

## Section 24 - Production Rates

Production rates or outputs can be obtained for user defined categories of resources, for either Bill Items or for Task Codes.

Production codes can be combined in order to compile total Man Hours for inclusion on worksheet or dual currency bill reports.

This section of the Candy manual contains the following topics:

- Production code definitions - Sheet 24.01
- Production code allocation - Sheet 24.01 to 24.02
- Reporting - Sheet 24.03 to 24.05
- Man Hours - Sheet 24.05 to 24.07

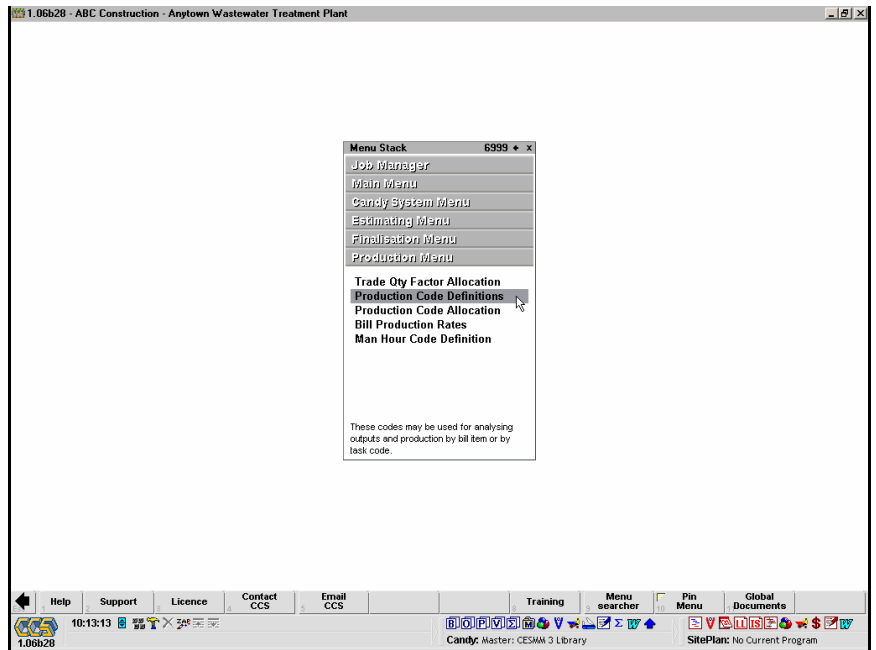




## Production Menu

The Production Menu is located within the Estimating module of the CCS System.

From the **CCS Menu** follow the path **Candy System** to **Estimating** to **Finalisation** to **Production**.



## Production Code Definitions

You first need to define some Production Codes.

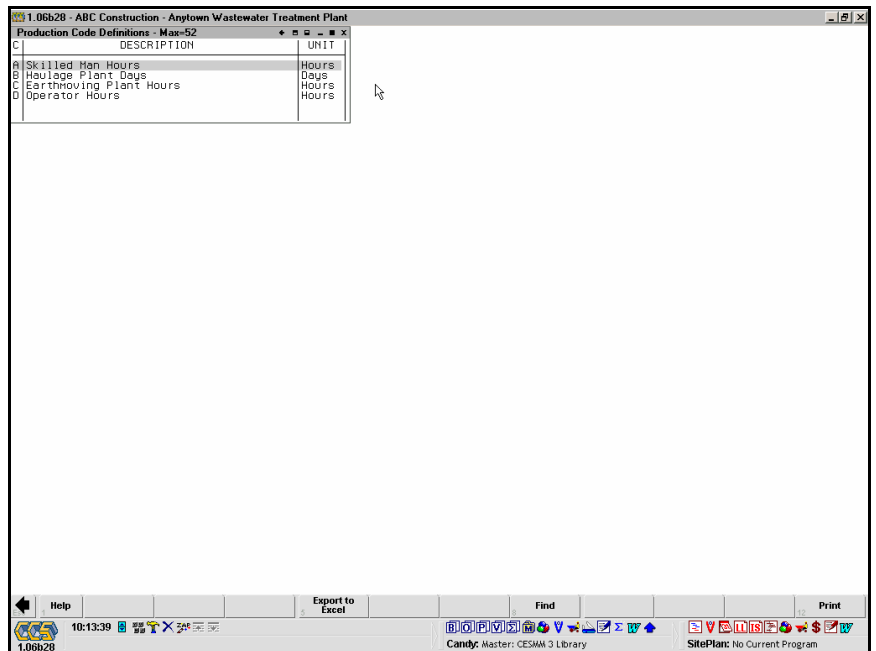
These definitions can either be created within the job, or copied from a master job during the setting up process.

From the **Production** menu select **Production Code Definitions**.

A document is displayed on which Production Codes can be defined. The code is a 1-digit letter, and there are 52 available, 26 **UPPER CASE** and 26 **lower case letters**.

There are fields for a description and a unit for each code.

*Note: This document is also available from the Candy Definitions Menu.*



## Production Code Allocation

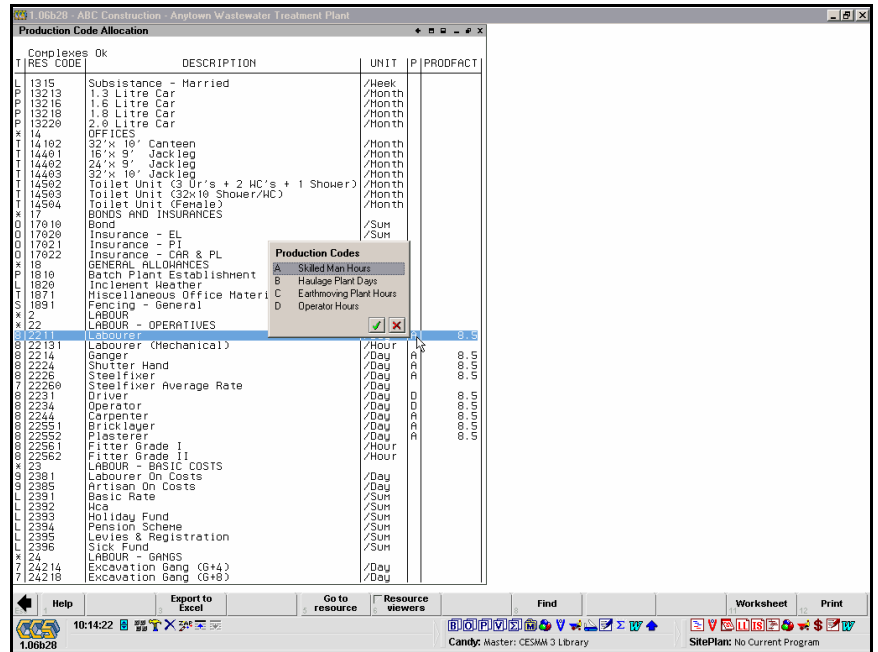
Having defined some Production Codes, you can now allocate them to resources.

