Section selection	205.962	

In this tab, items are defined by various criteria, including item No., item name, quantity, unit, selection name, as well as x and y coordinates describing the location of the object in a CAD drawing.

Shown below is the screenshot for the **Summary by Item** tab. Users can select a type of pay item and all items of the same type in the *AutoCAD* drawing will be listed. Example follows:

Quantity Takeoff Setting								
Quantity Details								
Summary By Item								
Summary By Selection								
Quantity Tabulation								
Cost Estimation								
Item Name:		TYPE B PULLBOX, NEW		Total:		7.00		Export...
Item	Quantity	Unit	Selection Name	East of BeginPoint (X)	North of Begin Point (Y)	East of EndPoint (X)	North of End Point (Y)	
623.6013	1.00	EA.	Section selection	244.544	546.902			
623.6013	1.00	EA.	Section selection	266.784	567.860			
623.6013	1.00	EA.	Section selection	176.960	569.238			
623.6013	1.00	EA.	Section selection	180.660	621.848			
623.6013	1.00	EA.	Section selection	271.360	621.404			
623.6013	1.00	EA.	Section selection	247.753	637.999			
623.6013	1.00	EA.	Section selection	199.222	547.084			

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Shown below is the screenshot for **Summary by Selection** tab. Choose a selection name from the combo box, all items in the selection will be listed. An example follows:

Item	Name	Quantity	Unit	East of BeginPoint (X)	North of Begin Point (Y)	East of EndPoint (X)
623.6013	TYPE B PULLBOX, NEW	1.00	EA.	244.544	546.902	
623.6013	TYPE B PULLBOX, NEW	1.00	EA.	266.784	567.860	
623.6013	TYPE B PULLBOX, NEW	1.00	EA.	176.960	569.238	
623.6013	TYPE B PULLBOX, NEW	1.00	EA.	180.660	621.848	
623.6013	TYPE B PULLBOX, NEW	1.00	EA.	271.360	621.404	
623.6013	TYPE B PULLBOX, NEW	1.00	EA.	247.753	637.999	
623.6013	TYPE B PULLBOX, NEW	1.00	EA.	199.222	547.084	
623.6014	TYPE C PULLBOX, NEW	1.00	EA.	205.962	637.893	

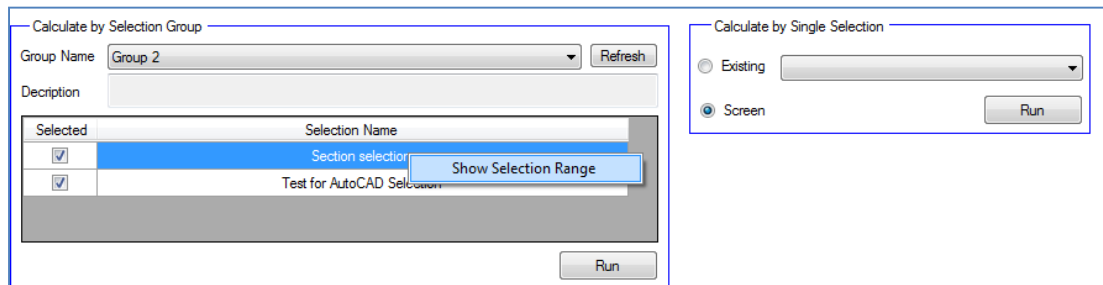
Shown below is the screenshot for **Quantity Tabulation** tab. In this tab, all quantities are summarized by pay item type and by selection.

Item No.	Item Name	Unit	Section selection	Total
623.5012	TRAFFIC SIGNAL DUCTLINE, THRE...	L.F.		0.00
623.5013	TRAFFIC SIGNAL DUCTLINE, THRE...	L.F.		0.00
623.5014	TRAFFIC SIGNAL DUCTLINE, FOUR ...	L.F.		0.00
623.6001	Type A Pullbox	EA.		0.00
623.6011	Type B Pullbox	EA.		0.00
623.6012	TYPE A PULLBOX, NEW	EA.		0.00
623.6013	TYPE B PULLBOX, NEW	EA.	7.00	7.00
623.6014	TYPE C PULLBOX, NEW	EA.	1.00	1.00
623.6015	TYPE C PULLBOX	EA.		0.00

Click the **Cost Estimation** button; all current prices that were previously set for pay items are listed. The interface provides users the flexibility to perform cost estimates by selection, items, or total. The results will be listed under the **Cost Estimation** tab.

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As shown in the screenshot below, this interface also provides an effective tool for users to validate a selection range.



Move the mouse to the data grid and right click on selection, the function **Show Selection Range** will appear. Click the function, a closed polygon which represents the range of selection will be automatically drawn in the *AutoCAD* file.

This interface also provides users with the flexibility to perform quantity takeoff by a single selection or from the screen.

To perform quantity takeoff by a single selection, click the “**Existing**” Radio button and choose the selection from the combo box, and then click the **Run** button.

To perform quantity takeoff by the screen, click the “**Screen**” Radio button and then the **Run** button. Move the mouse to the screen and select the objects from the screen. Be sure to press the **Enter** key after select the items to perform this function.

4.4 Method 3: Quick Quality Takeoff for Items in AutoCAD Files

This module was developed to provide users with an effective tool for performing quick and rough cost estimates from an existing CAD drawing. Such a tool has proven to be very handy and helpful for engineering planning, funding programming, and preliminary design purposes.

The screenshot shows a dialog box titled "AutoCAD" with a pink header bar that says "Pick Object from AutoCAD File". Below the header, there are eight checkboxes, each followed by a text input field and a dropdown arrow: "Layer Name", "Color", "Line Style", "Line Weight", "Line Thickness", "Block Name", "Pattern Type", and "Pattern Name". Below these are three radio buttons labeled "Num", "Length", and "Area". At the bottom, there are three buttons: "Quantity Take Off" (pink), a white text input field, and "Close" (pink).

Click the Pick Object from AutoCAD File button.

Select the properties to be used to identify the objects with the same properties in the quantity takeoff process.

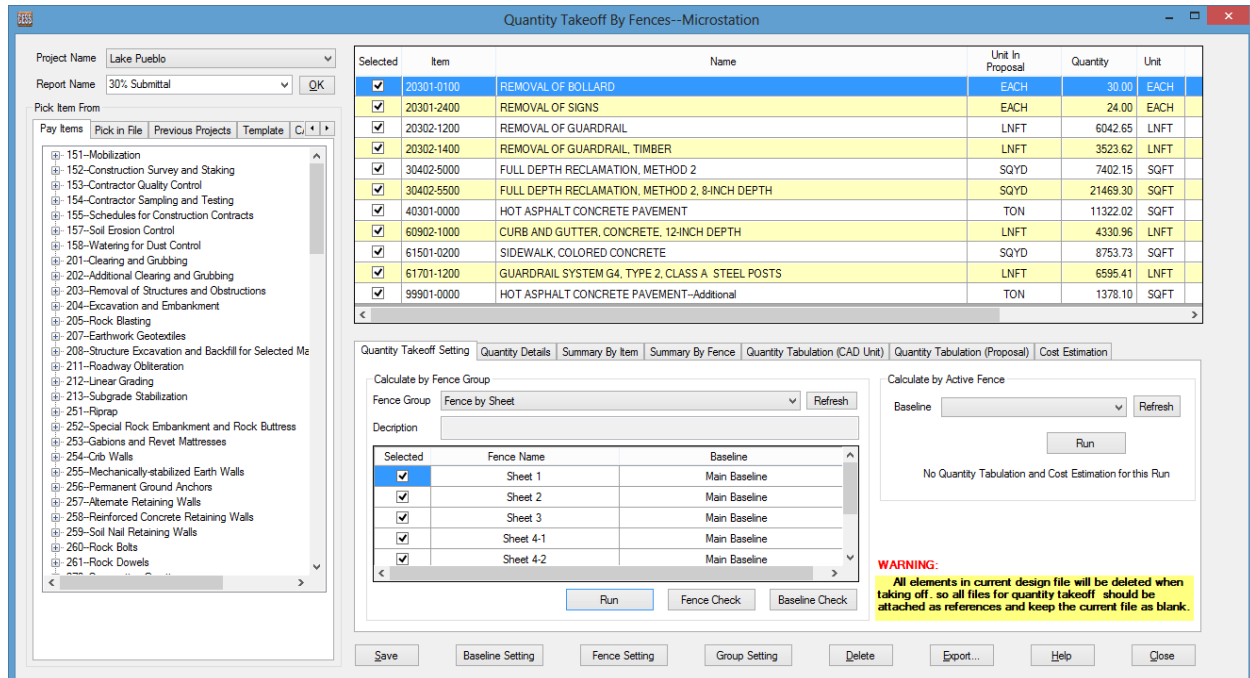
Select the type of quantity to be calculated, such as, number, length, or area.

Click the **Quantity TakeOff** button, the total quantity of the same type of objects that are contained in the AutoCAD drawing will be calculated and displayed in the text box.

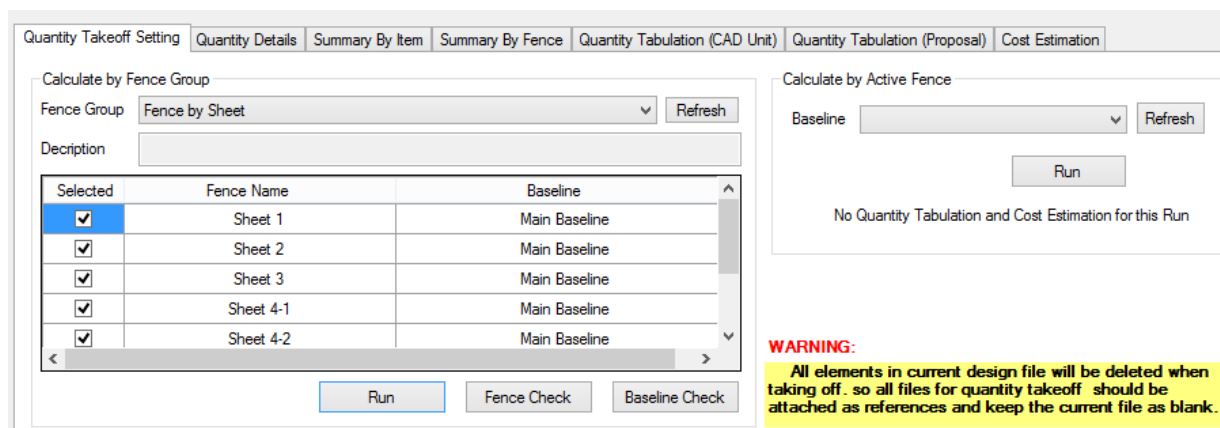
Click the **Close** button to close the window.

4.5 Method 4: Quantity Takeoff with Pay Items Imported from MicroStation

The window below shows the main interface of **Quantity Takeoff by Fence** with items imported from a *MicroStation* file. The left side of screenshot provides the project and report information, as well as a pay items list, which was introduced in **Quantity takeoff** section. The right bottom part of the screen allows users to define a **Fence** to be applied in the quantity takeoff process.

