

CRC for Construction Innovation Research Conference

Gold Coast 28th to 30th July 2003



# What is a quantity surveyor?

# Architect gives you good news





# What is a quantity surveyor?

# The QS gives you the bad news





### Taxi Driver and Researcher

# "Oh you're the people that count bricks"





QS is a Cost Manager & Cost Planner

### **Brief, CBD Hotel**

Hotel: 500 rooms, 5 star
Podium: 8000 m<sup>2</sup>
Carpark: 500 cars





- Basic building
- 5 Star area 95-110m2 per room Car Park 40-50m2/car
  - Hotel Range \$2,200 \$3,000/m2
  - Podium Range \$2,500 \$3,500/m2
  - Car Park Range \$950 \$1,100/m2

• FF&E \$40,000 - \$75,000/Room



# Cost Plan

- •Time frame
- •Contract Type
  - Negotiated
  - GMP
  - Tendered

- Industrial factors
- •What else is happening in market
- Escalation
- Contingency
- •Existing site condition
- •Extraordinary issues
- •Risk



### Car Park

- Measure scheme
  - Concept stage
  - Sketch plan
  - Documentation
  - Working drawing



### Does not meet budget

- Not efficient enough 45m<sup>2</sup>/car space
- Floor to floor height too generous
- Construction not appropriate
  - Structure
  - External walls
- Finishes too generous



## What Do We Do?

Quite simply ...

- Appropriate quantification
- Appropriate pricing





| Concept            | GFAs on historical info                       |
|--------------------|---|
| Sketch Plan        | GFAs on historical measurement                |
| Design development | Detailed measurement<br>No details            |
| Working drawing    | Full measurement<br>Incl. details and labours |





| Concept               | Historical GFA rates                                    | Big Picture<br>Historical   |
|-----------------------|---|---|
| Sketch plan           | Detailed global<br>rates includes<br>extras             | Which lasts as<br>long as subbie<br>market thinks is<br>appropriate |
| Design<br>development | More detail   | Same as above<br>Different time<br>frame                            |
| Working<br>drawing    | Price for today's<br>market rates in<br>detail from BoQ | Same as above<br>Different time<br>frame                            |



## **Consider Risk**

- Architect
- Contract type
- Market place  $\rightarrow$  up or down
- Ground conditions
- Site
- Current Builders Pricing
- Contingency



### **Rider Hunt Cost Index**

| PERIOD<br>ENDING | RHBCI<br>SYDNEY | BUILDING<br>MATERIALS<br>PRICE<br>INDEX | CPI<br>SYDNEY |
|------------------|-----------------|---|---------------|
| Dec 80           | 100.0           | 100.0                                   | 100.0         |
| Dec 81           | 116.7           | 111.0                                   | 110.8         |
| Dec 82           | 125.5           | 126.3                                   | 124.0         |
| Dec 83           | 133.0           | 132.9                                   | 133.5         |
| Dec 84           | 141.0           | 138.4                                   | 136.5         |
| Dec 85           | 162.2           | 149.4                                   | 147.8         |
| Dec 86           | 180.0           | 161.1                                   | 162.2         |
| Dec 87           | 198.4           | 176.4                                   | 174.1         |
| Dec 88           | 215.8           | 192.1                                   | 190.1         |
| Dec 89           | 232.3           | 206.3                                   | 204.1         |
| Dec 90           | 225.2           | 218.8                                   | 217.0         |
| Dec 91           | 201.1           | 222.1                                   | 220.3         |
| Dec 92           | 191.2           | 220.0                                   | 220.9         |
| Dec 93           | 194.1           | 220.5                                   | 223.8         |
| Dec 94           | 201.9           | 227.2                                   | 229.9         |
| Dec 95           | 212.0           | 233.4                                   | 243.3         |
| Dec 96           | 224.7           | 233.2                                   | 247.6         |
| Dec 97           | 240.4           | 236.5                                   | 247.0         |
| Dec 98           | 257.7           | 238.3                                   | 251.7         |
| Dec 99           | 273.4           | 239.0                                   | 256.5         |
| Dec 00           | 273.4           | 239.6                                   | 271.9         |
| Jun 01           | 273.4           | 241.7                                   | 277.7         |
| Dec 01           | 276.1           | 243.7                                   | 281.0         |
| Mar 02           | 278.2           | 244.1                                   | 283.6         |
| Jun 02           | 280.3           | 248.5                                   | 285.5         |
| Sep 02           | 282.3           | 249.8                                   | 287.8         |
| Dec 02           | 284.4*          | 251.0*                                  | 290.2*        |
| Mar 03           | 286.6*          | 252.9*                                  | 292.6*        |
| Jun 03           | 288.7*          | 254.8*                                  | 295.0*        |
| Sep 03           | 290.8*          | 256.7*                                  | 297.0*        |
| Dec 03           | 293.0*          | 258.6*                                  | 298.9*        |
| Donotoe for      | popet index     |   |               |