This allocation can either be done in the job or in the master resource list. Resources that are subsequently copied into the job from a master bring their production codes with them.

From the **Production** menu select **Production Code Allocation**.

The Resource list for the job is displayed, with two columns headed **"P"** and **"Prodfact"**, which are specifically for the allocation of Production Codes.

Production Codes may be allocated either by typing or Double Clicking in the "P" column to call up a picklist of defined codes.



The Production Code "A" has been defined for skilled man hours; however; the resources in this list are priced in days.

The Prodfact column is used to convert days to hours for the Production Code analysis, at the rate of 8.5 hours per day.

The Production Code "C" has been defined for earthmoving plant hours. The resources in this list are priced in various units.

The Prodfact column is used to convert days to hours for those resources that are priced in days.

The factor defaults to 1 when a Production Code is first entered, and is correct for those resources that are priced in the same unit as the Production Code.

Note: A similar document can be set up using a Resource Scroller. Refer to **Candy Manual Section 7 - Scrollers** for more information about setting up scrollers.

RES CODE	DESCRIPTION	UNIT	PRODFACT
7 24218	Excavation Gang (G+B)	/Day	
7 24412	Formwork Gang (C+2)	/Day	
7 24416	Formwork Gang (C+6)	/Day	
7 2443	Cast-in-Items Crew	/Day	
7 24516	Placing Gang (G+B)	/Day	
7 24812	Joint Sealing Gang (G+2)	/Day	
* 3	PLANT - ALLOWANCE		
P 3001	Site Transport Allowance	/Sum	
P 301421	Screw conveyor	/Day	
* 31	PLANT - TRANSPORT		
G 3150	Concrete Transport	/h3	
P 3152	0.75M3 Dumper	/Day	B 1
P 315211	0.75M3 Dumper	/Day	
P 3171	6M3 Tipper H&O	/Day	B 1
P 31711	6M3 Tipper	/Day	
P 31712	6M3 Tipper Km Levu	/Km	
* 32	PLANT - EXCAVATION		
T 32211	Kohatsu PC 150 H&O	/Hour	
T 322111	Kohatsu PC 150	/Hour	
T 32511	JD 410 Digger Loader H&O	/Day	
T 325111	JD 410 Digger Loader	/Hour	C 1
* 33	PLANT - EARTHWORKS		
T 3342	Dunlop ST60 Roller H&O	/Day	
P 33421	Dunlop ST60 Roller	/Day	C 8.5
T 3351	CH20 Pan Compactor H&O	/Day	
P 33511	CH20 Pan Compactor	/Day	
* 35	PLANT - CONCRETE		
T 3513	21/14 Mixing Plant	/h3	
T 35131	21/14 Mixer	/Day	
P 3542	Boomscraper F14	/Day	
T 3556	Cement Silo 100t	/Day	
P 3556	Screw Conveyor	/Day	
* 4	TEMPORARY MATERIALS		
* 40	FORMWORK		
T 4001	Formwork Material Allowance	/Sum	
T 4002	Formwork to Sides	/h2	
T 4009	Formwork (General)	/Sum	
T 4010	Formwork NE 150mm Hide	/h2	
T 401111	800x3000 SF Panels	/h2	
T 41143	Economy 1500x500	/h2	
T 42112	B&C Clamps	/h2	
T 42151	Wedge Sets	/Each	
T 42191	Rawl Washers	/Each	
T 421302	Rawl Plastic Plugs	/Each	
T 421303	Rawl Cones	/Each	
T 421305	Rawl Bolts 127mm Long	/Each	
T 421313	Rawl Ties 200mm Long	/Each	
T 441211	Scaffold Tube	/h2	
* 49	FUEL		

### Trade Quantity Factor Allocation

A trade factor may be allocated to each Op Code in order to convert billed quantities into a trade quantity.

From the **Production** menu select **Trade Quantity Factor Allocation**.

The Trade Quantity Factor Allocation document is displayed, which is essentially an Op Code scroller with the **Trade Factor** column included.

Trades do not have units associated with them, however, for the purpose of the production rate reports, sensible combinations of Op Code quantities may be made to reflect for example, the total m3 of Excavation or the total m2 of Formwork.

OP CODE	DESCRIPTION	UNIT	TRADE FACTOR
E20021	Excavate in bulk, Class A material and dispose within 2km freehaul distance	h3	1
E3251	Excavate in soft for trenches NE 2m deep	h3	1
E42111	Excavation in foundations ne 2m deep	h3	1
E42111a	Excavation in foundations ne 2m deep	h3	1
E52003	Excavate for working space in Class A material and back fill and compact to 95% mod. AASHTO.	h3	1
E603	Extra over all excavations in Class A material for Class B material	h3	
E603a	Extra over all excavations in Class A material for Class B material	h3	
E670	Overhaul	h3.km	
E670a	Stockpile excavated material on site	h3.km	
E7011	Excavate in soft for manholes	h3	
E8110	Dewatering of excavations	Sum	
E8121	Load and dispose of surplus material	h3	
E82245	Filling under floors and around foundations in layers of 150mm, compacted to 95% mod AASHTO	h3	
E8251	Backfill & compact to 90% MOD AASHTO	h3	
F2154	Vertical formwork to sides of foundations	h2	1
F2200	Vertical formwork to walls	h2	1
F243	Formwork to sides and soffits of beams	h2	1
F7301	Formwork not exceeding 150mm high	m	0.15
F7301a	Formwork not exceeding 150mm high	m	0.15
F7825	Formwork to soffits of manholes	h2	
F7826	Formwork in manholes in narrow width	m	

Enter a 1 in the trade factor column to associate an Op Code's quantity with its trade, or leave blank to ignore an Op Codes' quantity.

The trade factor may also be used to convert quantities that are measured in a different unit than that which you are combining quantities to.

In this example the formwork Op Codes, which are measured in linear metres, are being converted to m2 by entering the appropriate factor in the trade factor column.