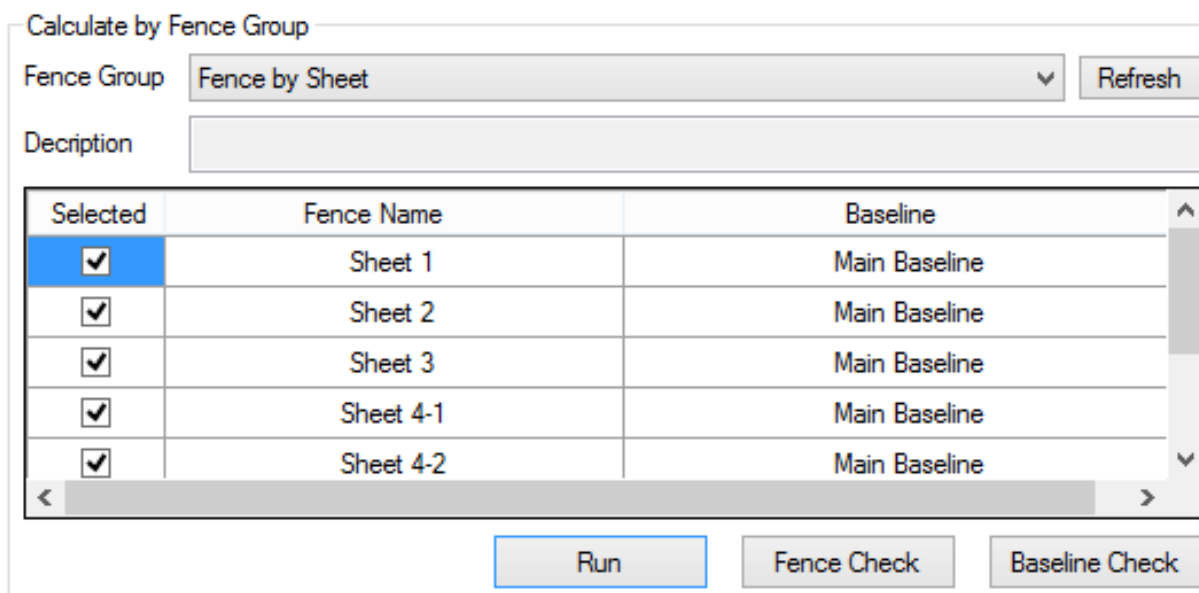


Similar to Method 2 as described in Section 4.3, this sub-module includes the following seven tabs: Quantity takeoff setting, Detail Summary, Summary by Item, Summary by Fence, Quantity Tabulation with CAD Unit, Quantity Tabulation with Proposal Unit and Cost Estimation. Refer to the screenshot below for further details.



4.5.1 Quantity Takeoff Procedure

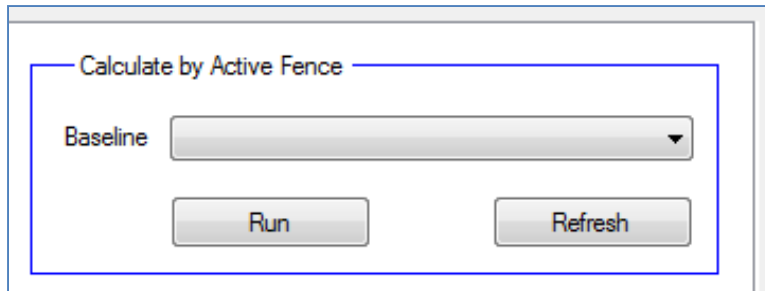
Click the **Quantity Takeoff Setting** tab, the following window will appear on the screen.



Users can select the fence group and fence names in the group from the data grid as shown above. Click the **Run** button, the quantity of all pay items listed in data grid will be calculated and displayed in the **Quantity Details** tab. Prior to clicking the **Run** button to perform any calculations, it is strongly recommended that users click the **Fence Check** button to validate the fences selected and click the **Baseline Check** button to validate the baselines.

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Quantity takeoff can also be performed based on an active fence in MicroStation. Such a task is very easy to accomplish with a highly automated process provided in this module. As shown in the screenshot below, users can select the baseline and click the **Run** button.



The screenshot shows the "Quantity Takeoff By Fences--Microstation" window. The "Selected" list includes the following items:

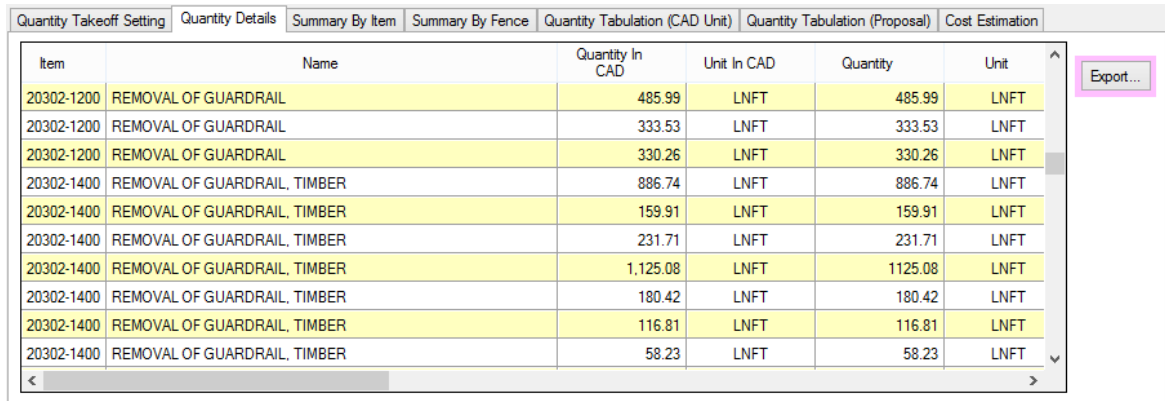
Selected	Item	Name	Unit In Proposal	Quantity	Unit
<input checked="" type="checkbox"/>	20301-0100	REMOVAL OF BOLLARD	EACH	30.00	EACH
<input checked="" type="checkbox"/>	20301-2400	REMOVAL OF SIGNS	EACH	24.00	EACH
<input checked="" type="checkbox"/>	20302-1200	REMOVAL OF GUARDRAIL	LNFT	6042.65	LNFT
<input checked="" type="checkbox"/>	20302-1400	REMOVAL OF GUARDRAIL, TIMBER	LNFT	3523.62	LNFT
<input checked="" type="checkbox"/>	30402-5000	FULL DEPTH RECLAMATION, METHOD 2	SQYD	7402.15	SQFT
<input checked="" type="checkbox"/>	30402-5500	FULL DEPTH RECLAMATION, METHOD 2, 8-INCH DEPTH	SQYD	21469.30	SQFT
<input checked="" type="checkbox"/>	40301-0000	HOT ASPHALT CONCRETE PAVEMENT	TON	11322.02	SQFT
<input checked="" type="checkbox"/>	60902-1000	CURB AND GUTTER, CONCRETE, 12-INCH DEPTH	LNFT	4330.96	LNFT
<input checked="" type="checkbox"/>	61501-0200	SIDEWALK, COLORED CONCRETE	SQYD	8753.73	SQFT
<input checked="" type="checkbox"/>	61701-1200	GUARDRAIL SYSTEM G4, TYPE 2, CLASS A STEEL POSTS	LNFT	6595.41	LNFT
<input checked="" type="checkbox"/>	99901-0000	HOT ASPHALT CONCRETE PAVEMENT--Additional	TON	1378.10	SQFT

The "Quantity Tabulation (CAD Unit)" tab is active, showing the following data:

Item	Name	Quantity In CAD	Unit In CAD	Quantity	Unit
20302-1200	REMOVAL OF GUARDRAIL	485.99	LNFT	485.99	LNFT
20302-1200	REMOVAL OF GUARDRAIL	333.53	LNFT	333.53	LNFT
20302-1200	REMOVAL OF GUARDRAIL	330.26	LNFT	330.26	LNFT
20302-1400	REMOVAL OF GUARDRAIL, TIMBER	886.74	LNFT	886.74	LNFT
20302-1400	REMOVAL OF GUARDRAIL, TIMBER	159.91	LNFT	159.91	LNFT
20302-1400	REMOVAL OF GUARDRAIL, TIMBER	231.71	LNFT	231.71	LNFT
20302-1400	REMOVAL OF GUARDRAIL, TIMBER	1,125.08	LNFT	1125.08	LNFT
20302-1400	REMOVAL OF GUARDRAIL, TIMBER	180.42	LNFT	180.42	LNFT
20302-1400	REMOVAL OF GUARDRAIL, TIMBER	116.81	LNFT	116.81	LNFT
20302-1400	REMOVAL OF GUARDRAIL, TIMBER	58.23	LNFT	58.23	LNFT

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Once the quantity takeoff is done, details of all items will list in the **Quantity Details** tab. Click the **Export** button, the result will be automatically exported into a spreadsheet file.



Item	Name	Quantity In CAD	Unit In CAD	Quantity	Unit
20302-1200	REMOVAL OF GUARDRAIL	485.99	LNFT	485.99	LNFT
20302-1200	REMOVAL OF GUARDRAIL	333.53	LNFT	333.53	LNFT
20302-1200	REMOVAL OF GUARDRAIL	330.26	LNFT	330.26	LNFT
20302-1400	REMOVAL OF GUARDRAIL, TIMBER	886.74	LNFT	886.74	LNFT
20302-1400	REMOVAL OF GUARDRAIL, TIMBER	159.91	LNFT	159.91	LNFT
20302-1400	REMOVAL OF GUARDRAIL, TIMBER	231.71	LNFT	231.71	LNFT
20302-1400	REMOVAL OF GUARDRAIL, TIMBER	1,125.08	LNFT	1125.08	LNFT
20302-1400	REMOVAL OF GUARDRAIL, TIMBER	180.42	LNFT	180.42	LNFT
20302-1400	REMOVAL OF GUARDRAIL, TIMBER	116.81	LNFT	116.81	LNFT
20302-1400	REMOVAL OF GUARDRAIL, TIMBER	58.23	LNFT	58.23	LNFT

Click the **Summary by Item** tab, detailed information by items will be provided as shown in the screenshot below. Click the **Export** button, the results will be exported into a spreadsheet file.

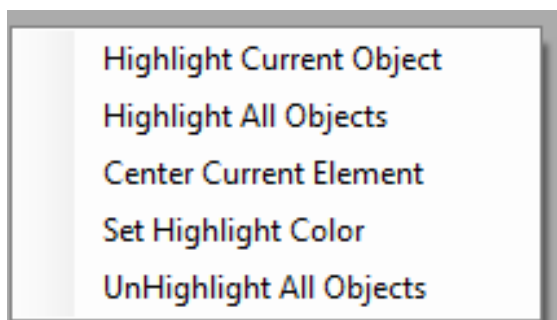
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Quantity Takeoff Setting Quantity Details Summary By Item Summary By Fence Quantity Tabulation (CAD Unit) Quantity Tabulation (Proposal) Cost Estimation							
Item Name: HOT ASPHALT CONCRETE PAVEMENT						Total: 280943.45	Export...
Item	Name	Quantity In CAD	Unit In CAD	Quantity	Unit	Fac	
40301-0000	HOT ASPHALT CONCRETE PAVEMENT	37,479.63	SQFT	1510.43	TON		
40301-0000	HOT ASPHALT CONCRETE PAVEMENT	40,295.13	SQFT	1623.89	TON		
40301-0000	HOT ASPHALT CONCRETE PAVEMENT	39,200.00	SQFT	1579.76	TON		
40301-0000	HOT ASPHALT CONCRETE PAVEMENT	11,200.00	SQFT	451.36	TON		
40301-0000	HOT ASPHALT CONCRETE PAVEMENT	31,319.66	SQFT	1262.18	TON		
40301-0000	HOT ASPHALT CONCRETE PAVEMENT	29,750.74	SQFT	1198.95	TON		
40301-0000	HOT ASPHALT CONCRETE PAVEMENT	8,396.99	SQFT	338.40	TON		
40301-0000	HOT ASPHALT CONCRETE PAVEMENT	8,396.99	SQFT	338.40	TON		
40301-0000	HOT ASPHALT CONCRETE PAVEMENT	35,704.31	SQFT	1438.88	TON		

Click the **Summary by Fence** tab and select a fence, detailed information on all pay items contained in the specified fence will appear as shown in the screenshot below. Click the **Export** button, the information will be exported into a spreadsheet file.

