Quantity Box Calculation System & Linking to Microstation

The Quantity Box Calculation System (QBCS) is utilized to create uniformity for bid item calculations and minimize transposition errors of those bid item quantities. QBCS consists of Microsoft Excel for bid item calculations and Microstation for linking of the bid item calculations for the purpose of generating PS&E.

EXCEL FILES

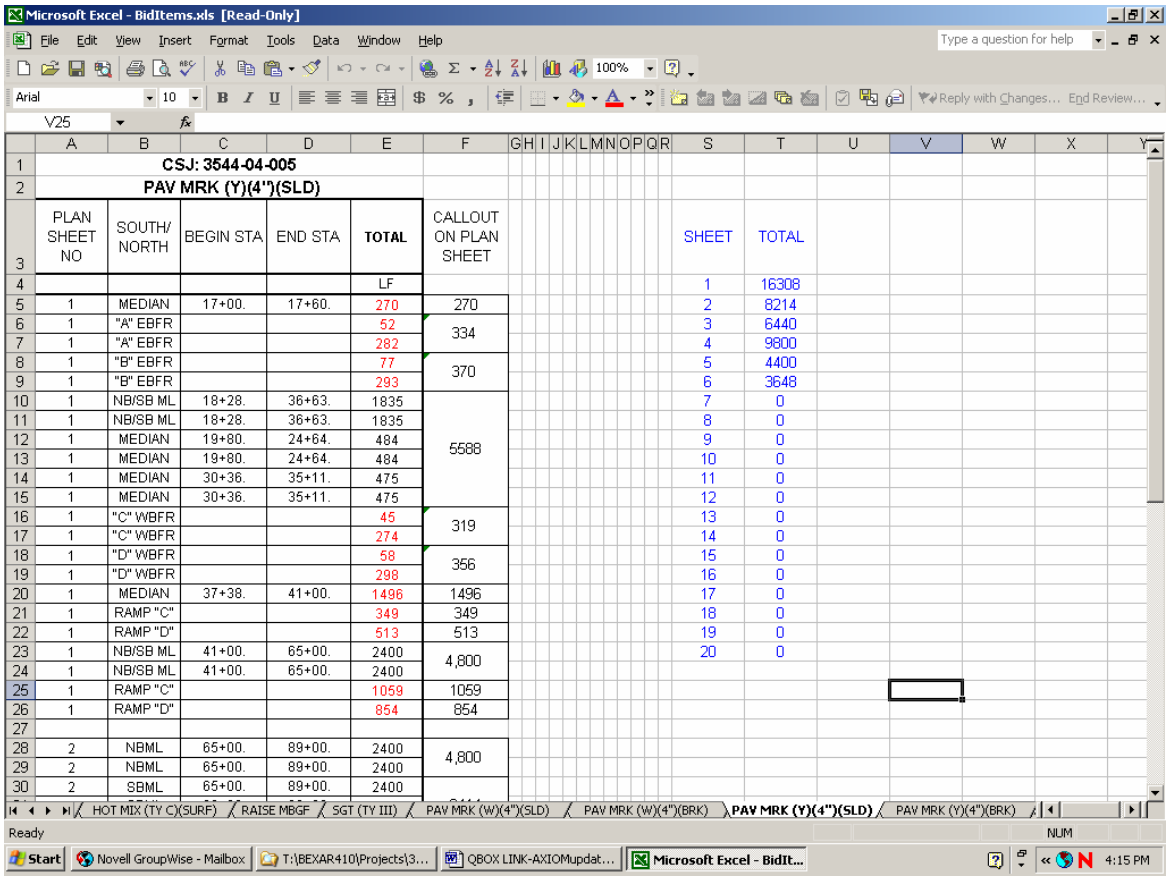
Excel bid item calculation files should be stored under K: *CSJ*/Summaries/Excel. Typically, one Excel file is created for each summary generated in the plans. For example, a project needing grading, pavement marking, and tcp/sw3p summaries would have three separate Excel files. Likewise, an overlay project having one summary for all bid items would have a single Excel file. Each Excel file should contain a QBOXES tab, a SUMMARY tab, and individual bid item tabs. "Starter" Excel files are provided in http://www.dot.state.tx.us/sat/specinfo/index.htm /Filemangement/**BlankOverlay or BlankReconstruction**/Summaries/Excel.