OP CODE	DESCRIPTION	UNIT	TRADE FACTOR
E8110	Dewatering of excavations	Sum	
E8121	Load and dispose of surplus material	m3	
E82245	Filling under floors and around foundations in layers of 150mm, compacted to 95% mod AASHTO	m3	
E8251	Backfill & compact to 90% MOD AASHTO	m3	
F2154	Vertical formwork to sides of foundations	m2	
F2200	Vertical formwork to walls	m2	1
F243	Formwork to sides and soffits of beams	m2	1
F7301	Formwork not exceeding 150mm high	m	0.15
F7301a	Formwork not exceeding 150mm high	m	0.15
F7825	Formwork to soffits of manholes	m2	
F7826	Formwork in manholes in narrow width	m	
F9103	Form vertical expansion joints with 20mm thick impregnated fibre board including all necessary formwork. Size ex. 150mm ne 300mm high	m	1
F9444	Rake out 20mm thick filler board 13mm deep and fill with polysulphide sealant, including bond breaker	m	
J6827	Meranti window type C1 (597x930mm)	No	
L2111a	0.6mm thick galv sheet iron in 100 x 75mm rectangular pattern concealed eaves gutter with beaded top edge and fixing to falls on steel framing	m	1
L2112a	Extra on last for stopped end	no	
L2114a	Extra for outlet with nozzle piece for end joint to 100 x 75mm sheet iron rainwater pipe	no	
L2211a	0.6mm thick galv sheet iron in 100 x 75mm rectangular pattern rainwater pipe	m	1


## Bill Production Rates

Having allocated Production Codes and Trade Quantity Factors, you can now obtain some reports.

From the **Production** menu select **Bill Production Rates**.

A selector is displayed with the following options:

- **Bill order using billed quantity** - Select this option to report production rates for bill items using the billed quantity.
- **Op Code order using billed + macro quantity** - Select this option to report production rates for Op Codes using the billed quantity and macro bill quantity.

Select the required option and use the  button to continue.


If the first option is selected on the previous step, a further selector is displayed with the following options :

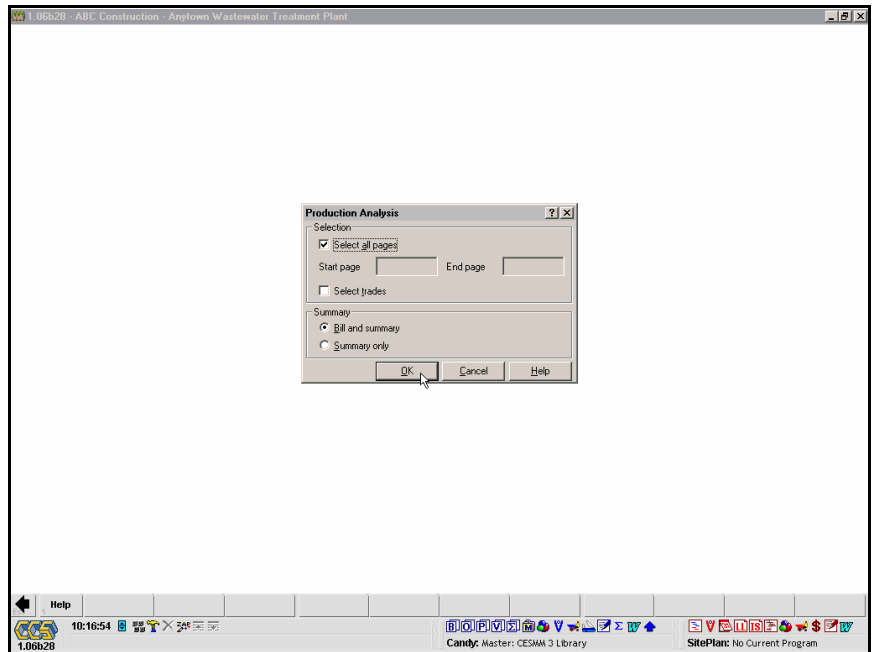
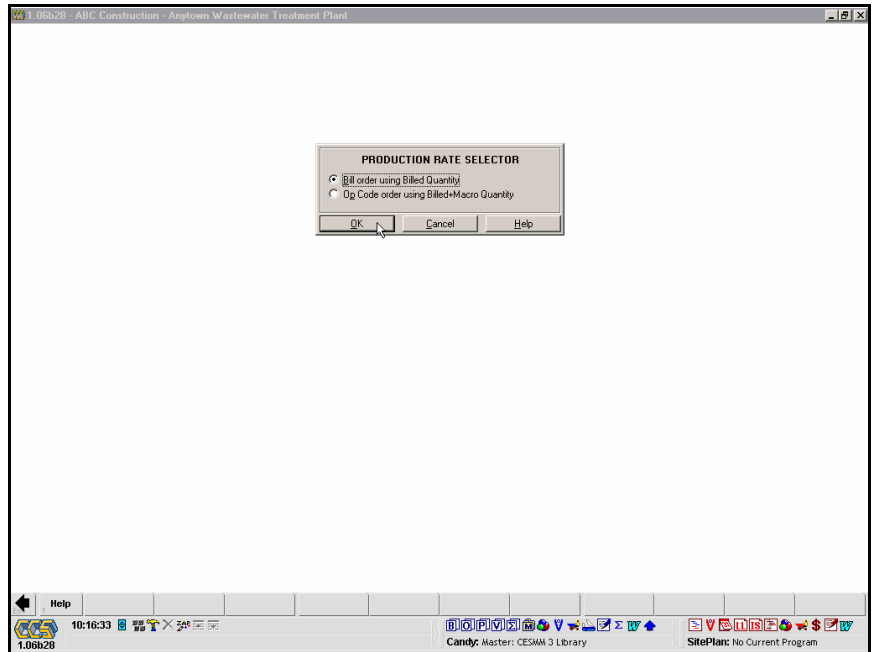
### Selection

- **Page range** - A CCS page range can be specified. Use **Select All Pages** to analyse the whole bill.
- **Select trades** - Select this option to produce the report for a selected trade or trades.

### Summary

- **Bill and summary** - If selected reports Production Rates at full bill detail.
- **Summary only** - If selected reports Production Rates as a Trade based summary report.

Select the required options and use the  button to produce the report.



## Bill Production Rates

The Bill Production Rates report looks like this.

Looking at Page 3 / Item L, the billed quantity is 1950 m3. The number of skilled man hours allowed to do this work is 5977 hours.