Quantity Takeoff Setting Quantity Details Summary By Item Summary By Fence Quantity Tabulation (CAD Unit) Quantity Tabulation (Proposal) Cost Estimation						
Fence: Sheet 2						Export...
Item	Name	Quantity In CAD	Unit In CAD	Quantity	Unit	Fac
20301-0100	REMOVAL OF BOLLARD	1.00	EACH	1	EACH	
20301-0100	REMOVAL OF BOLLARD	1.00	EACH	1	EACH	
20301-2400	REMOVAL OF SIGNS	1.00	EACH	1	EACH	
20301-2400	REMOVAL OF SIGNS	1.00	EACH	1	EACH	
20302-1200	REMOVAL OF GUARDRAIL	1,220.06	LNFT	1220.06	LNFT	
20302-1200	REMOVAL OF GUARDRAIL	51.26	LNFT	51.26	LNFT	
20302-1400	REMOVAL OF GUARDRAIL, TIMBER	159.91	LNFT	159.91	LNFT	
30402-5000	FULL DEPTH RECLAMATION, METHOD 2	10,568.76	SQFT	1174.30	SQYD	
30402-5500	FULL DEPTH RECLAMATION, METHOD 2, 8-INCH DEPTH	33,267.27	SQFT	3696.33	SQYD	

For the purpose of double check, the system provides a pop-up menu with shortcuts to five common operations available for the object under the tabs of Quantity Details, Summary By Item, and Summary By Fence. The pop-up menu will appear as follows after a right mouse button click in the data grid.



- Highlight Current Object:** Current object in the data grid will be highlighted.
- Highlight All Objects:** All objects in the data grid will be highlighted
- Center Current Element:** Current object in the data grid will be moved to the center of the screen.
- Set Highlight Color:** Set a color for highlighting purpose
- UnHighlight All Objects:** Unhighlight all objects in the Microstation

Click the **Quantity Tabulation with CAD Unit** tab, all quantities related to the specified pay items will be listed in the data grid with CAD Unit. The picture below is a sample:

Item No.	Item Name	Unit	Sheet 1	Sheet 2	Sheet 3	Sheet 4-1	Sheet 4-2
20301-0100	REMOVAL OF BOLLARD	EACH	6.00	2.00			2.00
20301-2400	REMOVAL OF SIGNS	EACH	4.00	2.00	2.00		2.00
20302-1200	REMOVAL OF GUARDRAIL	LNFT	637.52	1271.33	489.44	390.38	281.4
20302-1400	REMOVAL OF GUARDRAIL, TIMBER	LNFT	886.74	159.91	1537.20	175.03	764.7
30402-5000	FULL DEPTH RECLAMATION, METH...	SQFT	10902.89	10568.76	10843.69	3263.24	7898.1
30402-5500	FULL DEPTH RECLAMATION, METH...	SQFT	30191.76	33267.27	31049.50	8733.80	21857.7
40301-0000	HOT ASPHALT CONCRETE PAVEM...	SQFT	37479.63	40295.13	39200.00	11200.00	61070.4
60902-1000	CURB AND GUTTER, CONCRETE, 1...	LNFT	918.20	833.71	1400.31	401.78	776.9
61501-0200	SIDEWALK, COLORED CONCRETE	SQFT	11224.67	11019.01	11199.54	3218.29	16919.2

Click the **Quantity Tabulation with Proposal Unit** tab, all quantities related to the specified pay items will be listed in the data grid with Proposal Unit. The picture below is a sample:

Item No.	Item Name	Unit	Sheet 1	Sheet 2	Sheet 3	Sheet 4-1	Sheet 4-2
20301-0100	REMOVAL OF BOLLARD	EACH	6.00	2.00			2.00
20301-2400	REMOVAL OF SIGNS	EACH	4.00	2.00	2.00		2.00
20302-1200	REMOVAL OF GUARDRAIL	LNFT	637.53	1271.32	489.44	390.38	281.4
20302-1400	REMOVAL OF GUARDRAIL, TIMBER	LNFT	886.74	159.91	1537.21	175.04	764.7
30402-5000	FULL DEPTH RECLAMATION, METH...	SQYD	1211.42	1174.30	1204.84	362.58	877.5
30402-5500	FULL DEPTH RECLAMATION, METH...	SQYD	3354.61	3696.33	3449.91	970.41	2428.6
40301-0000	HOT ASPHALT CONCRETE PAVEM...	TON	1510.43	1623.89	1579.76	451.36	2461.1
60902-1000	CURB AND GUTTER, CONCRETE, 1...	LNFT	918.20	833.71	1400.31	401.78	776.9
61501-0200	SIDEWALK, COLORED CONCRETE	SQYD	1247.17	1224.32	1244.38	357.58	1879.9

Click the **Cost Estimation** tab, the cost will be estimated. The picture below is a sample:

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ITEM				Sheet 1		Sheet 2		
Item No.	Name	Unit	Unit Price	Quantity	Amount	Quantity	Amount	Qu
20301-0100	REMOVAL OF B...	EACH	700.00	6.00	4,200.00	2.00	1,400.00	
20301-2400	REMOVAL OF SI...	EACH	850.00	4.00	3,400.00	2.00	1,700.00	
20302-1200	REMOVAL OF G...	LNFT	2.20	637.53	1,402.57	1,271.32	2,796.90	
20302-1400	REMOVAL OF G...	LNFT	2.00	886.74	1,773.48	159.91	319.82	1
30402-5000	FULL DEPTH R...	SQYD	1.60	1,211.42	1,938.27	1,174.30	1,878.88	1
30402-5500	FULL DEPTH R...	SQYD	2.40	3,354.61	8,051.06	3,696.33	8,871.19	3
40301-0000	HOT ASPHALT ...	TON	53.00	1,510.43	80,052.79	1,623.89	86,066.17	1
60902-1000	CURB AND GUT	LNFT	22.00	918.20	20,200.40	833.71	18,341.62	1

4.5.2 Baseline Management

The **Baseline Management** module was developed to assist users in the event that a new fence needs to be created. Shown below is the main screen for this module.

Define Baseline

Name:

Inverted First Point Station:

Description:

Element ID: 11582
 Current Project: Lake Pueblo
 Current File: C:\CESS\SampleData\Microstation Files\QT Lake\QT.dgn
 Parent File: HCL_02.dgn

Name	ElementID	FirstPointStation	ParentFile
Main Baseline	11582	1597+00	HCL_02.dgn

Copy Baseline From Other File

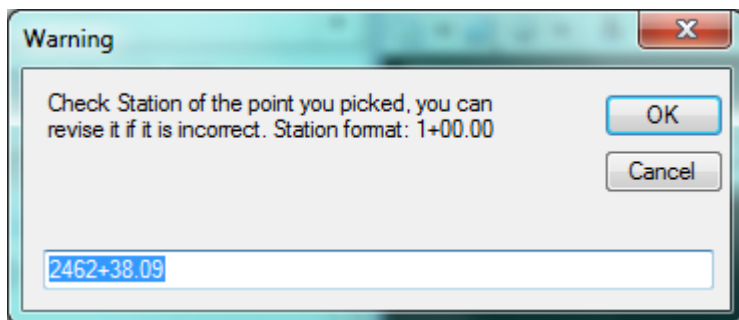
File:

Baseline:

Click the **Baseline Setting** button to create a new fence. When a *MicroStation* file is opened, the fence related to the file is loaded in the combo box. Users can setup a new

baseline in this window with the following steps: 1) specify the name for baseline, 2) select an object in the *MicroStation* file, and 3) click the **Set Baseline** button.

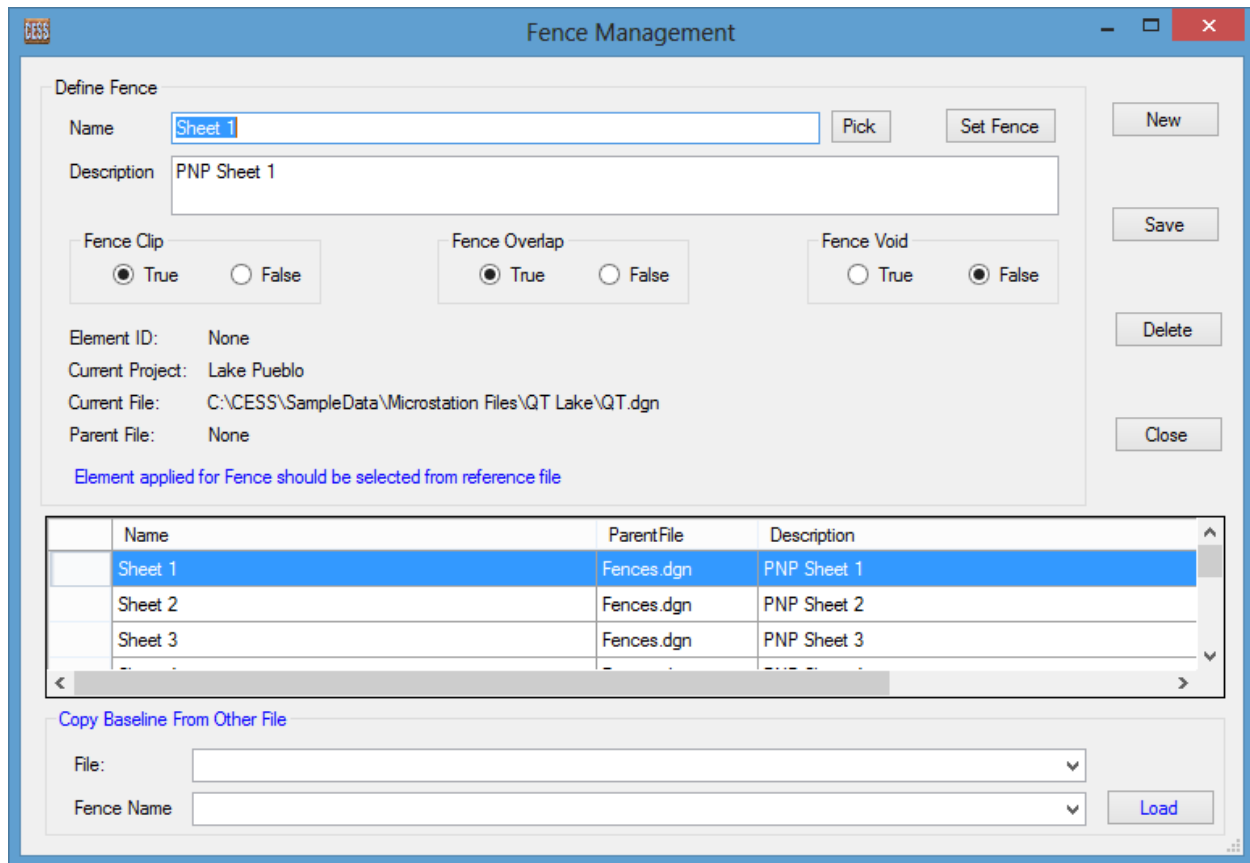
By default, the object does not invert, and the first point of the baseline (alignment) is “0+00.00”. If the alignment inverts, click the checkbox to the left to invert it. If the first point of the baseline is not at “0+00.00”, users can change it manually, or click the **Set** button, then pick the point on the baseline, and input its Station. The program will calculate the Station of the first point. Shown below is the window for such an input.



Click the **Check** button to double check the settings of the baseline. Move the mouse to the *MicroStation* file and click a point, an information window with the station of the point will appear. The settings are correct if the station listed in the window matches with the station shown in the *MicroStation* drawing. Otherwise, the baseline has to be reset.

4.5.3 Fence Management

The picture below shows the main interface of **Fence management**. When a *MicroStation* file is opened, the fence information related to the file is loaded in the combo box. Given that fence is always defined by element, there is a need to select an element to define the fence in *MicroStation* first. Input the fence name and click the **Set Fence** button, the element ID of the object, the current *MicroStation* file, and parent file of the object will be obtained, if both the object and parent file are contained in the current file. Otherwise, the parent file will be in the attachment.



In this interface, users also can define the *Fence Clip*, *Fence Overlap* and *Fence Void*.

Fence Clip: The fence clip lock is turned on when the **True** button is selected.