Denotes forecast index

### **Building Cost Indices**

These indices reflect the change in tender levels for commercial buildings in Sydney as compared with the consumer price index and the materials used in construction. The figures take into account labour and material cost changes and market conditions.



### **Automated Quantities**

### Where are we going 2005 $\rightarrow$

Concept:?Sketch Plan:?Design Development:PotentialWorking Drawing:Yes



### Where are we going 2005 $\rightarrow$ Same as today ???

### **Price Book**

- Rawlinson
- Cordells

### **Quantity Surveying Firm**

- Previous projects
- Main contractor
- Subcontractors
- Suppliers



### **Parametric Estimating**

e.g. Apartments



| RESIDENTIAL CONSTRUCTION ESTIMATE INPUT |  |
|---|--|
| (PROJECTS GREATER THAN 3 STORIES)       |  |

|   | TO 18  | Net Profit:  | No feasibility   | Return on inv:  | No feasibi                      |
|---|--|--|--|---|---------------------------------|
|   | 100000000000000000000000000000000000000  | Total Cost:  | #NI/A  | Cest / m2 GFA:  | #NIA                            |
| PROJECT NAME  | CRIC Innovatio   | 00   |  |   |                                 |
| LOCATION  | STATE Tate S   | n.tr.Viales 💌  | LOCATION   | Sythey Suburbs  | •                               |
| DATE OF ESTIMATE ( ddmm/yy )  | 15/30/03   |  |  |   |                                 |
| CONSTRUCTION START DATE ( dd/mm/yy  | 15/34/04   |  |  |   |                                 |
| UNIT DATA   | 2  | No   | Saleable<br>Area incl<br>Balconier   | No of<br>Bathrooms  | Area of<br>Balconia<br>(OPTIONA |
|   | 1 Bedroom  | 18   | - 60   |   |                                 |
|   | 1 Bedroom<br>1 Bedroom   |  |  |   |                                 |
|   | 2 Bedroom  | 110  | - 00   | 2   |                                 |
|   | 2 Bedroom<br>2 Bedroom   |  | -  | -   |                                 |
|   | 3 Bedroom  | 20   | 120  | .2  |                                 |
|   | 3 Bedroom<br>3 Bedroom   |  | -  |   | -                               |
|   | Perthouse  | 5.   | 190  | 3   |                                 |
|   | Penthouse  |  |  |   |                                 |
|   |  |  |  |   |                                 |
|   | Totais   | 23.0   |  |   |                                 |
|   |  | 40%  | 18,950   | 370   | 2,842                           |
| DOES THE BUILDING HAVE PODIUM LEVELS  | Vec  |  | 18,959   | 379   | 2,842                           |
| and the second  | 2007   | •  | 18,350   | 579   | 2,842                           |
| ANSWER QUESTION 7   | 186  |  | 18,354   | 379   | 2,042                           |
| ANSWER QUESTION 7   |  | •  | 18,354   | 379   | 2,042                           |
| ANSWER QUESTION T<br>ASSIGN PODIUM AREAS TO THE FOLLOWING US<br>Core and Circulation Should be around 15% of the<br>Commercia   | ves  | •  | CARPARNING   | ABOVE GROUN!  |                                 |
| ANSWER QUESTION 7<br>ASSIGN PODIUM AREAS TO THE FOLLOWING UP<br>Core and Circulation Should be around 15% of the<br>Commercia<br>Retai  | Tes<br>Total podium a<br>1,700   | m2<br>m2   | CARPARKING   | ABOVE GROUN!  |                                 |
| ANSWER QUESTION T<br>ASSIGN PODIUM AREAS TO THE FOLLOWING UP<br>Core and Circulation Should be around 15% of the<br>Commercia<br>Retai<br>Cafe  | Tes  | res m2 m2 m2 m2  | CARPARKING<br>Basel on 37 mg   | ABOVE GROUN!<br>Der car you are pro   | oviding                         |