Therefore you have allowed 3.07 skilled man hours per m3 of concrete or conversely you must pour 0.33 m3 per skilled man hour.

The cost per unit, in this case 59.29, is the nett cost per m3 which is generated by those resources which have been allocated the skilled man hour production code.

*Note: The same report is available from the CCS Menu by following the path to Candy System to Estimating to Reports to Resource Analysis and select Bill Production Rates.*

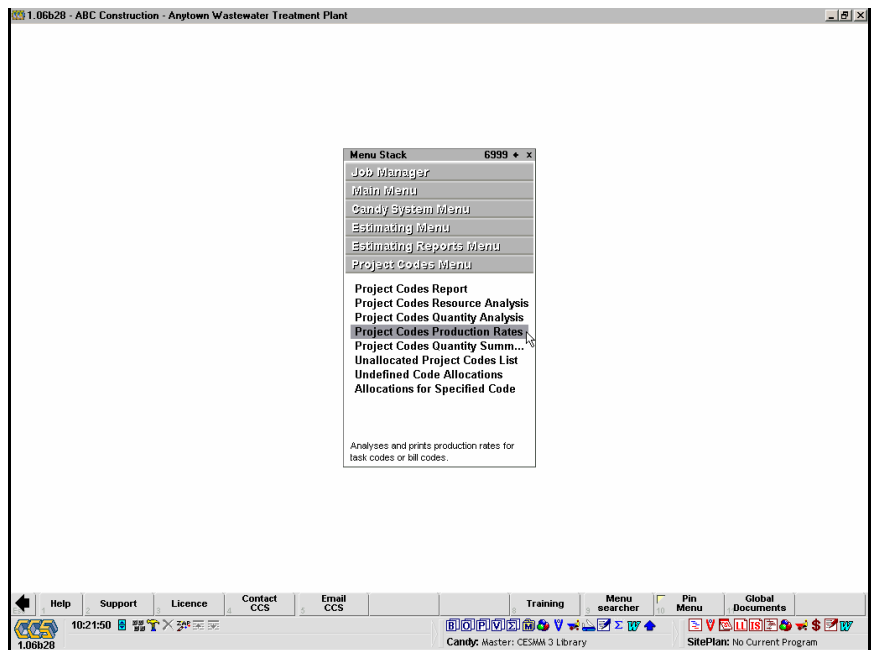
1.06b28 - ABC Construction - Anytown Wastewater Treatment Plant						
XCRL01.B07						
L	C341	C25 Concrete in foundations	1,950 m3			
	A	Skilled Man Hours	5,977 Hours	3.07 Hours/m3	0.33	59.29
	B	Haulage Plant Days	152 Days	0.08 Days/m3	12.87	10.88
	D	Operator Hours	1,733 Hours	0.89 Hours/m3	1.13	20.37
		Total Man Hours	7,710			
M	C3520	C25 Concrete in walls	315 m3			
	A	Skilled Man Hours	1,454 Hours	4.62 Hours/m3	0.22	89.49
	B	Haulage Plant Days	23 Days	0.07 Days/m3	13.57	10.33
	D	Operator Hours	256 Hours	0.84 Hours/m3	1.19	19.33
		Total Man Hours	1,720			
N	C3580	C25 Concrete in ground slabs	185 m3			
	A	Skilled Man Hours	368 Hours	3.64 Hours/m3	0.27	70.56
	B	Haulage Plant Days	38 Days	0.08 Days/m3	13.18	10.63
	D	Operator Hours	91 Hours	0.87 Hours/m3	1.15	19.90
		Total Man Hours	474			
O	C950	Hood float finish	1,365 m2			
	A	Skilled Man Hours	454 Hours	0.34 Hours/m2	2.94	6.45
		Total Man Hours	454			
4 A	F2154	Vertical formwork to sides of foundations	3,315 m2			
	A	Skilled Man Hours	7,044 Hours	2.13 Hours/m2	0.47	43.39
		Total Man Hours	7,044			
B	F2200	Vertical formwork to walls	1,778 m2			
	A	Skilled Man Hours	3,089 Hours	1.70 Hours/m2	0.59	34.71
		Total Man Hours	3,089			
C	F243	Formwork to sides and soffits of beams	159 m2			
	A	Skilled Man Hours	446 Hours	2.98 Hours/m2	0.34	60.74
		Total Man Hours	446			
D	F7301	Formwork not exceeding 150mm high	30 m			
	A	Skilled Man Hours	31 Hours	1.02 Hours/m	0.98	21.38
		Total Man Hours	31			
E	R240	16mm dia. HTS reinforcement	114.60 t			
	A	Skilled Man Hours	3,572 Hours	31.17 Hours/t	0.63	612.52
		Total Man Hours	3,572			
F	R228	E70 16mm HTS for bars of dia 10mm	24.60 t			
	A	Skilled Man Hours	256 Hours	10.39 Hours/t	0.10	284.17
		Total Man Hours	256			
G	R268	E70 16mm HTS for bars of dia 25mm	90 t			
	A	Skilled Man Hours	-467 Hours	-5.19 Hours/t	-0.19	-102.09
		Total Man Hours	-467			
H	R3150	Welded Mesh reinforcement Ref 395	405 m2			
	A	Skilled Man Hours	57 Hours	0.14 Hours/m2	7.06	2.75
		Total Man Hours	57			
I	H24636	M20 HD bolts in lengths ex. 750mm and ne 1000mm overall length	480 No.			
	A	Skilled Man Hours	870 Hours	1.81 Hours/No.	0.55	35.61
		Total Man Hours	870			
J	H24656	M30 HD bolts in lengths ex. 1250mm and ne 1500mm overall length	9,660 kg			
	A	Skilled Man Hours	4,927 Hours	0.51 Hours/kg	1.96	10.03
		Total Man Hours	4,927			
5 A	F9103	Form vertical expansion joints with 20mm thick impregnated fibre board	1,260 m			
		Total Man Hours	1,260			



## Project Code Production Rates

Production Rates can be printed by **Task Code** or **Bill Code**.

From the **CCS Menu** follow the path **Candy System** to **Estimating** to **Reports** to **Project Codes** and select **Project Codes Production Rates**.