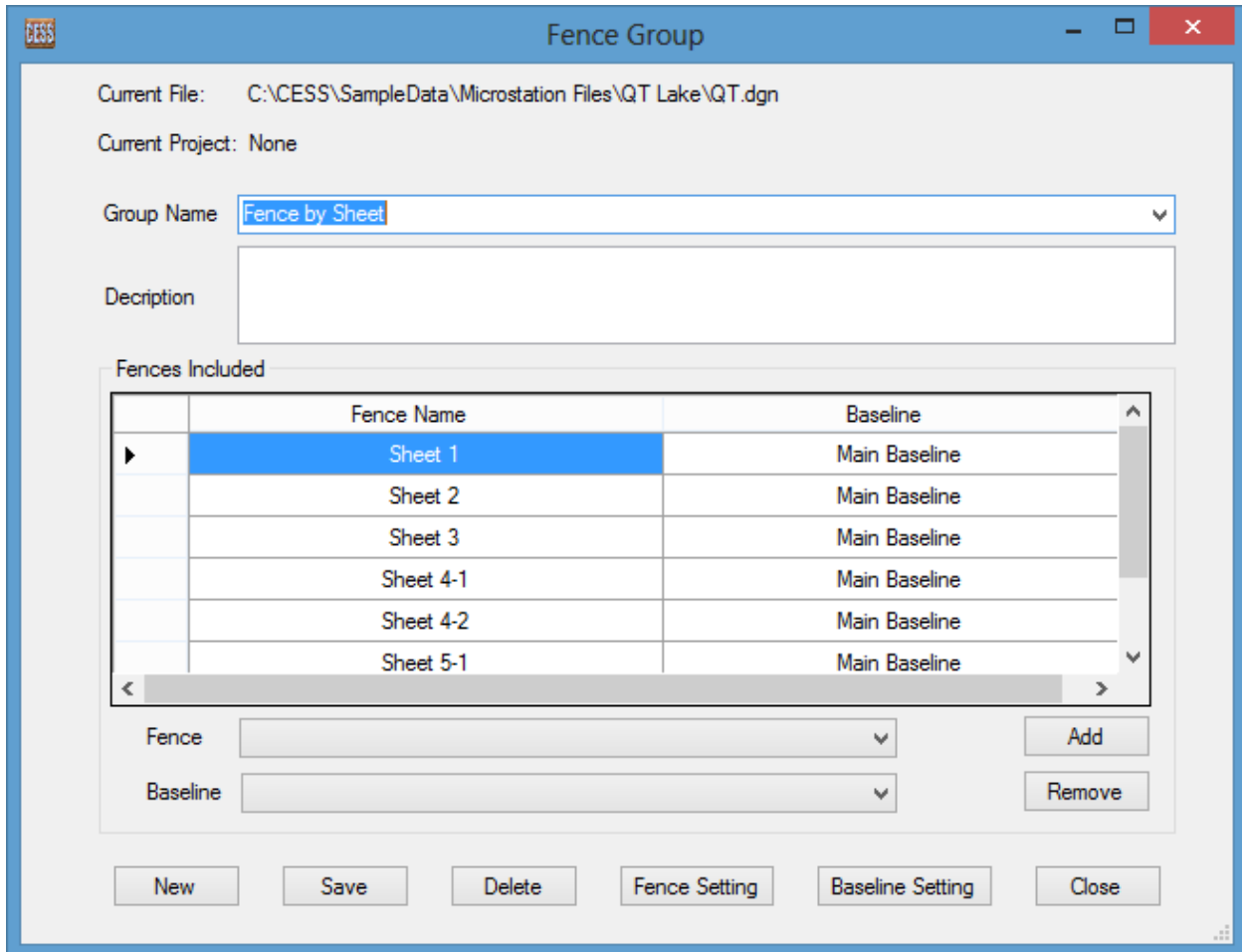
Fence Overlap: When the **False** button is selected, fence operations will be applied only to those elements that are completely inside the fence, or completely outside of the fence if the **True** button is also selected under the *Fence Void*. When the **True** button is selected under *Fence Overlap*, all fence operations will also be applied to those elements that straddle the fence.

Fence Void: When the **False** button is selected, fence operations will be applied to all elements inside of the fence. When the **True** button is selected, fence operations will be applied to all elements outside of the fence.

4.5.4 Fence Group

The picture below shows the interface of **Fence Group**. When a *MicroStation* file is opened, the fence groups related to the file are loaded. Select a group, all fences in the group will be listed in the data grid. Users also can create a new group by clicking the **New** button and following the steps: 1) input group name, 2) select a fence and a

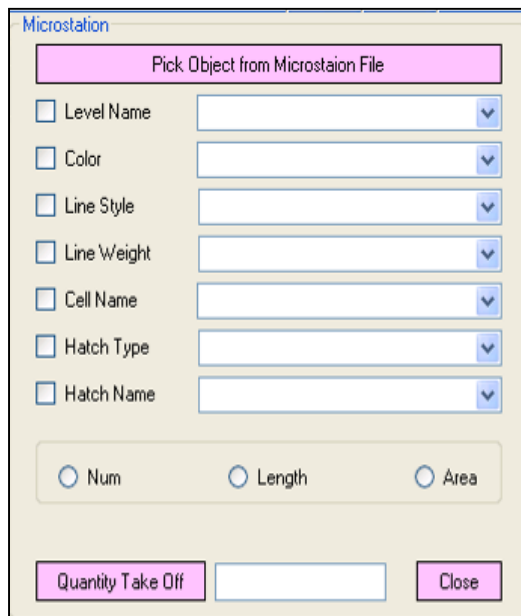
baseline, and 3) click the **Add** button to add the fence to the group. Repeat this operation to add more fences to the group if needed. To remove a fence, select the fence and click the **Remove** button. Click the **Save** button to save the fence group. Users also can delete a fence group by click the **Delete** button if so desired.



Click the **Fence Setting** button to go to fence setting window.

Click the **Baseline Setting** button to go to baseline setting window.

4.6 Quick Quality Takeoff for Items in MicroStation Files



Click the Pick Object from MicroStation File button.

Select the properties to be used to identify the same type of objects in the *MicroStation* file for quantity takeoff purpose.

Select the type of quantity to be calculated, such as, number, length, or area.

Click the **Quantity TakeOff** button, the total quantity of the same type of objects contained in the *MicroStation* drawing will be calculated and displayed in the text box.

4.7 Quantity Takeoff Comparison and Merge

In a project, there are different alternatives or different phases, the comparison or merge need to be completed along those alternatives or phases. In this module, users only need to select different reports generated in Quantity Takeoff, and the system will compare or merge them automatically. Click Save button, the result will be saved in the system, and exported to the spreadsheet in Quantity Takeoff module.

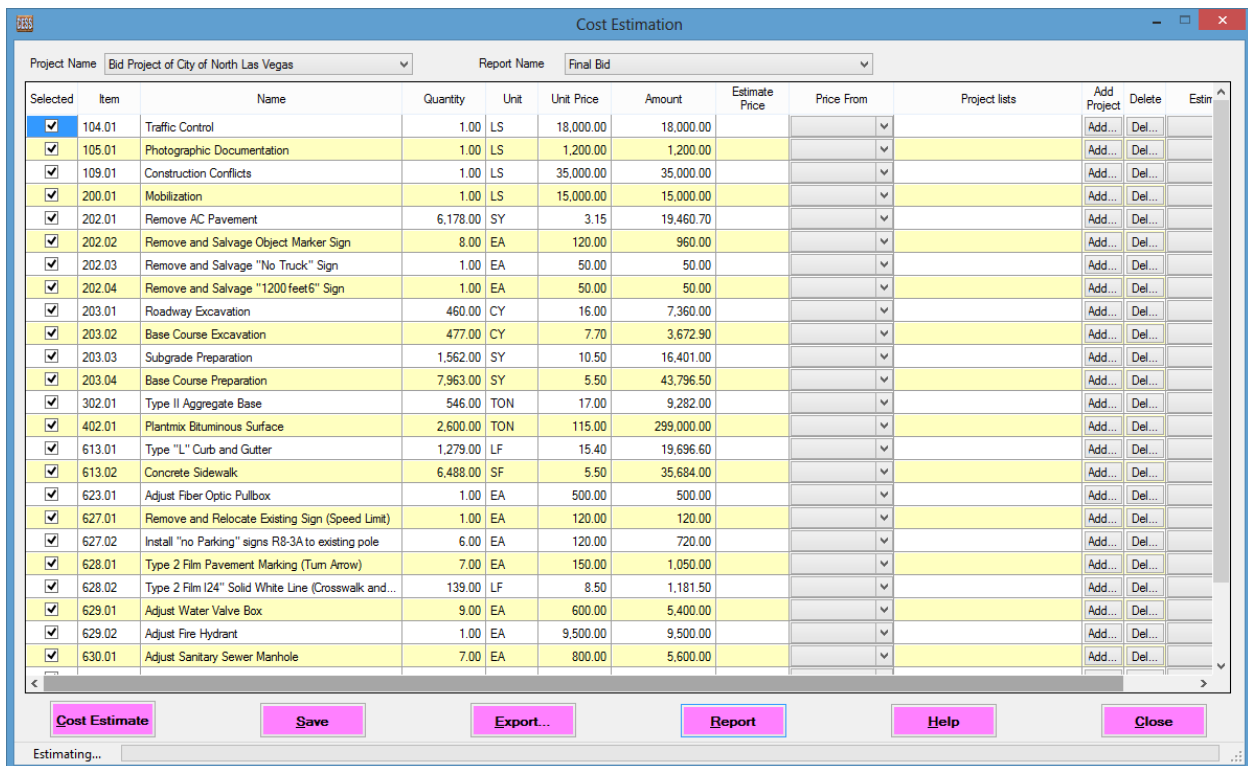
Item	Name	Unit In Proposal	Quantity In Proposal	Unit In CAD	Quantity In CAD
20301-0100	REMOVAL OF BOLLARD	EACH	30.00	EACH	30.00
20301-2400	REMOVAL OF SIGNS	EACH	24.00	EACH	24.00
20302-1200	REMOVAL OF GUARDRAIL	LNFT	6042.65	LNFT	6042.65
20302-1400	REMOVAL OF GUARDRAIL, TIMBER	LNFT	3523.62	LNFT	3523.62

Item	Name	Unit In Proposal	Quantity In Proposal	Unit In CAD	Quantity In CAD
20301-0100	REMOVAL OF BOLLARD	EACH	30.00	EACH	30.00
20301-2400	REMOVAL OF SIGNS	EACH	24.00	EACH	24.00
20302-1200	REMOVAL OF GUARDRAIL	LNFT	6042.65	LNFT	6042.65
20302-1400	REMOVAL OF GUARDRAIL, TIMBER	LNFT	3523.62	LNFT	3523.62

Item	Name	Unit In Proposal	Quantity In Proposal	Unit In CAD	Quantity In CAD
20301-2400	REMOVAL OF SIGNS	EACH	0.00	EACH	0.00
20302-1200	REMOVAL OF GUARDRAIL	LNFT	0.00	LNFT	0.00
20302-1400	REMOVAL OF GUARDRAIL, TIMBER	LNFT	0.00	LNFT	0.00
30402-5000	FULL DEPTH RECLAMATION, METHOD 2	SGYD	0.00	SGFT	0.00
30402-5500	FULL DEPTH RECLAMATION, METHOD 2, 8-INCH DEPTH	SGYD	0.00	SGFT	0.00
40301-0000	HOT ASPHALT CONCRETE PAVEMENT	TON	1,177.47	SGFT	29,217.51
60902-1000	CURB AND GUTTER, CONCRETE, 12-INCH DEPTH	LNFT	0.00	LNFT	0.00
61501-0200	SIDEWALK, COLORED CONCRETE	SGYD	0.00	SGFT	0.00

5. COST ESTIMATION MODULE

Cost estimation can be performed in this module after completing the quantity takeoff process. The picture below depicts the main interface of the **Cost Estimation Module**.