| ANSWER QUESTION 7<br>ASSIGN PODIUM AREAS TO THE FOLLOWING UP<br>Core and Circulation Should be around 16% of the<br>Commercia<br>Retai<br>Cafe<br>Restauran<br>Units  | Tes  | m2<br>m2<br>m2<br>m2<br>m2<br>m2   | CARPARKING<br>Based on 37 m3<br>8 Catharlis abo<br>You can change                                  | ABOVE GROUNI<br>I per car you are pro-<br>e ground<br>the area per car m  | oviding                         |
| ANSWER QUESTION 7<br>ASSIGN PODIUM AREAS TO THE FOLLOWING UP<br>Core and Circulation Should be around 15% of the<br>Commercia<br>Retai<br>Cafe<br>Restauran<br>Units<br>Foyers, communia  | Total podium a   | m2<br>m2<br>m2<br>m2<br>m2<br>m2<br>m2<br>m2                               | CARPARKING<br>Deset on 37 m<br>1 Carpeto abo<br>You can change<br>CORE AND CE                      | ABOVE GROUN!<br>Decor you are proved on you are proved on you are proved on you are per car to the area per car tot the area per car tot the area per | oviding<br>Question 2           |
| ANSWER QUESTION 7<br>ASSIGN PODIUM AREAS TO THE FOLLOWING UP<br>Core and Circulation Should be around 16% of the<br>Commercia<br>Retai<br>Cafe<br>Restauran<br>Units  | Total podium a   | m2<br>m2<br>m2<br>m2<br>m2<br>m2   | CARPARKING<br>Deset on 37 m<br>1 Carpeto abo<br>You can change<br>CORE AND CE                      | ABOVE GROUN!<br>per car you are pri-<br>e ground<br>the area per car in<br>ICULATION<br>Unition would be  | oviding                         |
| ANSWER QUESTION 1<br>ASSIGN POOLUM AREAS TO THE FOLLOWING UP<br>Core and Circulation Should be around 15% of the<br>Commercia<br>Retai<br>Café<br>Restauran<br>Units<br>Foyers, communia<br>Carparking above ground   | Tes<br>a total podium a<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700 | m2<br>m2<br>m2<br>m2<br>m2<br>m2<br>m2<br>m2<br>m2<br>m2<br>m2<br>m2<br>m2 | CARPARKING<br>Based on 37 m<br>9 Carparlo abor<br>You can change<br>CORE AND CE<br>15% core & circ | ABOVE GROUN!<br>per car you are pri-<br>e ground<br>the area per car in<br>ICULATION<br>Unition would be  | oviding<br>Question 2           |
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| ANSWER GUESTION 7<br>ASSIGN POOLUM AREAS TO THE FOLLOWING UP<br>Core and Circulation Should be around 15% of the<br>Commercia<br>Retai<br>Cafe<br>Restauran<br>Units<br>Foyers, communia<br>Carparking above ground<br>Core and circulation<br>TOTAL AREA OF PODIUM<br>IS THE BUILDING A "TOWER ONLY" BEINC | Vei<br>a total podium a<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700<br>1,700 | m2<br>m2<br>m2<br>m2<br>m2<br>m2<br>m2<br>m2<br>m2<br>m2<br>m2<br>m2<br>m2 | CARPARKING<br>Based on 37 m<br>9 Carparlo abor<br>You can change<br>CORE AND CE<br>15% core & circ | ABOVE GROUN!<br>per car you are pri-<br>e ground<br>the area per car in<br>ICULATION<br>Unition would be  | oviding<br>Question 2           |



| AREA OF SITE   | 2,600  | m2                       |     |     |
|--|--|--------------------------|-----|-----|
| FACILITIES PROVIDEC  | Pool and spaing<br>Pool and spa sus<br>Pool and spa on<br>Sauna<br>Gymnasium | pendec                   | 785 |     |
| QUICK OR DETAILED BUILDING PROFILE   | Detailed   | -                        |     | 7.5 |
| SKIP QUESTION 12, ANSWER QUESTION 13   | ]  |                          |     |     |
| DETAILED TOWER PROFILE BUILDUI<br>SO TO DETAILED PROFILE WORKSHEET AND FIL<br>DOES THE BUILDING HAVE TERRACES A'<br>SULDING SETBACKS | L IN DETAIL  |                          |     |     |
| QUALITY OF UNITS   | Medium/High  | <b> + </b>               |     |     |
| If you have penthouses you can select qualit<br>upgrades over standard units as require:   | Kitchen<br>Appliances<br>Sanitary Fistures<br>Tilling                        | 789<br>789<br>789<br>789 |     |     |