PROJECTS WITH ONE SUMMARY

Spreadsheet name: BID Items – FMxxx.xls

Each bid item has a tab, or a worksheet, where the item is calculated according to plan sheet. As the bid item tabs are calculated the Total columns, the QBoxes tab and the Summary tab will be automatically updated based on the quantity in the *Plan Sheet No* column. If you need to add more tabs for items not yet included, see your File Manager for instructions to ensure that all quantities are correctly calculated and are carried over

to the QBOXES tab and the SUMMARY tab. For example, the tab for Refl Pav Mrk (W) (4") (BRK) appears as:



CSJ: 3544-04-005

PAV MRK (Y)(4")(SLD)

PLAN SHEET NO	SOUTH/ NORTH	BEGIN STA	END STA	TOTAL	CALLOUT ON PLAN SHEET	SHEET	TOTAL
				LF		1	16308
1	MEDIAN	17+00.	17+60.	270	270	2	8214
1	"A" EBFR			52	334	3	6440
1	"A" EBFR			282		4	9800
1	"B" EBFR			77	370	5	4400
1	"B" EBFR			293		6	3648
1	NB/SB ML	18+28.	36+63.	1835	5588	7	0
1	NB/SB ML	18+28.	36+63.	1835		8	0
1	MEDIAN	19+80.	24+64.	484		9	0
1	MEDIAN	19+80.	24+64.	484		10	0
1	MEDIAN	30+36.	35+11.	475		11	0
1	MEDIAN	30+36.	35+11.	475		12	0
1	"C" WBFR			45	319	13	0
1	"C" WBFR			274		14	0
1	"D" WBFR			58	356	15	0
1	"D" WBFR			298		16	0
1	MEDIAN	37+38.	41+00.	1496	1496	17	0
1	RAMP "C"			349	349	18	0
1	RAMP "D"			513	513	19	0
1	NB/SB ML	41+00.	65+00.	2400	4,800	20	0
1	NB/SB ML	41+00.	65+00.	2400			
1	RAMP "C"			1059	1059		
1	RAMP "D"			854	854		
2	NBML	65+00.	89+00.	2400	4,800		
2	NBML	65+00.	89+00.	2400			
2	SBML	65+00.	89+00.	2400			

The Designer only has to enter in the beginning and ending stations and the pre-set formulas will calculate the actual length of pavement markings. Another method involves measuring the length in Microstation. Bid items can also be calculated from square feet, shapes in Microstation, or other aspects of the item.

RECONSTRUCTION PROJECTS

Reconstructon projects will require the use several excel files to calculate the bid items. Each "group" of items (TCP, pavement markings, roadway, etc.) will have its own Excel file of calculations named **RDWY Items – *PROJECT*.xls, PAV MRK Items – *PROJECT*.xls**, etc. The first tab of each file is the QBOXES tab; the second is the

SUMMARY tab. These files will work the same as described above in the previous section (Project with One Summary).

CREATING QUANTITY BOXES AND SUMMARIES IN EXCEL

The following is an example of an **Overlay** project:

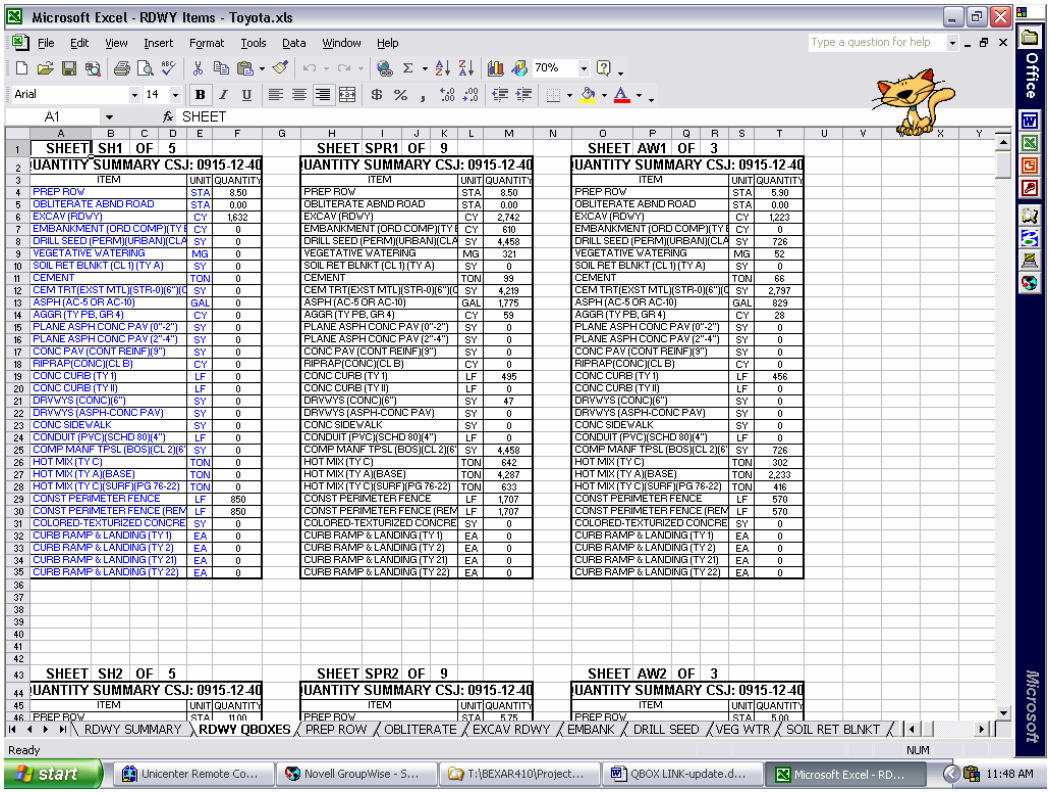
QUANTITY BOXES:

1. To create the Excel file for a new project - OPEN BidItems–blankoverlay.xls from K: /Filemanagement/**BlankOverlay**/Summaries/Excel. SAVE AS to the correct CSJ under Summaries/Excel. A Copy and Paste done through Window Explorer will not get the formulas correct.
2. The first tab is QBOXES. Modify this tab to include more or less quantity boxes for the number of plan sheets included in your project. If unsure about how many to make, extra quantity boxes can be left in the Excel file and deleted later.
3. Add tabs for bid items not included and link to the QBOXES tab and SUMMARY tab. See your supervisor for help with this if needed.

SUMMARIES:

1. Open the Excel file created with the Quantity Box process that is saved in K:/*CSJ*/Summaries/Excel.
2. The second tab is GRADING SUMMARY. Modify this tab to include more or less bid items and plan sheets for your project. The quantities for the bid items are linked to the bid item tabs; update as necessary for additional bid items.

Reconstruction projects will work the same although the process will be repeated for each “group” of bid items. When opening the “starter” excel file go to (http://www.dot.state.tx.us/sat/specinfo/index.htm) **BlankReconstruction**/Summaries /Excel and open RDWY Items–blankreconstruction.xls, TCP Items – blankreconstruction, etc.



SHEET SH1 OF 5

QUANTITY SUMMARY CSJ: 0915-12-40

ITEM	UNIT	QUANTITY
PREP ROW	STA	8.50
OBLITERATE ABND ROAD	STA	0.00
EXCAV (RDWY)	CY	1,632
EMBANKMENT (ORD COMP)(TY B	CY	0
DRILL SEED (PERM)(URBAN)(CLA	SY	0
VEGETATIVE WATERING	MG	0
SOIL RET BLNKT (CL 1) (TY A)	SY	0
CEMENT	TON	0
CEM TRT(EXST MTL)(STR-0)(6")(C	SY	0
ASPH (AC-5 OR AC-10)	GAL	0
AGGR (TY PB, GR 4)	CY	0
PLANE ASPH CONC PAV (0"-2")	SY	0
PLANE ASPH CONC PAV (2"-4")	SY	0
CONC PAV (CONT REINF)(9")	SY	0
RIPRAP(CONC)(CL B)	CY	0
CONC CURB (TY 1)	LF	0
CONC CURB (TY II)	LF	0
DRVWYS (CONC)(6")	SY	0
DRVWYS (ASPH-CONC PAV)	SY	0
CONC SIDEWALK	SY	0
CONDUIT (PVC)(SCHD 80)(4")	LF	0
COMP MANF TPSL (BOS)(CL 2)(6"	SY	0
HOT MIX (TY C)	TON	0
HOT MIX (TY A)(BASE)	TON	0
HOT MIX (TY C)(SURF)(PG 76-22)	TON	0
CONST PERIMETER FENCE	LF	850
CONST PERIMETER FENCE (REM	LF	850
COLORED-TEXTURIZED CONCRE	SY	0
CURB RAMP & LANDING (TY 1)	EA	0
CURB RAMP & LANDING (TY 2)	EA	0
CURB RAMP & LANDING (TY 21)	EA	0
CURB RAMP & LANDING (TY 22)	EA	0