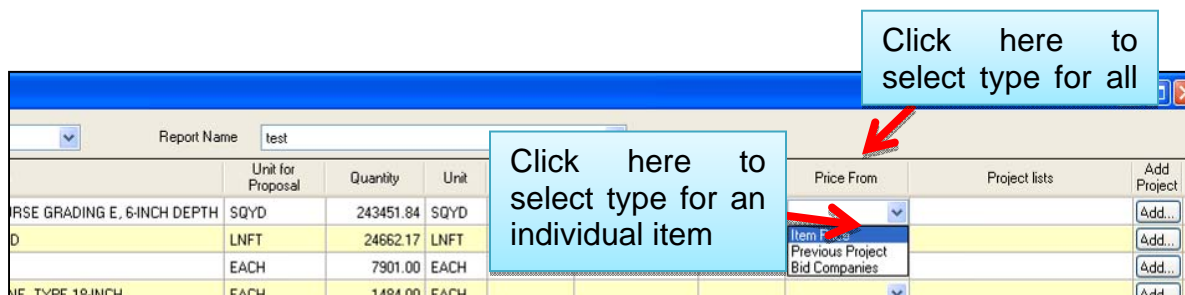


5.1 Cost Estimation Procedure

The procedure on how to use the cost estimation module is summarized below:

Select project and report names, all pay items and their quantities will be shown in the data grid.

Select the **Price From** from the pull-down menu for each pay item. There are three options available including item price, previous project, and bid companies as shown in the window below:



- a) **Item Price**: a fixed price of a pay item for a specific year. It is set in the **Pay Item Input** window.
- b) **Previous Project**: the price of a pay item that was used in previous projects.
- c) **Bid Companies**: the price of a pay item that a specified bid company used in previous projects.

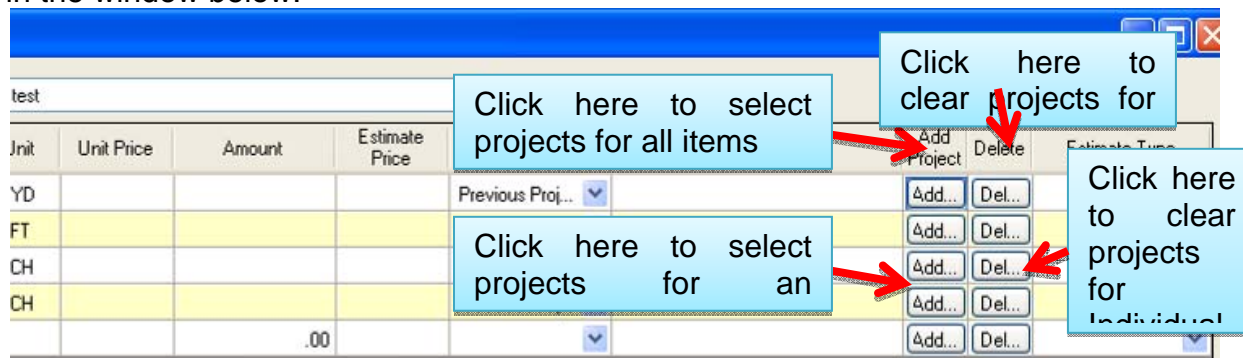
For individual item, select type from drop down combo box, if all pay items follow the same type, click the header of column, a frame appears and select a type for all items, the frame is shown right.



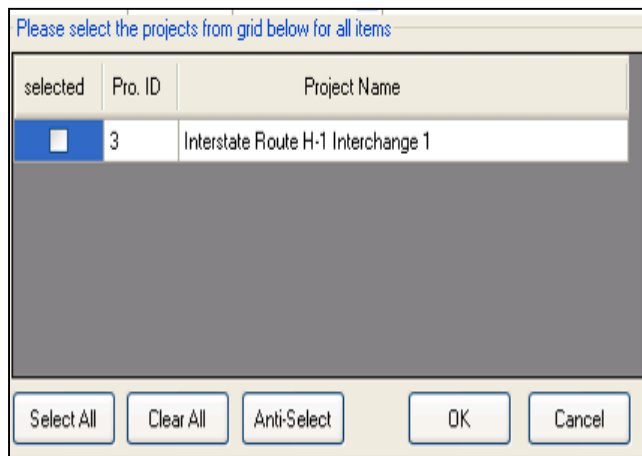
Depending on the type selected for each pay item, different settings should be specified accordingly prior to performing a cost estimation.

If **Item Price** is selected, click the **Cost Estimate** button to calculate the cost.

If **Previous Projects** is selected, click the **Add...** button to specify project ID as shown in the window below.



When click the header of **Add Project** column, the following frame appears on the screen:

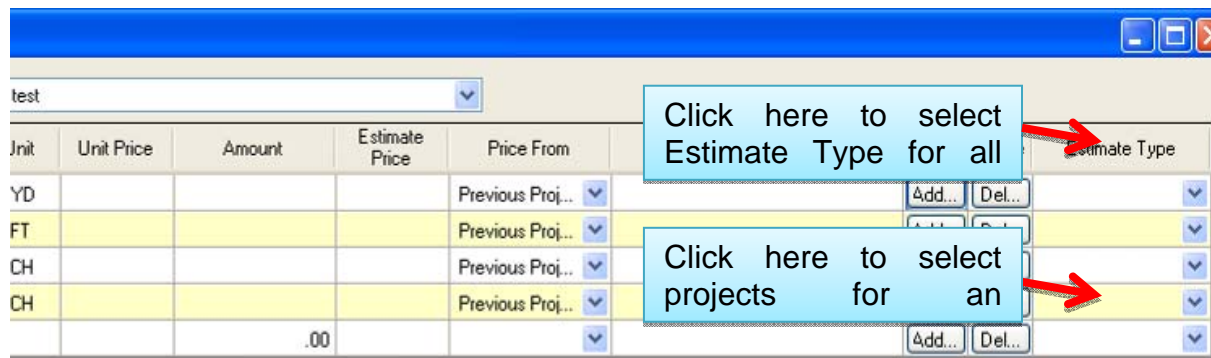


All previous projects followed the same standards will be listed in data grid and sorted by dates.

Projects can be selected by clicking the check box, or click the **Select All** button to select all project, or click the **Clear All** button to reset.

Click the **OK** button to confirm, or the **Cancel** button to abandon setting.

5) If *Bid Companies* is selected, users have to specify previous projects and the estimated type as shown in the window below:



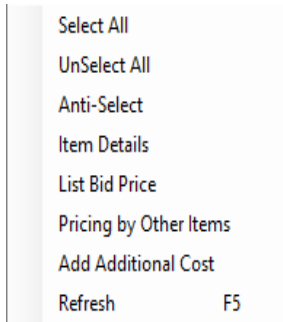
There are four choices available in this module for unit price estimation:

- 1) Average price without maximum and minimum
- 2) Average price
- 3) Maximum price
- 4) Minimum price

Once one of the above choices is selected, click the **Cost Estimate** button to calculate the cost. By default, unit price of each pay item is an estimated price, but users can manually change the value in the data grid if so desired. Users can also manually modify the unit price in the data grid whenever necessary.

Again, some additional functions have been added into this module to make ICE Software package a more robust tool. Right click the data grid, a menu with eight

functions appears as shown in the window below. The first three functions listed are self explanatory and the rest are specified in the box below:



Item Details: all information of current pay item appears, including AutoCAD properties, MicroStation properties, and all the basic Information.

List Bid Price: all bid prices of the item are listed.

Pricing by other items: Unit price of the item obtained based on other items.

Add Additional Cost: Add cost of non-standard pay item.

Refresh: Recalculate the amounts.

Pricing by other items:

A dialog box titled "Sum by Unit". It has two radio buttons: "Included" (selected) and "Excluded". Below are three input fields: "Unit" (with a dropdown arrow), "Factor", and "Amount". At the bottom are three buttons: "Calculate", "OK", and "Close".

Select the items in the data grid.

Determine the included/excluded unit and input factor, click the **Calculate** button, and then click the **OK** button to accept the amount.

For example, to calculate the total amount that excludes all lump sum items. Select the excluded box, select the L.S. unit, set 1 as the factor, and then click the **Calculate** button.

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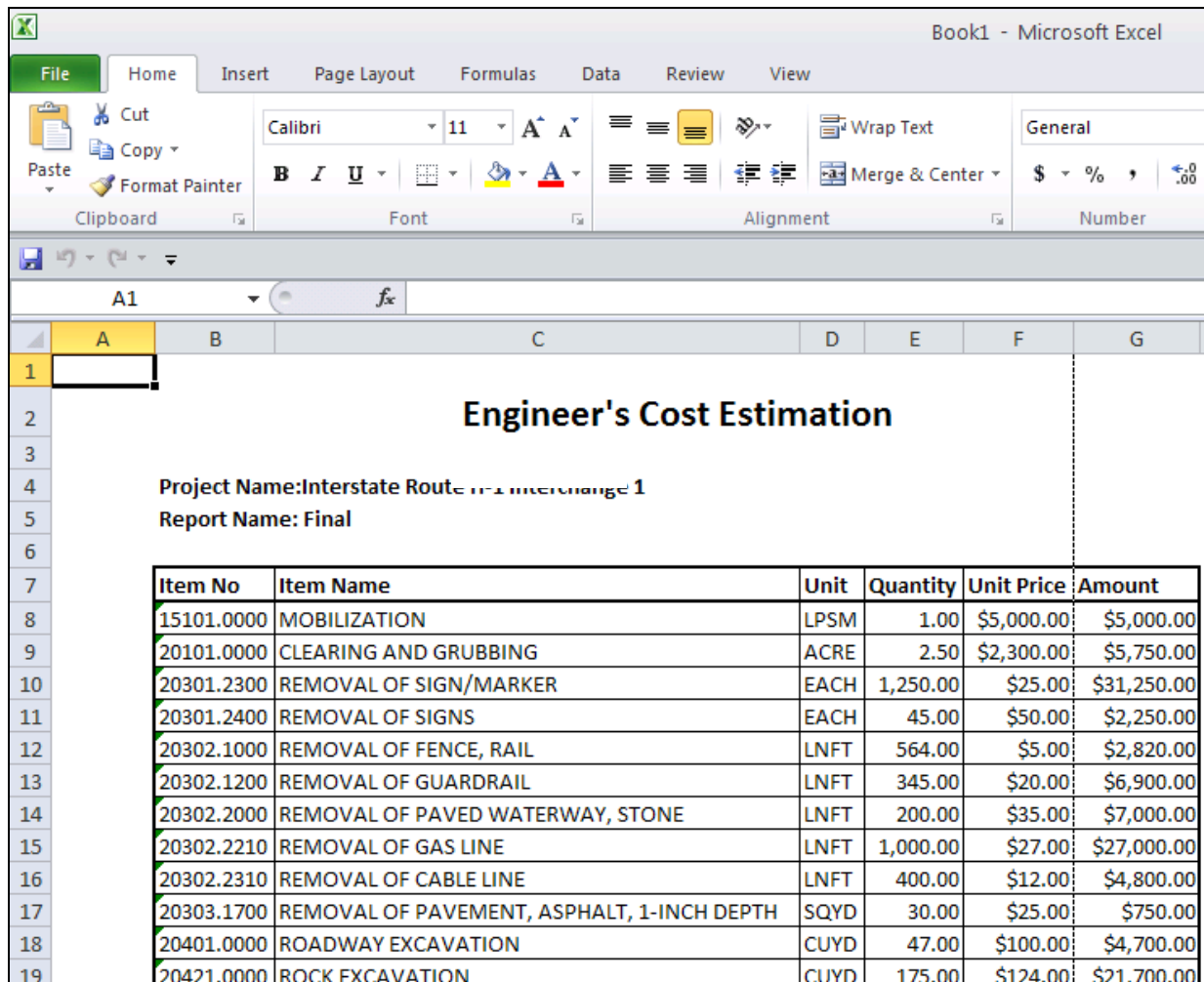
Users can add additional cost information by clicking the **Add Additional Cost** button. The additional cost window will appear as shown below:



Input item name and the associated cost, click the **Add** button, the addition item and its cost are imported to the data grid and the total cost is updated automatically.

Click the **Save** button to save all information including all parameters so that they become part of the database available for future uses.

Click the **Export...** button, all information as well as the results of the cost estimation will be exported to an Excel file as shown below.