A selector is displayed with the following options:

### Code Selection

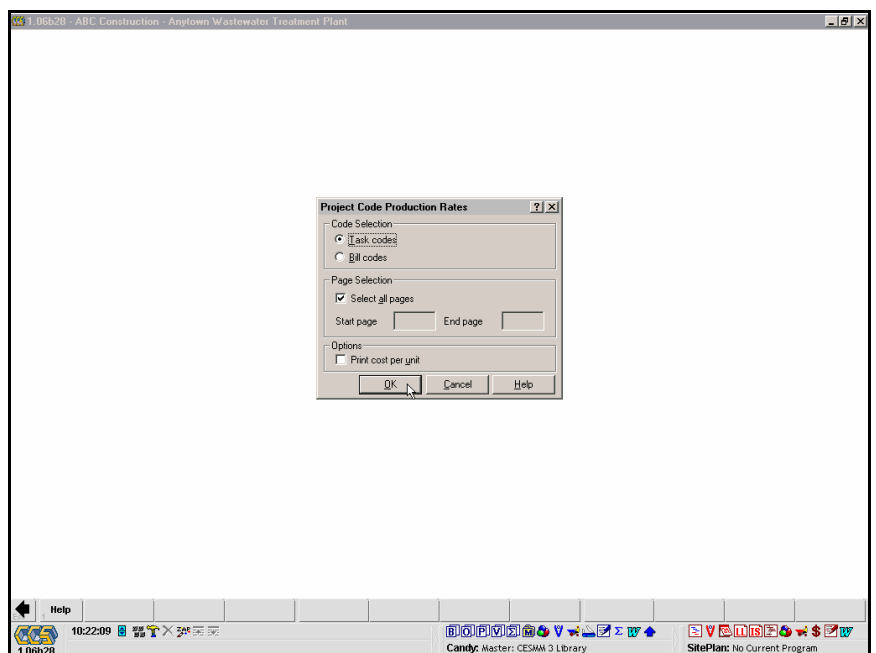
- **Task codes** - Select this option to report production rates for Task Codes.
- **Bill codes** - Select this option to report production rates for Bill Codes.

### Page Selection

- **Page range** - A CCS page range can be specified. Use **Select All Pages** to analyse the whole bill.

### Options

- **Print cost per unit** - Select this option to print the cost per unit on the report, that is the cost that each production code contributes per one of the project code quantity.



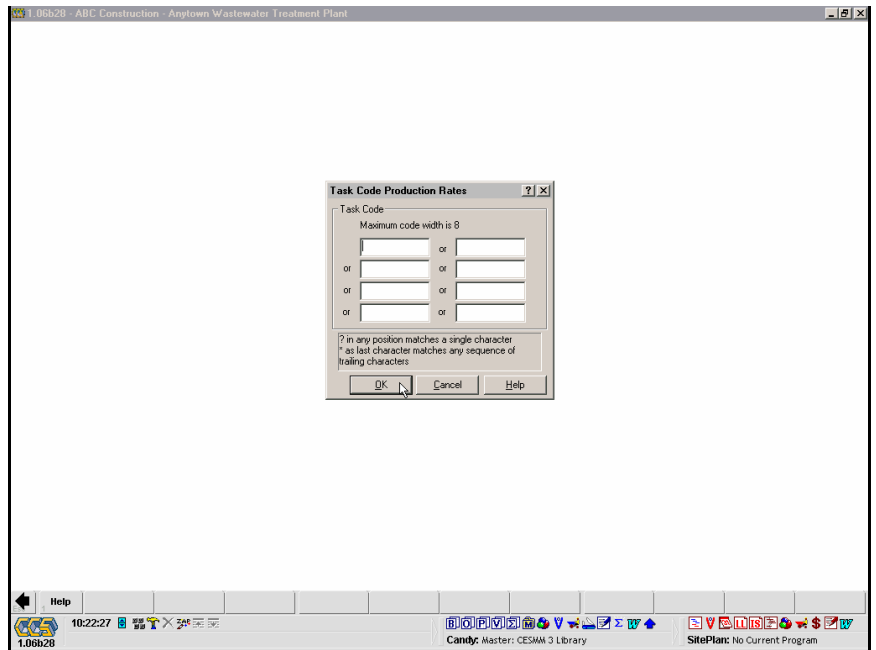
Select the required options and use the

button to continue.

A sieve is displayed on which specific Project Codes can be selected.

Leaving the sieve blank is the same as selecting all Project Codes.

Use the  button to produce the report.



## Project Code Production Rates

The Project Code Production Rates report looks like this.

Looking at Project Code 0110, the Quantity is 18646 m3. The number of skilled man hours allowed to do this work is 6695 hours.

Therefore you have allowed 0.36 skilled man hours per m3 of excavation or conversely you must excavate 2.78 m3 per skilled man hour.

The cost per unit, in this case 6.87, is the nett cost per m3 which is generated by those resources which have been allocated the skilled man hour production code.

*Note: The accuracy of the information produced on this report is dependent on the correct allocation of Project Codes and Project Code Factors to the bill items.*