SHEET SPR1 OF 9

QUANTITY SUMMARY CSJ: 0915-12-40

ITEM	UNIT	QUANTITY
PREP ROW	STA	8.50
OBLITERATE ABND ROAD	STA	0.00
EXCAV (RDWY)	CY	2,742
EMBANKMENT (ORD COMP)(TY B	CY	610
DRILL SEED (PERM)(URBAN)(CLA	SY	4,458
VEGETATIVE WATERING	MG	321
SOIL RET BLNKT (CL 1) (TY A)	SY	0
CEMENT	TON	99
CEM TRT(EXST MTL)(STR-0)(6")(C	SY	4,219
ASPH (AC-5 OR AC-10)	GAL	1,775
AGGR (TY PB, GR 4)	CY	59
PLANE ASPH CONC PAV (0"-2")	SY	0
PLANE ASPH CONC PAV (2"-4")	SY	0
CONC PAV (CONT REINF)(9")	SY	0
RIPRAP(CONC)(CL B)	CY	0
CONC CURB (TY 1)	LF	495
CONC CURB (TY II)	LF	0
DRVWYS (CONC)(6")	SY	47
DRVWYS (ASPH-CONC PAV)	SY	0
CONC SIDEWALK	SY	0
CONDUIT (PVC)(SCHD 80)(4")	LF	0
COMP MANF TPSL (BOS)(CL 2)(6"	SY	4,458
HOT MIX (TY C)	TON	642
HOT MIX (TY A)(BASE)	TON	4,287
HOT MIX (TY C)(SURF)(PG 76-22)	TON	633
CONST PERIMETER FENCE	LF	1,707
CONST PERIMETER FENCE (REM	LF	1,707
COLORED-TEXTURIZED CONCRE	SY	0
CURB RAMP & LANDING (TY 1)	EA	0
CURB RAMP & LANDING (TY 2)	EA	0
CURB RAMP & LANDING (TY 21)	EA	0
CURB RAMP & LANDING (TY 22)	EA	0

SHEET AW1 OF 3

QUANTITY SUMMARY CSJ: 0915-12-40

ITEM	UNIT	QUANTITY
PREP ROW	STA	5.90
OBLITERATE ABND ROAD	STA	0.00
EXCAV (RDWY)	CY	1,223
EMBANKMENT (ORD COMP)(TY B	CY	0
DRILL SEED (PERM)(URBAN)(CLA	SY	726
VEGETATIVE WATERING	MG	52
SOIL RET BLNKT (CL 1) (TY A)	SY	0
CEMENT	TON	66
CEM TRT(EXST MTL)(STR-0)(6")(C	SY	2,797
ASPH (AC-5 OR AC-10)	GAL	829
AGGR (TY PB, GR 4)	CY	28
PLANE ASPH CONC PAV (0"-2")	SY	0
PLANE ASPH CONC PAV (2"-4")	SY	0
CONC PAV (CONT REINF)(9")	SY	0
RIPRAP(CONC)(CL B)	CY	0
CONC CURB (TY 1)	LF	456
CONC CURB (TY II)	LF	0
DRVWYS (CONC)(6")	SY	0
DRVWYS (ASPH-CONC PAV)	SY	0
CONC SIDEWALK	SY	0
CONDUIT (PVC)(SCHD 80)(4")	LF	0
COMP MANF TPSL (BOS)(CL 2)(6"	SY	726
HOT MIX (TY C)	TON	302
HOT MIX (TY A)(BASE)	TON	2,233
HOT MIX (TY C)(SURF)(PG 76-22)	TON	416
CONST PERIMETER FENCE	LF	570
CONST PERIMETER FENCE (REM	LF	570
COLORED-TEXTURIZED CONCRE	SY	0
CURB RAMP & LANDING (TY 1)	EA	0
CURB RAMP & LANDING (TY 2)	EA	0
CURB RAMP & LANDING (TY 21)	EA	0
CURB RAMP & LANDING (TY 22)	EA	0