Book1 - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View

Clipboard Font Alignment Number

A1

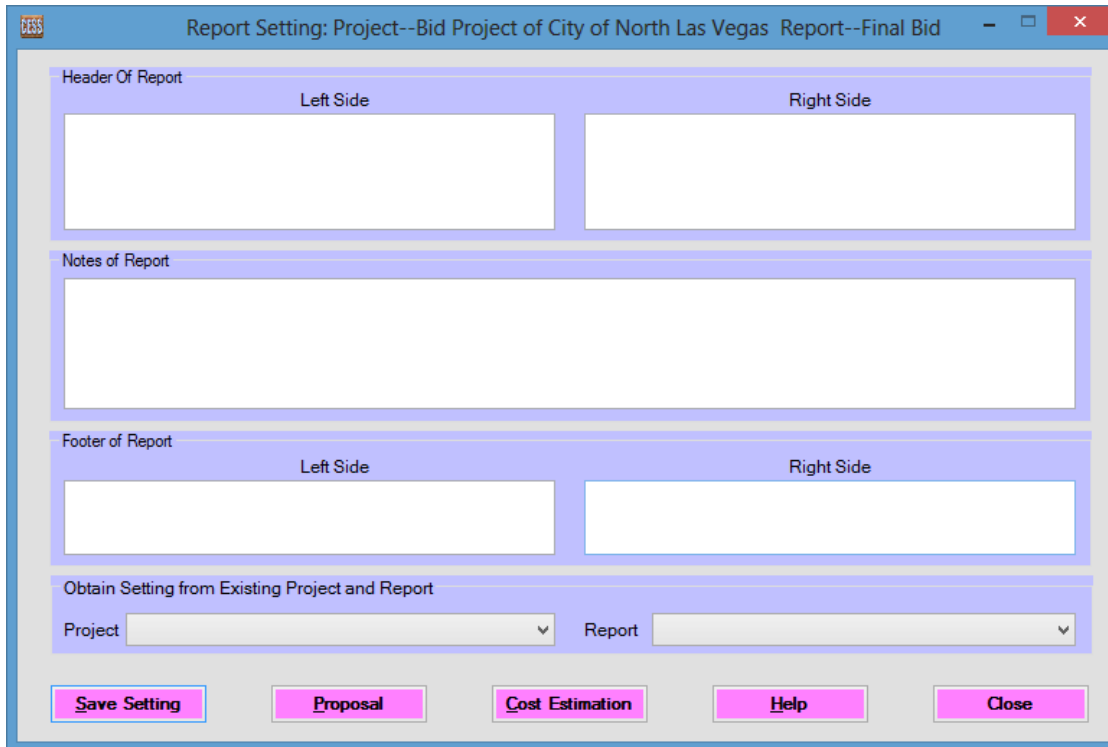
Engineer's Cost Estimation

Project Name: Interstate Route 171 Interchange 1
Report Name: Final

Item No	Item Name	Unit	Quantity	Unit Price	Amount
15101.0000	MOBILIZATION	LPSM	1.00	\$5,000.00	\$5,000.00
20101.0000	CLEARING AND GRUBBING	ACRE	2.50	\$2,300.00	\$5,750.00
20301.2300	REMOVAL OF SIGN/MARKER	EACH	1,250.00	\$25.00	\$31,250.00
20301.2400	REMOVAL OF SIGNS	EACH	45.00	\$50.00	\$2,250.00
20302.1000	REMOVAL OF FENCE, RAIL	LNFT	564.00	\$5.00	\$2,820.00
20302.1200	REMOVAL OF GUARDRAIL	LNFT	345.00	\$20.00	\$6,900.00
20302.2000	REMOVAL OF PAVED WATERWAY, STONE	LNFT	200.00	\$35.00	\$7,000.00
20302.2210	REMOVAL OF GAS LINE	LNFT	1,000.00	\$27.00	\$27,000.00
20302.2310	REMOVAL OF CABLE LINE	LNFT	400.00	\$12.00	\$4,800.00
20303.1700	REMOVAL OF PAVEMENT, ASPHALT, 1-INCH DEPTH	SQYD	30.00	\$25.00	\$750.00
20401.0000	ROADWAY EXCAVATION	CUYD	47.00	\$100.00	\$4,700.00
20421.0000	ROCK EXCAVATION	CUYD	175.00	\$124.00	\$21,700.00

Intelligent Cost Estimator Manual

It is worth noting that the Cost Estimation Module provides users the tools and flexibilities to generate a cost estimate proposal/report in their preferred format. Prior to printing out the report, users can use the following interface to customize the report by setting the format and properties to ensure the quality and consistency of the final product.



The screenshot shows a software window titled "Report Setting: Project--Bid Project of City of North Las Vegas Report--Final Bid". The window contains several sections for customizing a report:

- Header Of Report:** Divided into two columns, "Left Side" and "Right Side", each with a large empty text box.
- Notes of Report:** A single large empty text box.
- Footer of Report:** Divided into two columns, "Left Side" and "Right Side", each with a large empty text box.
- Obtain Setting from Existing Project and Report:** A section with two dropdown menus labeled "Project" and "Report".
- Buttons:** Five buttons are located at the bottom: "Save Setting", "Proposal", "Cost Estimation", "Help", and "Close".

The header portion of the report is divided into two parts as shown in the picture above so that users can incorporate project specific information. Users also can include additional project related information in the notes and/or footer sections to further customize the report.

To set the properties of the report, users can either fill in the blank spaces manually or copy and paste from an existing report. To copy from an existing report, users need to select the project name and report name. All previously specified properties of the selected project and report will appear on the screen ready for use. Users can make changes to them if so desired, and click the **Save** button to save all modifications.

To print out a cost estimation proposal/report, click the **Proposal** or **Cost Estimation** button. Users can also preview the report and further customize the format prior to printing. Refer to the screenshot below as an example.

Intelligent Cost Estimator Manual

Print Proposal

Main Report

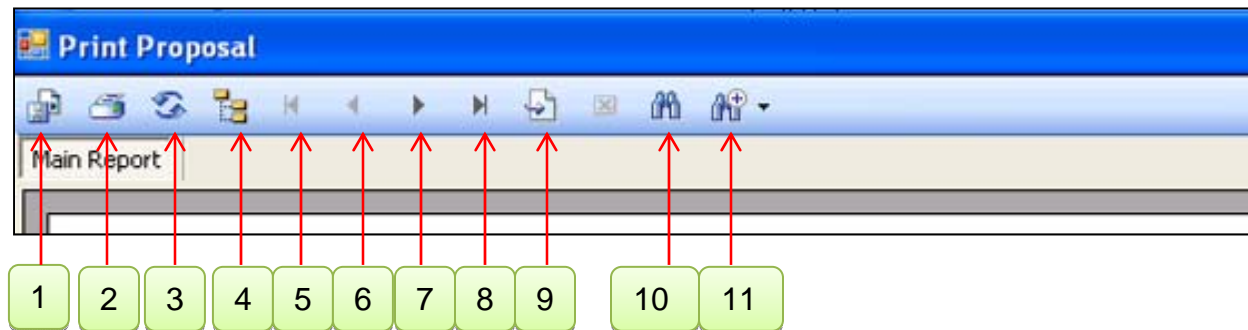
PROPOSAL SCHEDULE

DOT Project I
Nnanaio Bridge To Pal Interchange
Project No. XXXXXX
ISLAND: Oahu District: Ewa

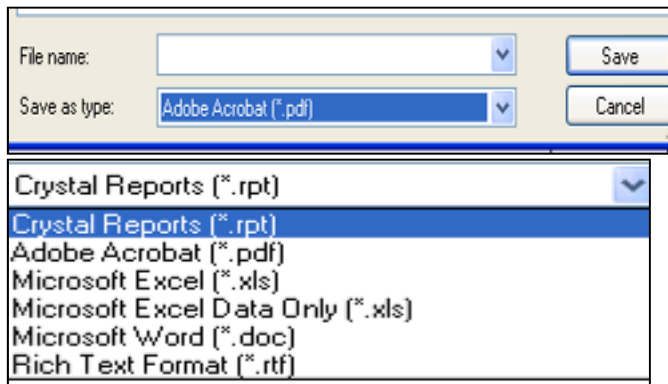
ITEM NO.	ITEM	APPRO. QUANTITY	UNIT	UNIT PRICE	AMOUNT
209.0100	Installation, Maintenance, Monitoring, and Removal of BMP	1.00	LS	\$	\$
209.0200	Additional Water Pollution, Dust, and Erosion Control	1.00	FA	\$	\$
312.0100	Plant Mix Glassphalt Concrete Base Course	1,725.00	Ton	\$	\$
401.0112	HMA Pavement, Mix No. IV	14,007.00	L.S.	\$	\$
414.0100	Excavation of Weakened Pavement Areas	817.00	C.Y.	\$	\$
415.0100	COLD PLANING	164,484.00	S.Y.	\$	\$
504.0300	Adjusting Storm Drain Manholes, Exposed	2.00	Each	\$	\$

5.2 Additional Tools

In the preview window, there are some useful tools that are provided for users to further customize the report with a minimal to none effort in inputting additional information. Presently, there are eleven such tools that are listed on the top tool bar in the picture shown below. Refer to the descriptions below for the details on how these tools work:



Export Report is the first tool listed on the top tool bar in the above screenshot. Click this button, an export report window will appear as shown below:



Specify the file name.

Select the file type to export. There are seven types available in the pull-down menu as shown to the left.

Click the **Save** button to finish exporting report.

Print Report can be used to print out a cost estimate proposal/report.

Refresh can be used to update the report whenever changes are made.

Toggle Group Tree can be used to generate multiple reports.

Go to First Page can be used to return to the first page of the report.

Go to Previous Page can be used to return to the first page of the report.

Go to Next Page can be used to return to the next page of the report.

Go to Last Page can be used to go to the last page of the report.

Go to Page X can be used to go to any page as specified by a user.

Find Text can be used to find specified text in the report.

Zoom is a self explanatory tool.

Click the **Print Proposal** or **Print Cost Estimation** button to print the report directly once the report settings are done.

6. BID PROPOSAL MODULE

Based on our experience in serving various roles during the course of delivering engineering projects, CESS LLC. has developed three different bid proposal modules as an effort to provide effective yet user-friendly tools that meet the different needs of consulting engineers, government agency staff and bidding contractors.

6.1 Consulting Engineers' Module

This module was developed to assist consulting engineers who usually serve as the designer of an engineering project. Specifically, this module includes the following five aspects:

6.1.1 Generate Bid Proposal

In this interface, consulting engineers can easily and effectively generate bid proposals for their clients, such as government agencies at city/state/federal levels, or private bidding companies. Shown below is the main interface for the **General Bid Proposal** as well as the procedure to generate a professional bid proposal.

Selected	Bid Base and Alternatives Name
----------	--------------------------------

Select a project from the project list in the combo box. All base bid and alternatives will be listed in the data grid. In most cases, only one bid package is required for a project. Users do not have to select the base bid nor the additive alternatives as the system will load them to the data grid automatically.