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#### **RESIDENTIAL CONSTRUCTION ESTIMATE INPUT** (PROJECTS GREATER THAN 3 STORIES) 16 FAÇADE SYSTEM ٠ Painted rande ed block OR ENTER \$ / M2 WALL TO FLOOR RATIO Helium restanging . 17 ARE UNITS AIRCONDITIONEL Control ducted system. -18 ARE FOYERS AIRCONDITIONES -**QUESTIONS 19 TO 29 ARE OPTIONAL** 19 NO OF LIFTS SERVING THE BUILDING OR DEFAULT 6 ٠ 20 GEOTECH CONDITION OF SITE OR DEFAULT Clay dard Hock -21 FLOOR TO FLOOR HEIGHT OF TOWEF OR DEFAULT 2.88 m 3.10 m 22 FLOOR TO FLOOR HEIGHT OF PODIUM OR DEFAULT 3.20 m 4.00 m 23 STRUCTURAL SYSTEM OR DEFAULT CONC FRAMED Concrete Filamed ٠ 24 QUALITY OF EXTERNAL SITE FINISH OR DEFAULT Medium And Law . 25 NO OF CARPARKS REQUIRED BELOW GROUNI 222 OR DEFAULT (DEFAULT III 1 PER 1/N/T LESS ABOVE SPOUND PARKING) 26 NO OF SQUARE METRES PER CAF OR DEFAULT 36 27 TYPE OF BALCONY ARRANGEMEN Long - Internal OR DEFAULT . ang - intertui 28 ENTER DATA FOR DETAILED PRELIMINARIE Select a Location ٠ OF THE QUESTION IS NOT ANSWERED PRELING WILL BE CALCULATED BY THE DEFAULT PERECENTAGE) Select length of footpath gantry required ٠ Select No of Tower cranes . Having calculated detailed preliminaries d • you wish to over-ride and use the default percentage 29 FREEFORM AREA Description Amount Enter in description and amount of mone emolition working 2 000 000 00 for any additional known cost: (eg) Headworks, demolition of exist buildings, alle contamination, work autoble alle boundary, Rootpath landscaping, fapade features, elic)



#### **RESIDENTIAL CONSTRUCTION ESTIMATE INPUT** (PROJECTS GREATER THAN 3 STORIES) ANSWER QUESTIONS 30 TO 32 TO PRODUCE A FEASIBILITY STUDY 30 LAND COBT 31 INTEREST RATE ON BORROWED MONEY 32 INCOME FROM SALES 1 Bed units 1 m2 2 Bed units 1 m2 **3** Bed units 1 m2 Penthouse Units 1 m2 Commercial 1 m2 Retail 1 m2 Café 1 m2 Restaurant /m2 Management Rights / unit 33 DEVELOPER'S EQUITY IF OTHER THAN 30% Answering this question is options 34 PROFESSIONAL FEES IF OTHER THAN 8.05 Answering this question is options 35 MARKETING FEES IF OTHER THAN 4.35 Answering this question is options 35 ADVANCE COMMISSION OF ANY Answering this question is options 37 COUNCIL & SUNDRY FEES IF OTHER THAN 2.09 Answering this question is options 38 DEV. CONTINGENCY IF OTHER THAN 0.59 Answering this question is options 39 REAL ESTATE COMMISSION IF OTHER THAN 4.01 Answering this question is options



| c   | COST SUM   | IMARY  |               |    |           |
|---|--|--------|---------------|----|-----------|
| Project name<br>Location<br>Estimate Date<br>Commencement of Construction | CRC Innovatio<br>Sydney Suburi<br>15/Jul/03<br>15/Jul/04 |        |               |    |           |
| Building Component  | Floors   | Area   | Net Cost / m2 | N  | et Cost   |
| Foundations   |  |        |               | \$ | 52,500    |
| Basement Carpark  | з  | 7,500  | #N/A          |    | #N/A      |
| Podium Levels   | 2  | 2,450  | #N/A          |    | #N/A      |
| Tower Unit Levels & plantrooms  | 18   | 23,100 | #N/A          |    | #N/A      |
| Lifts   |  |        |               | \$ | 7,960,000 |
| External Works  |  |        |               |    | #N/A      |
| Other Additional Items  |  |        |               | \$ | 2,000,000 |
| Sub-Total   |  |        |               |    | #N/A      |
| Preliminaries   |  |        | 18.0%         |    | #N/A      |
| Builder's Margin  |  |        | 4.0%          |    | #N/A      |
| Contingency   |  |        | 3.0%          |    | #N/A      |
| Escalation  |  |        | 5.08%         |    | #N/A      |
| TOTAL ESTIMATE  | 23   | 33,050 | #N/A          |    | #N/A      |