SHEET SH2 OF 5

QUANTITY SUMMARY CSJ: 0915-12-40

ITEM	UNIT	QUANTITY
PREP ROW	STA	11.00

SHEET SPR2 OF 9

QUANTITY SUMMARY CSJ: 0915-12-40

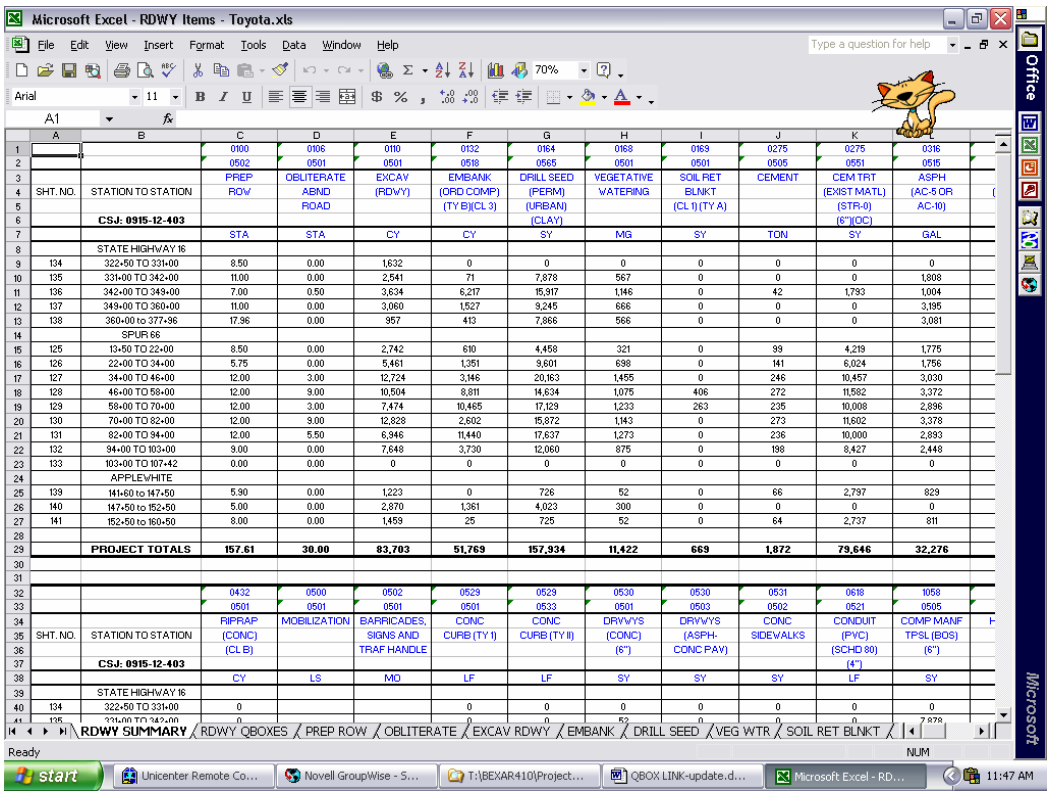
ITEM	UNIT	QUANTITY
PREP ROW	STA	5.75

SHEET AW2 OF 3

QUANTITY SUMMARY CSJ: 0915-12-40

ITEM	UNIT	QUANTITY
PREP ROW	STA	5.00

Example of QBOXES tab in Excel



		C	D	E	F	G	H	I	J	K	
		0100	0106	0110	0132	0164	0168	0169	0275	0275	0316
		0502	0501	0501	0518	0565	0501	0501	0505	0551	0515
SHT. NO.	STATION TO STATION	PREP ROW	OBLITERATE ABND ROAD	EXCAV (RDWY)	EMBANK (ORD COMP) (TY B)(CL 3)	DRILL SEED (PERM) (URBAN) (CLAY)	VEGETATIVE WATERING	SOIL RET BLNKT (CL 1) (TY A)	CEMENT	CEM TRT (EXIST MATL) (STR-0) (6")(OC)	ASPH (AC-5 OR AC-10)
	CSJ: 0915-12-403										
		STA	STA	CY	CY	SY	MG	SY	TON	SY	GAL
	STATE HIGHWAY 16										
134	322+50 TO 331+00	8.50	0.00	1,632	0	0	0	0	0	0	0
135	331+00 TO 342+00	11.00	0.00	2,541	71	7,878	567	0	0	0	1,808
136	342+00 TO 349+00	7.00	0.50	3,634	6,217	15,917	1,146	0	42	1,793	1,004
137	349+00 TO 360+00	11.00	0.00	3,060	1,527	9,245	666	0	0	0	3,195
138	360+00 to 377+96	17.96	0.00	957	413	7,866	566	0	0	0	3,081
	SPUR 66										
125	13+50 TO 22+00	8.50	0.00	2,742	610	4,458	321	0	99	4,219	1,775
126	22+00 TO 34+00	5.75	0.00	5,461	1,351	9,601	698	0	141	6,024	1,756
127	34+00 TO 46+00	12.00	3.00	12,724	3,146	20,163	1,455	0	246	10,457	3,030
128	46+00 TO 58+00	12.00	9.00	10,504	8,811	14,634	1,075	406	272	11,582	3,372
129	58+00 TO 70+00	12.00	3.00	7,474	10,465	17,129	1,233	263	235	10,008	2,896
130	70+00 TO 82+00	12.00	9.00	12,828	2,602	15,872	1,143	0	273	11,602	3,378
131	82+00 TO 94+00	12.00	5.50	6,946	11,440	17,637	1,273	0	236	10,000	2,893