In an event that more than one base bid and additive alternatives are included in the project, users will need to select the base bid and/or additive alternatives and click the

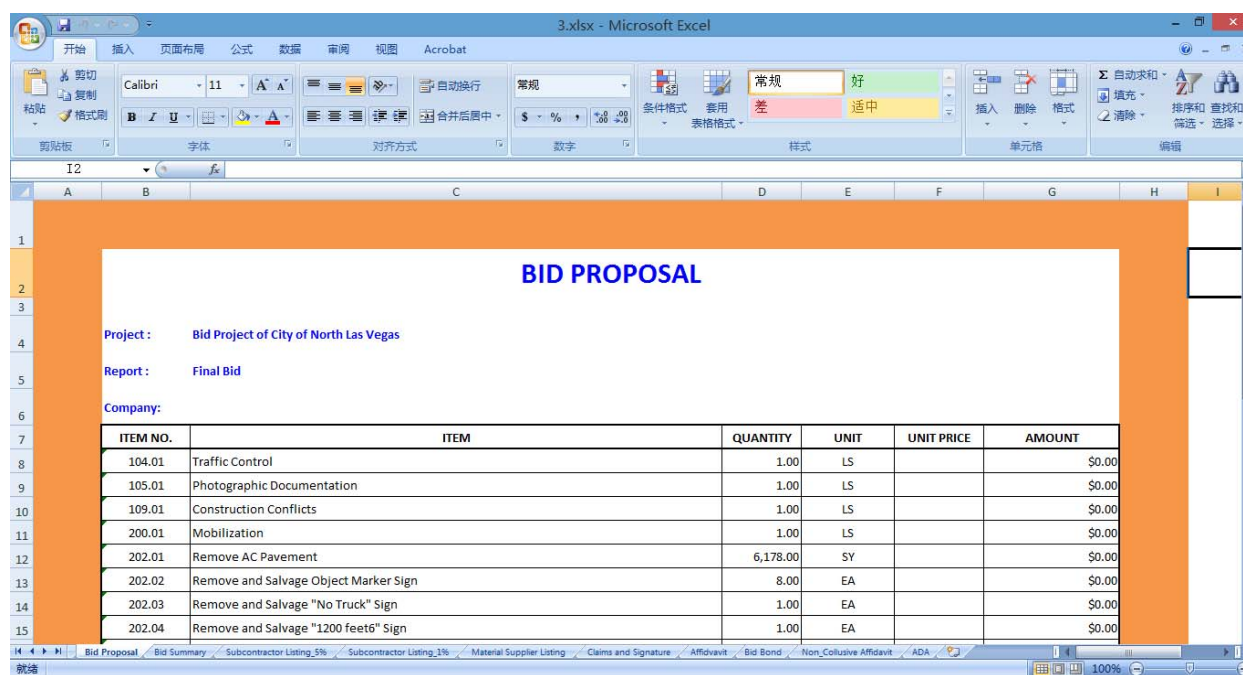
Intelligent Cost Estimator Manual

Add button. To remove an alternative, select the alternative in the data grid and click the **Remove** button.

To show the details of base bid and/or additive alternatives, click the **Show Details** button and select the items of interest. The details of the selected items will be shown in the data grid.

When the alternatives are determined, click the **Generate for City/State** button, Engineer's Cost Estimation will be generated in a spreadsheet file format for a public agency.

Click the **Generate for Bidders** button, a blank bid proposal package will be generated for bidders to use for their upcoming bid submittal. Following is an example of exporting data into a spreadsheet file.



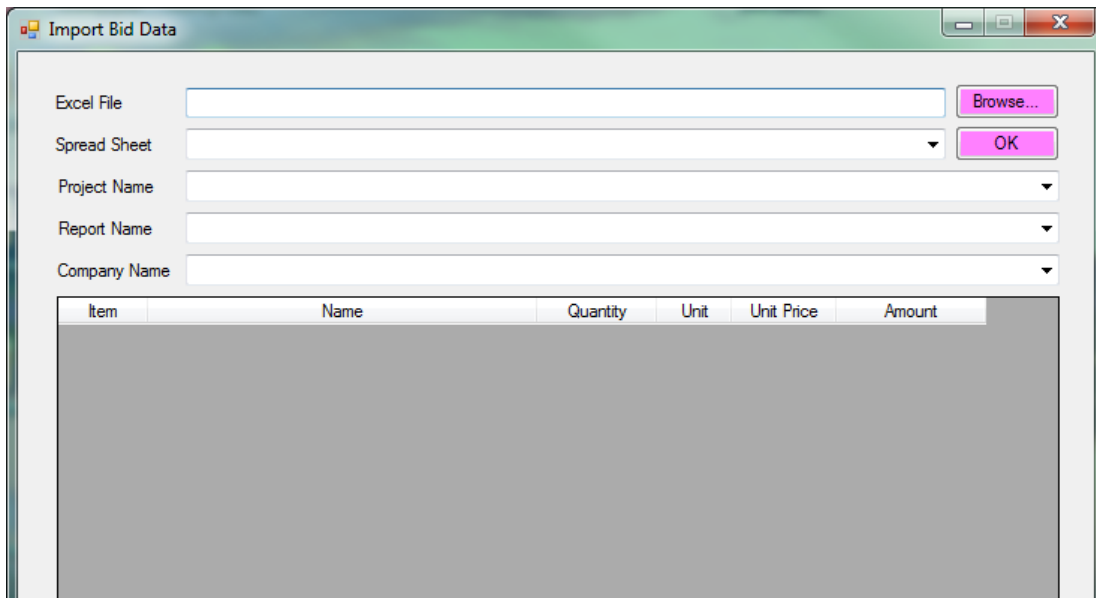
The screenshot shows a Microsoft Excel spreadsheet titled "3.xlsx - Microsoft Excel". The spreadsheet is titled "BID PROPOSAL" and contains the following information:

Project: Bid Project of City of North Las Vegas
Report: Final Bid
Company:

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
104.01	Traffic Control	1.00	LS		\$0.00
105.01	Photographic Documentation	1.00	LS		\$0.00
109.01	Construction Conflicts	1.00	LS		\$0.00
200.01	Mobilization	1.00	LS		\$0.00
202.01	Remove AC Pavement	6,178.00	SY		\$0.00
202.02	Remove and Salvage Object Marker Sign	8.00	EA		\$0.00
202.03	Remove and Salvage "No Truck" Sign	1.00	EA		\$0.00
202.04	Remove and Salvage "1200 feet6" Sign	1.00	EA		\$0.00

6.1.2 Import Bid Data

In most cases, bid related information is not yet organized in the standard format that is required in order to use the **Bid Proposal Module**. As a result, the agency seeking bids has to manually input the bid proposal data from individual bidders. The **Import Bid Data** interface was developed to improve this practice by providing a framework and process that will eliminate tedious manual data entry as well as human errors by direct data import from Excel bid files. Obviously, in order to take advantage of this powerful tool, the agency seeking bids has to require all participating bidders to submit their bids in a standard electronic format. The main interface for **Import Bid Data** is shown in the window below:



Item	Name	Quantity	Unit	Unit Price	Amount
------	------	----------	------	------------	--------

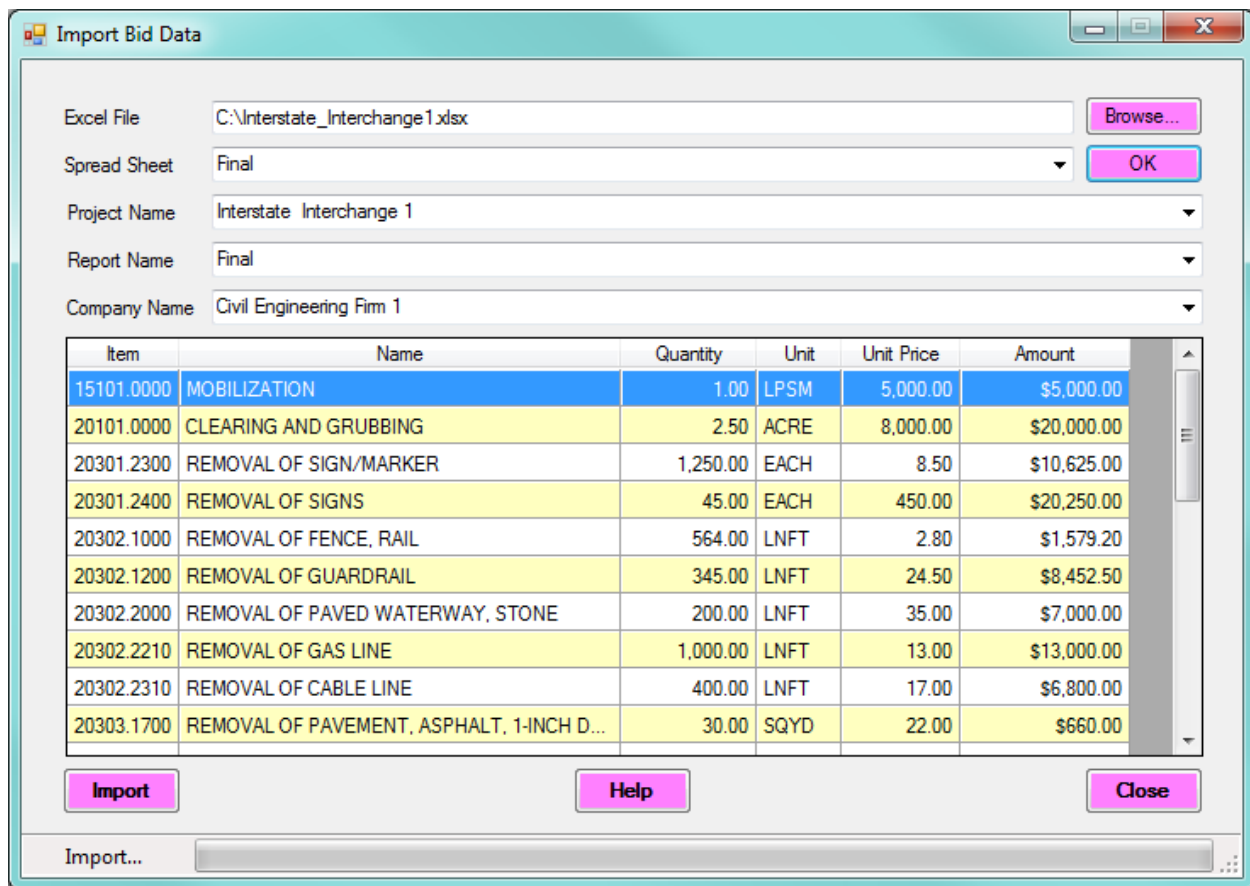
With a simple and intuitive process flow, this interface allows users to effectively complete the bid data import by following the steps below:

Step 1: Click the **Browse...** button and select an *Excel* file.

Step 2: Select the spreadsheet of a bid proposal that was submitted by a specific bidding company.

Step 3: Click the **OK** button, all pertinent information, including project name, report and company, will be loaded with all the details of the bid shown in the data grid. If the names of the project, report and company are not shown, then select them from the combo box. If the file is provided by a design company, then select the company name from the drop down box.

Step 4: Double check the data listed in the data grid and validate the information shown on the screen. Click the **Import** button, the data specified will be saved in the database.