TASK CODE	DESCRIPTION	QUANTITY	UNIT	PRODUCTION	1/PROD	COST/UNIT
001	Client Preliminaries	0.000	Sum			
0100	Clear Site	8,250.000	H2			
	A Skilled Man Hours	257	Hours	0.03 Hours/h2	32.12	0.59
	B Haulage Plant Days	8	Days	0.00 Days/h2	1,092.12	0.28
	C Earthmoving Plant Hours	6	Hours	0.01 Hours/h2	127.73	0.44
	D Operator Hours	128	Hours	0.02 Hours/h2	64.24	0.34
	Total Man Hours	385				
0110	Excavation	18,646.000	H3			
	A Skilled Man Hours	6,695	Hours	0.36 Hours/h3	2.78	6.87
	B Haulage Plant Days	141	Days	0.01 Days/h3	132.32	2.27
	C Earthmoving Plant Hours	2,583	Hours	0.14 Hours/h3	7.22	7.11
	D Operator Hours	4,390	Hours	0.24 Hours/h3	4.25	5.17
	Total Man Hours	11,685				
0120	Filling	11,520.000	H3			
	A Skilled Man Hours	3,917	Hours	0.34 Hours/h3	2.94	6.45
	B Haulage Plant Days	1,369	Days	0.11 Hours/h3	8.98	3.97
	C Earthmoving Plant Hours	1,958	Hours	0.17 Hours/h3	5.88	3.84
	D Operator Hours	5,875	Hours			
	Total Man Hours	84,720				
1101	Blinding	54,720.000	H3			
	A Skilled Man Hours	333	Hours	3.93 Hours/h3	0.25	76.00
	B Haulage Plant Days	9	Days	0.11 Days/h3	3.23	15.19
	C Earthmoving Plant Hours	105	Hours	0.19 Hours/h3	0.81	28.42
	D Operator Hours	438	Hours			
	Total Man Hours	2,145,000				
1102	Foundations	6,631.000	H3			
	A Skilled Man Hours	167	Hours	3.09 Hours/h3	0.32	59.79
	B Haulage Plant Days	1,966	Days	0.08 Days/h3	12.88	18.88
	C Earthmoving Plant Hours	8,537	Hours	0.89 Hours/h3	1.13	29.37
	D Operator Hours	315,000	Hours			
	Total Man Hours	1,424				
1103	Halls	1,424.000	H3			
	A Skilled Man Hours	23	Hours	4.62 Hours/h3	0.22	89.49
	B Haulage Plant Days	266	Days	0.07 Days/h3	13.57	18.33
	C Earthmoving Plant Hours	1,720	Hours	0.84 Hours/h3	1.19	19.33
	D Operator Hours	480,000	Hours			
	Total Man Hours	2,397				
1104	Ground Slabs	36.000	H3			
	A Skilled Man Hours	36	Hours	6.06 Hours/h3	0.17	116.30
	B Haulage Plant Days	417	Days	0.08 Days/h3	13.18	10.63
	C Earthmoving Plant Hours	3,324	Hours	0.87 Hours/h3	1.15	19.90
	D Operator Hours	3,324	Hours			
	Total Man Hours	3,315,000				
2102	Vertical Formwork - Founds.	7,044.000	H2			
	A Skilled Man Hours	2,130	Hours	2.13 Hours/h2	0.47	43.39
	B Haulage Plant Days	7,044	Days			
	C Earthmoving Plant Hours	7,044	Hours			
	D Operator Hours	3,009	Hours			
	Total Man Hours	1,770,000				
2103	Vertical Formwork - Walls	3,009.000	H2			
	A Skilled Man Hours	3,009	Hours	1.70 Hours/h2	0.59	34.71
	B Haulage Plant Days	3,009	Days			
	C Earthmoving Plant Hours	3,009	Hours			
	D Operator Hours	336,750	Hours			
	Total Man Hours	1,716				
2105	Vertical Formwork - Beams	1,716.000	H2			
	A Skilled Man Hours	1,716	Hours	5.10 Hours/h2	0.20	186.11


## Man Hour Code Definitions

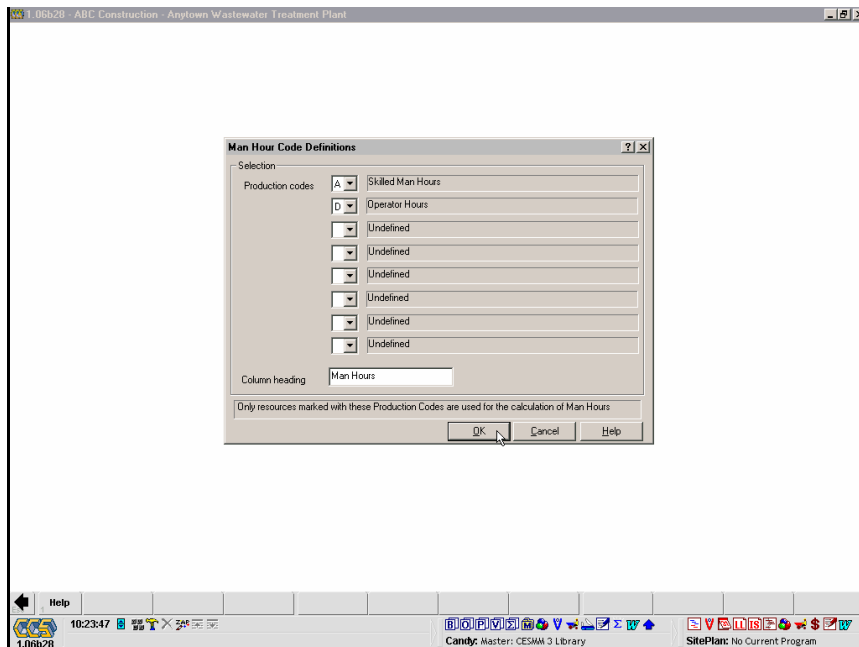
It is possible to group together up to eight Production Codes in order to produce an overall figure for Man Hours.

This information can then be printed on either worksheet or dual currency bill reports.

From the **Production** menu select **Man Hour Code Definition**.

A document is displayed on which up to eight Production Codes can be selected, together with a column heading, which is printed on reports.

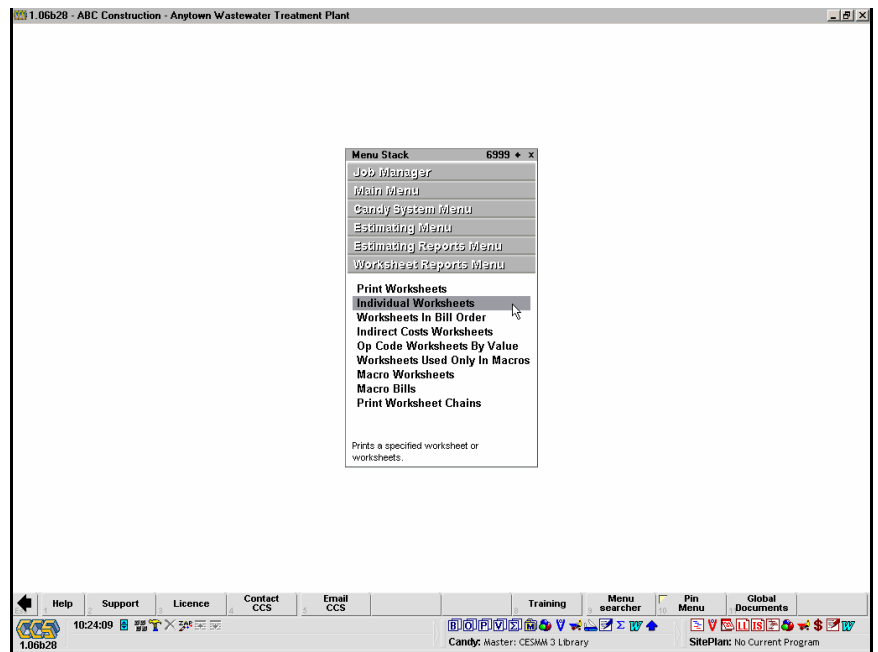
When the data has been entered use the  button.