132	94+00 TO 103+00	9.00	0.00	7,648	3,730	12,060	875	0	198	8,427	2,448
133	103+00 TO 107+42	0.00	0.00	0	0	0	0	0	0	0	0
	APPLEWHITE										
139	141+60 to 147+50	5.90	0.00	1,223	0	726	52	0	66	2,797	829
140	147+50 to 152+50	5.00	0.00	2,870	1,361	4,023	300	0	0	0	0
141	152+50 to 160+50	8.00	0.00	1,459	25	725	52	0	64	2,737	811
	PROJECT TOTALS	**157.61**	**30.00**	**83,703**	**51,769**	**157,934**	**11,422**	**669**	**1,872**	**79,646**	**32,276**

		0432	0500	0502	0529	0529	0530	0530	0531	0618	1058
		0501	0501	0501	0501	0533	0501	0503	0502	0521	0505
SHT. NO.	STATION TO STATION	RIPRAP (CONC) (CL B)	MOBILIZATION	BARRICADES, SIGNS AND TRAF HANDLE	CONC CURB (TY 1)	CONC CURB (TY II)	DRVWYS (CONC) (6")	DRVWYS (ASPH-CONC PAV)	CONC SIDEWALKS	CONDUIT (PVC) (SCHD 80) (4")	COMP MANF TPSL (BOS) (6")
	CSJ: 0915-12-403										
		CY	LS	MO	LF	LF	SY	SY	SY	LF	SY
	STATE HIGHWAY 16										
134	322+50 TO 331+00	0			0	0	0	0	0	0	0
135	331+00 TO 342+00	0			0	0	52	0	0	0	7,878

Example of SUMMARY tab in Excel

LINKING

QUANTITY BOXES:

The Excel file quantity boxes will be pasted into a Microstation file that is used as a reference file attached to plan sheets. This file will contain quantity boxes for each plan sheet in a project or "group" of plan sheets. Both overlay and reconstrucction projects will have only one QBOX.dgn reference file. The individual quantity boxes for a reconstruction project (Roadway, TCP, etc.) will all be pasted into a single QBOX.dgn file. All QBox files should be stored under K:/*CSJ*/ReferenceFiles. The link between Microstation and Excel can be setup at the beginning and then updated throughout the duration of a project. Always open the quantity box file and update before a batchplot is run!