6.1.3 Import Bidder's Information

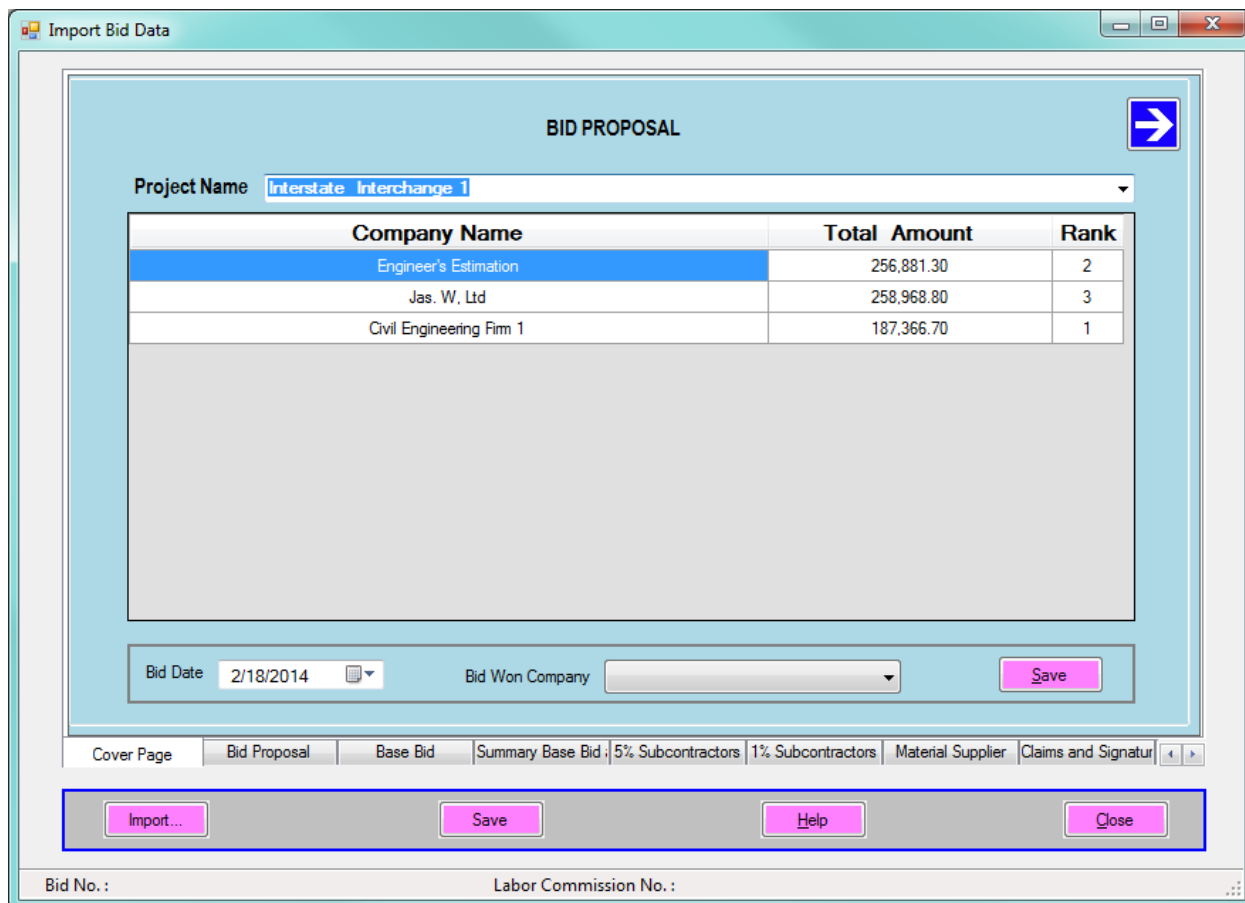
In this interface, users can import the bid proposal information of individual bidders. First of all, select an excel file which contains the bidder's information. The format of a bid proposal package varies from agency to agency and state to state. The following is an example that was customized based on what is being used in Las Vegas, Nevada. Their bid proposal package contains 14 components, including cover page, bid proposal, base bid, additive alternatives, summary, 5% subcontract lists, 1% subcontract lists, material supplier, claims, certificate of eligibility, bidders preference affidavit, bid bond, non-collusive affidavit of prime bidder, and Americans with Disabilities Act (ADA).

In this particular example, the **Bid Proposal Module** can be used to generate a bid proposal by following the steps below:

Select the project from the project combo box, and the system will automatically load all pertinent information from the existing database. Company's information, including the company that provided the Engineer's Estimates, will be listed on the cover page. If no company data exist in the database, only the Engineer's Estimation will be listed.

Click the **Import...** button, and select the bid proposal in a spreadsheet file format as submitted by a specific company.

If the company name listed in the spreadsheet matches with the company name that is selected in the data grid, all information related to the company will be loaded from the spreadsheet. Otherwise, a warning message will appear. Users can validate the company's information by double checking the information that is listed under various tabs within the interface.



Double click the **Engineer's Estimation** or other company, the bid proposal, including quantity takeoff and/or cost estimation, will be loaded. All information of the bidding company is also included under various tabs within this interface.

6.1.4 Import Bid Data

This interface was developed to eliminate manual input effort by using a highly automated process to import the bid data submitted by bidders. Summarized below is a step by step procedure:

Step 1: Select the project or report; the engineer's cost estimation will appear.

Step 2: Select a bid company from the drop down combo box, click the **Add** button to add the company's name to the data grid. If the company cannot be found from the list in the combo box, then close the current window and go to the **Company Information** window and add the company to the database. To remove a company from the data grid, select the company from the combo box and click the **Remove** button.

Step 3: If so desired, users can manually fill in the bid information of each item in the data grid with either the *Unit Price* or the *Amount*. The interface will automatically calculate the amount according to the set unit price, or the unit price based on the amount entered. The interface also automatically calculates and summarizes the total amount whenever changes are made to the data.

Step 4: Repeat **Step 2** and **Step 3** for all bidding companies.

Step 5: Select the company that submitted the apparent low bid from the drop down combo box, and then click the **Save** button.

Step 6: Click the **Save** button to save all bid related information.

Step 7: Click the **Export...** button, bid results will automatically be exported to an Excel file.

Step 8: Right click on the data grid; a menu will appear as shown below:



Using those function, the system will reset the unit prices based on the most recent bidding results and save them for the cost estimation of future projects.

Please note that the apparent low bid may not be the winning bid unless a complete bid evaluation process confirms that such a bid has met all specifications required by the particular project and all pertinent laws as required by local, state and federal governments.

6.1.5 Bid Data Summary

This interface was developed to eliminate manual data entry as well as human errors in the process of generating a summary report from the products of previous interfaces based on the bid information submitted by all participating bidders. It is the last and an important interface of the ICE software package as it builds up and updates the local market database with the latest bid prices. Such an updated database saves tremendous time and effort in estimating the costs of future projects. Shown below is an example of the bid summary report that was generated for the example that was stated in Section 6.1.3.

The screenshot shows a software window titled "Bid Data Summary". At the top, there are dropdown menus for "Project" (Interstate Interchange 1) and "Report" (Final), along with buttons for "Export...", "Print", "Help", and "Close". Below this is a table with columns for "Item", "Engineer Estimate", "Jas. W, Ltd", and "Civil Engineering Firm". The table lists 20 items with their respective units, quantities, and prices.

Item No.	Name	Unit	Quantity	Engineer Estimate		Jas. W, Ltd		Civil Engineering Firm	
				Unit Price	Amount	Unit Price	Amount	Unit Price	Amount
15101.0000	MOBILIZATION	LPSM	1.00	5,000.00	5,000.00	5,000.00	5,000.00	5,000.00	
20101.0000	CLEARING AND GRUBBING	ACRE	2.50	2,300.00	5,750.00	2,200.00	5,500.00	8,000.00	2
20301.2300	REMOVAL OF SIGN/MARKER	EACH	1,250.00	25.00	31,250.00	26.00	32,500.00	8.50	1
20301.2400	REMOVAL OF SIGNS	EACH	45.00	50.00	2,250.00	45.00	2,025.00	450.00	2
20302.1000	REMOVAL OF FENCE, RAIL	LNFT	564.00	5.00	2,820.00	4.80	2,707.20	2.80	
20302.1200	REMOVAL OF GUARDRAIL	LNFT	345.00	20.00	6,900.00	21.00	7,245.00	24.50	
20302.2000	REMOVAL OF PAVED WATERWAY, STONE	LNFT	200.00	35.00	7,000.00	40.00	8,000.00	35.00	
20302.2210	REMOVAL OF GAS LINE	LNFT	1,000.00	27.00	27,000.00	30.00	30,000.00	13.00	1
20302.2310	REMOVAL OF CABLE LINE	LNFT	400.00	12.00	4,800.00	10.00	4,000.00	17.00	
20303.1700	REMOVAL OF PAVEMENT, ASPHALT, 1-INCH ...	SQYD	30.00	25.00	750.00	26.00	780.00	22.00	
20401.0000	ROADWAY EXCAVATION	CUYD	47.00	100.00	4,700.00	125.00	5,875.00	2,000.00	9
20421.0000	ROCK EXCAVATION	CUYD	175.00	124.00	21,700.00	125.00	21,875.00	0.00	
20701.0100	EARTHWORK GEOTEXTILE, TYPE I-A	SQYD	237.00	13.00	3,081.00	15.00	3,555.00	0.00	
21201.0000	LINEAR GRADING	STA	2.30	400.00	920.00	12.00	27.60	0.00	
61102.0100	1/2-INCH WATERLINE, COPPER	LNFT	234.00	2.80	655.20	3.00	702.00	0.00	
63602.3000	SYSTEM INSTALLATION, ELECTRICAL	EACH	22.00	300.00	6,600.00	310.00	6,820.00	0.00	
63610.0100	CONDUIT, 3/4-INCH, PVC	LNFT	34.00	3.70	125.80	4.00	136.00	0.00	

6.2 Government Agencies' Module

This module was developed to meet the specific needs of a government agency in terms of the final products of the bid proposal evaluation process. However, the **Government Agencies' Module** follows exactly the same principles and procedures that were built in the **Consulting Engineers' Module**. Please refer to Section 6.1 for further details.

6.3 Bidding Companies' Module

There are many similarities between the **Bidding Companies' Module** and the **Consulting Engineers' Module**, especially in terms of generating, importing and exporting bid proposals. Although users at a bidding company could use the ICE software package to accomplish the same tasks, the primary goal of this module is to assist bidders to neatly and efficiently complete the bid proposal using the established templates and format as provided by an agency seeking for bids.

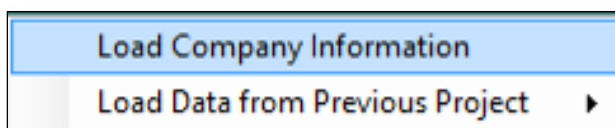
The **Bidding Companies' Module** has been proven to be a handy yet powerful tool as it not only saves bidders' time and effort, but more importantly ensures accuracy and consistency in the process of preparing a bid submittal. Inconsistency as well as calculation and/or tabulation related mistakes have often been the main reasons for many apparent low bidders not getting the contract award at the end.

Prior to filling bid proposal related information in the pre-established templates, users should create a record for the project first for purpose of having a sound practice in project information management. If a project is not available for selection in the data grid, please refer to Section 2.2 Project Information to create the project first. If pay items are not currently included in the database, please refer to previous sections to import these pay items first and then perform the cost estimation.

Summarized below is a standard procedure for bidders to use the features that are built in this module:

Step 1: Select a project from the combo box

Step 2: Right click on the screen, the following menu appears:



Step 3: Click the **Load Company Information** button.

Step 4. If there are some similar projects that were done previously, click the **Load Data from Previous Project** button, and select the project from the combo box. All related information, including the company, subcontractors, and material supplier information, etc., will be loaded.

Step 5. Confirm the proposal information and click the **Save** button to save the data.

Step 6. Click the **Export...** button, all bid proposal data will be exported to an Excel file. Double check the data to verify and then save the data prior to summing the bid proposal to the agency seeking the bids.

7. PRODUCT REGISTRATION

Product registration is an important step in order for users to keep up with the latest news and updates, and continue to receive technical support as well as free upgrades from CESS LLC. This interface was built-in the ICE software package so that users can conveniently register their CESS LLC. product licenses and activate the software packages that were purchased. The Register interface and a step-by-step procedure are provided below for users' convenience.

The screenshot shows a window titled "Register" with a blue border. At the top left, there is a red asterisk icon and the text "* Denotes Required Fields". The window is divided into three main sections: "Basic Information", "Address", and "Contact Information".

Basic Information:

- * Last Name: Fan
- Mid Name: (empty)
- * First Name: Chunqiu
- Title: (empty)
- Company: (empty)

Address:

- * Address 1: 1617 Keamouku street Apt 901
- Address 2: (empty)
- * City: Honolulu
- * State: HI
- * Zip Code: 96822
- * Country: USA

Contact Information:

- * Email: chunqiu@gmail.com
- * Check Email: (empty)
- Cell Phone: (empty)
- Office Number: (empty)
- Fax Number: (empty)

On the right side of the form, there are several buttons: "Register", "Activate...", "Purchase...", "Help", "About", and "Close". At the bottom of the window, a status bar displays "Current Register User ID: chunqiu@gmail.com".

After the 30-day trial period, users will have to purchase the software in order to continue to use these highly effective tools. Simply click the **Purchase** button, and a license agreement will be effectuated with an on-going technical support once the payment is made in full.

Once user fill the information above, and click the **Register** button, then user will get email which includes the activation code.

To activate software, Click the **Activate...** button, and input activate code obtained in the previous step.

Click the **Close** button to terminate the action and close the window.