## Man Hours on Worksheets

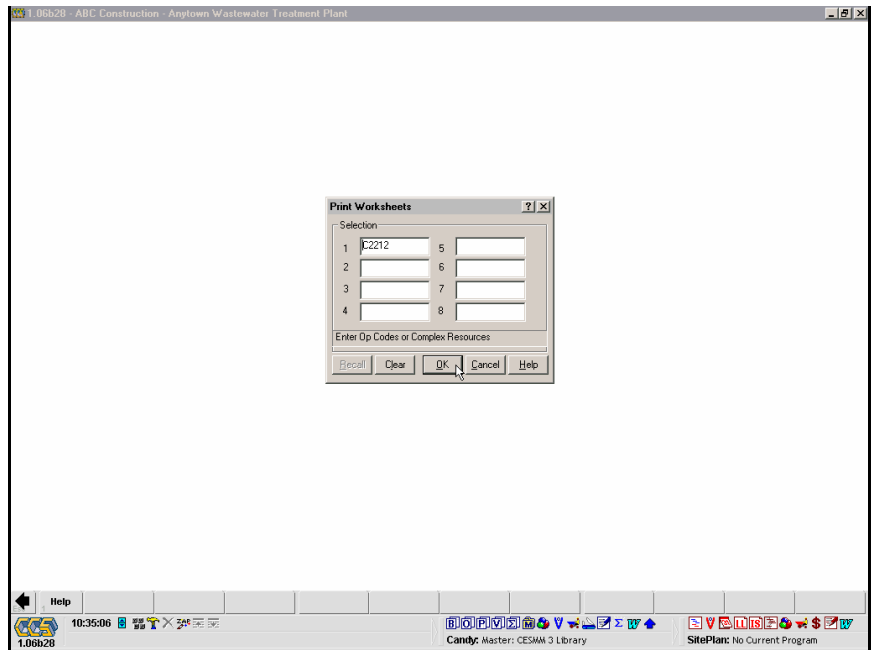
The calculated Man Hours can be printed on any of the Worksheet reports.

In this example select **Individual Worksheets** from the Worksheet Reports Menu.




Enter the required Op Code(s) on the sieve that is displayed.

Use the  button to continue.

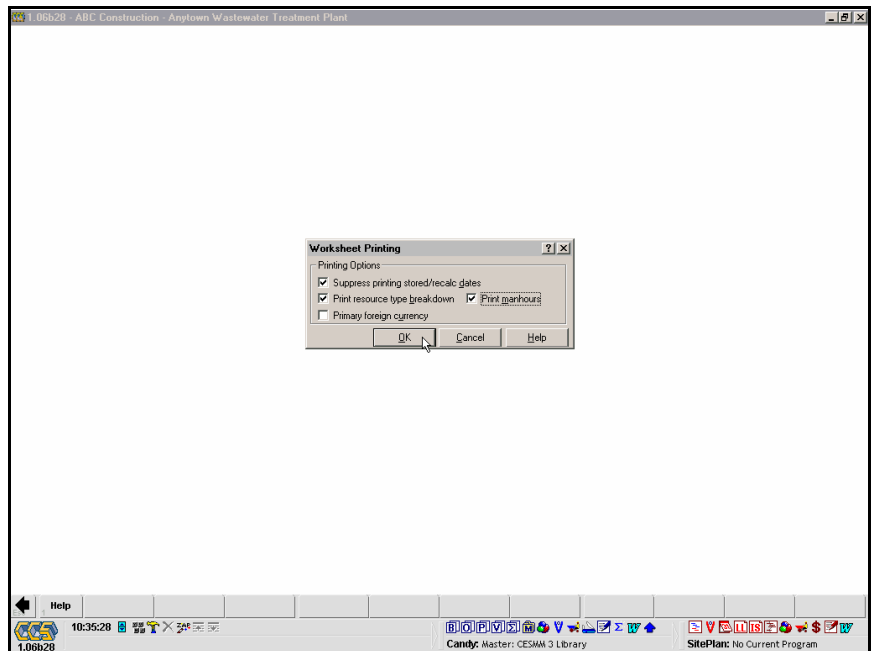


The following Worksheet printing options are available.

- **Suppress Printing Dates** - If selected the Worksheet **Stored** and **Rate Change** dates are not printed.
- **Print Resource Type Breakdown** - If selected prints the **Nett Split Amounts** for each line of the worksheet.
- **Print Man Hours** - If selected prints Man Hours on the worksheet report. This option is only available if **Print Resource Type Breakdown** has been selected.
- **Primary foreign currency** - Select this option to produce the report expressed in the **Primary Foreign Currency**.

Select the required options and use the  button to produce the report.

*Note: You have to select **Both** options two and three in order to print Man Hours on the worksheet.*



The Worksheet printout has the Man Hours displayed for each line on the worksheet, and in total for that worksheet.


		Total Qty Billed= 1,695.000 m2		Worksheet mode	
				Man Hours	
4	S15103 C10/19 Concrete Mixed & Delivered	182.643/m3	x1	=	13.70
7	24516 Placing Band (G+6)	1157.350/Day	/30m3 per day	=	252.1
=				APPLIED FACTOR	16.59
				Nett Rate	438.2
L= 5.22 P= 2.67 H= 8.90 1,695.000x16.59=28,120.05					
et 1					