The example below is for quantity boxes of an **Overlay** project.

To Link Quantity Boxes in Microstation from Excel:

1. Create QBOX.dgn in K: /*CSJ*/. Be sure to use the correct seed file for your project.
2. Open the Excel file created using the linking process outlined above (Quantity Box) that is saved in K: /*CSJ*/Summaries/Excel.
3. The Axiom Settings (the last Icon on the Axiom Office Importer ToolBox) may need to be adjusted before pasting from Excel. There is a recommended TxDOT standard for the settings in Axiom Importer. When Microsoft Office Importer was installed, the d:\Engapps\Axiom\Office\office.ini file was set to baseline values. A backup file is located in D:\Engapps\Axiom\save\tx32a.ini to restore those settings if necessary. If for some reason the setting are reset (to "0" or "Defaults"), The user can copy the backup file (tx32a.ini) and rename the file to office.ini to restore baseline values. When creating an Excel or Word file, use an Arial font with size 6 (standard/minimum) or 7. This will create a finished plot scale of 1" = 100', so if

necessary, scaling of quantity boxes will be simplified. These standards can be manipulated to your own area office preferences.

4. In the Name Box (in the upper left hand corner that displays the current cell) highlight on the pull down menu “QBOXES” This will highlight all the quantity boxes. If boxes have been added, modify the field under Insert/Name/Define to include the new boxes.
5. Select the Copy Icon or select Copy from the Edit menu.
6. In Microstation (QBOX.dgn), bring up the Axiom Office Importer ToolBar (under Axiom/Microsoft Office Importer). Make **Level 3** current.
7. Select the Paste Icon on the Axiom Office Importer ToolBar. The program will run through and then select where to place the quantity boxes. The quantity boxes will appear as they do in Excel. Repeat the process for the different “groups” of bid items for a reconstruction project pasting all quantity boxes into a single reference file. After all the quantity boxes are in place, the QBOX.dgn file can be referenced into the plan sheets, placed in the upper right corner and cliped around the box.
8. Place the cooresponding sheet number on each quantity box on **Level 2**. The sheet numbers are used to keep the correct quantity box with its plan sheet. Turn off Level 2 to hide the number at the very end of a project (this may not be until mylars are printed, check with your supervisor).

SUMMARIES

The links for the summaries are done directly on the summary sheet in Microstation. No reference files are needed. Always open each summary sheet and update before a batchplot is run! The example below is for a grading summary of an **Overlay** project.

To Link Summaries from Excel into Microstation:

1. Create **GradingSummary.dgn** in K: /*CSJ*/Summaries. Be sure to use the correct seed file for your project.
3. Open the Excel file created in the Quantity Box process that is saved in K:/*CSJ*/Summaries/Excel.
4. Verify Axiom Settings.
5. In the Name Box highlight on the pull down menu “SUMM1” This will highlight the top summary.
6. Select the Copy Icon or select Copy from the Edit menu.
7. In Microstation (GradingSummary.dgn), bring up the Axiom Office Importer ToolBar (under Axiom/Microsoft Office Importer).
8. Select the Paste Icon on the Axiom Office Importer ToolBar. The program will run through and then select where to drop the summary. The summary will appear as it does in Excel.
9. Repeat for “SUMM2” and “SUMM3” as necessary.

Reconstruction projects will work the same although the process will be repeated for each “group” of bid items. Create TCPSummary.dgn, PAVMRKSummary.dgn, etc.

To update the link between Microstation and Excel:

QUANTITY BOXES & SUMMARIES

1. Make the necessary changes in the Excel file and SAVE. Keep the Excel file open.
2. Open the cooresponding QBOX or Summary Microstation file and the Axiom Office Importer ToolBox.
3. Select the Manage Icon (second Icon from the left) on the Axiom Office Importer ToolBox. Select the quantity box or summary to be updated; then select “Update”

in the Manage Link box that appears. The program will run through and then visually check that it is updated.