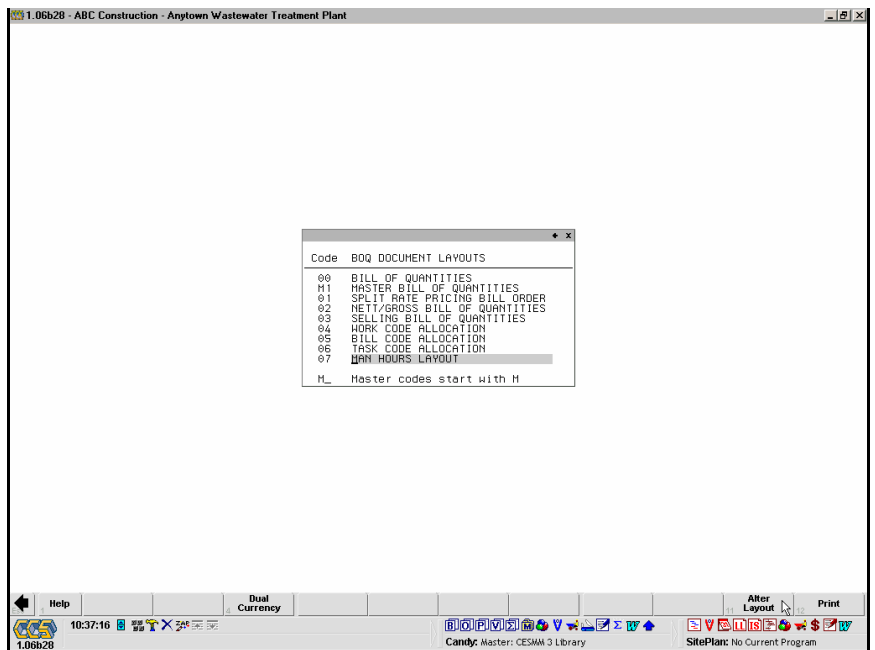
## Man Hours on a Bill Scroller

It is possible to display the man hours for each bill item on a bill scroller.

From the **CCS Menu** follow the path **Candy System** to **Estimating** and select **Bill of Quantities**.

This is the Bill of Quantities Layouts selector.

Create a new layout called **Man Hours Layout**, and use the  softkey.




A document is displayed which consists of two lists.

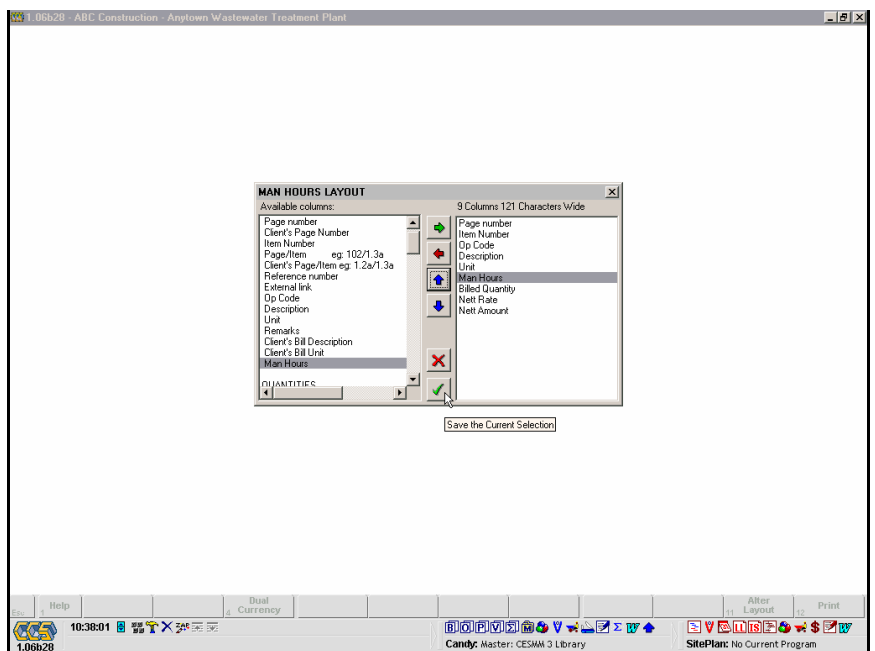
The left-hand list contains all the Bill of Quantities fields that are available.

The right hand list shows the currently selected fields.

Select the **Man Hours** column as in this example.

Use the  button to store any changes to the layout.

*Note: Refer to **Candy Manual Section 7 - Scrollers** for more information about the setting up of further, user-defined layouts.*



The Bill of Quantities Layouts selector is displayed once again.

Select the new **Man Hours Layout**.

The bill of quantities is displayed with the **Man Hours** column included on the layout.

The values in this column are automatically calculated if the quantity and/or the worksheet is changed for an item.

PAGE	ITEM	OP CODE	DESCRIPTION	UNIT	BILL QTY MAN HOURS	BILLED QUANTITY	NETT RATE	NETT AMOUNT
3	H	E670	compacted to 95% mod AASHTO	m <sup>3</sup> .km	244.8	21,600	0.80	17,280.00
3	I	E8110	Dewatering of excavations	SUM		1		Included
3	J	E670a	Stockpile excavated material on site	m <sup>3</sup> .km		0	0.20	Rate only
3	X	X1	CONCRETE, FORMWORK & REINFORCING	LEVEL		3		
3	X	X1	CONCRETE	LEVEL		4		
3	K	C2212	C10 Concrete in blinding 50mm thick	m <sup>2</sup>	438.3	1,695	16.58	28,120.05
3	L	C341	C20 Concrete in foundations	m <sup>3</sup>	7,710.2	1,950	244.51	476,794.50
3	M	C3520	C25 Concrete in walls	m <sup>3</sup>	1,719.9	315	266.66	83,997.90
3	N	C3580	C25 Concrete in ground slabs	m <sup>3</sup>	473.8	105	252.95	26,559.75
3	O	C350	Wood float finish	m <sup>2</sup>	464.1	1,365	6.45	8,804.25
4	X	X1	FORMWORK	LEVEL		4		
4	A	F2154	Vertical formwork to sides of foundations	m <sup>2</sup>	7,044.4	3,315	51.35	170,225.25
4	B	F2200	Vertical formwork to walls	m <sup>2</sup>	3,009.0	1,770	42.67	75,525.90
4	C	F243	Formwork to sides and soffits of beams	m <sup>2</sup>	446.3	150	75.74	11,361.60
4	D	F7301	Formwork not exceeding 150mm high	m	30.6	30	29.85	895.50
4	X	X1	REINFORCEMENT	LEVEL		4		
4	E	R240	16mm dia. HTS reinforcement	t	3,571.7	114.60	1,179.02	135,115.69
4	F	R228	E/D 16mm HTS for bars of dia 16mm	t	255.6	24.60	204.17	5,022.58
4	G	R268	E/D 16mm HTS for bars of dia 25mm	t	-467.5	90	-102.09	-9,188.10
4	H	R3150	Welded Mesh reinforcement Ref 395	m <sup>2</sup>	57.4	405	11.38	4,608.90
4	X	X1	H.D. BOLTS AND MISCELLANEOUS METALWORK	LEVEL		4		
4	X	X1	Supply, place and cast into position, hot dip galvanised H.D. bolts	LEVEL		0		
4	I	H24636	M20 HD bolts in lengths ex. 750mm and	No.	069.5	400	52.88	25,302.40