#### SPECIFICATION

| Project name | -        |       |
|--------------|----------|-------|
|              | Drailact | 0.000 |
|              |          |       |

Location Estimate Date **CRC** Innovations

New South Wales Sydney Suburbs 15/Jul/03 Commencement of Construction 15/Jul/04

**INIA Construction Estimate** 

| Core and Circulation                              | 290        | m2             |
|---|------------|----------------|
| Carparking above ground                           | 290        | m2             |
| Foyers, communi al                                | 170        | m2             |
| Utvts   | 0          | m2             |
| Restaurant  | 0          | m2             |
| Café  | 0          | m(2            |
| Retail  | 0          | m2             |
| Commercial  | 1,700      | m2             |
| Consisting of                                     | 4,400      | 1114           |
| PODILM<br>No of Podium Levels<br>Total GFA Podium | 2,450      | No<br>m2       |
|   |            |                |
| Terraces at unit setbacks                         | Yes        |                |
| Efficiency of unit floors                         | 84%        |                |
| No of lifts servicing building                    | 4          | No             |
| Type of balcony amangement                        | Long - int | tornal         |
| Foyers arconditioned                              | Yes        |                |
| Airconditioning of units                          |            | initial system |
| Shape of floorplate                               |            | rectangular    |
| Facade System                                     |            | endered block  |
| Guality of units                                  | Medum      | High           |
| Total GFA of unit tower only                      | 23,100     | m2             |
| Area of Balconies only                            | 2,842      | m2             |
| Saleable area of units (incl balconies)           | 18,950     | m2             |
| No of Penthouses                                  | ÷          | No             |
| No of 3 Bedroom units                             | 20         | 140            |
| No of 2 Bedroom units                             | 110        | No             |
|   |            |                |

| BASEMENTS (BELOW GROUND)    |       |       |  |
|-----------------------------|-------|-------|--|
| Total GFA of Basement       | 7,500 | ria l |  |
| No of Elasements            | 3     | No    |  |
| No of carpatis below ground | 210   | No    |  |
| Square metres per car       | 37    | m2    |  |

#### SITE AND FACILITIES

| Site Area<br>Geotechnical condition of site<br>Quality of external site finish | 2,600 m2<br>Hard Rock<br>Medium |  |
|--|---------------------------------|--|
| Facilities<br>Inground pool and spa  | No                              |  |
| Suspended pool and spa<br>Pool and spa on roof                                 | Yes                             |  |
| Sauna  | No                              |  |
| Gymnasium  | Y 65                            |  |

| Vernalition works | \$2,000,00 |
|-------------------|------------|
|                   |            |
|                   |            |
|                   |            |
|                   |            |

#### CRC Innovations PROPOSED RESIDENTIAL DEVELOPMENT OUTLINE FEASIBILITY STUDY

|                      | TOTAL CAPITA  | L COST  |                                     |  |                              |   |  |  |                                 |   |    | \$  |
|----------------------|---|---|-------------------------------------|--|------------------------------|---|--|--|---------------------------------|---|----|---|
| 1.01                 | Land  |   |                                     |  |                              |   |  |  |                                 |   |    | 0   |
| 1.02                 | Stamp Duty, Rates   | & Land 1  | Fast                                |  |                              |   |  |  |                                 |   |    | 0   |
| 1.03                 | Building (GF  | A 33,05   | 0 m2 @ #                            | AV9  |                              |   |  |  |                                 |   |    | #N/A  |
| 1.04                 | Building variation  | lowance   | (Incl in                            | 1.03)  | 0.096                        |   |  |  |                                 |   |    | #N/A  |
| 1.05                 | Professional Fees   |   |                                     |  | 8.0%                         |   |  |  |                                 |   |    | #t-WA   |
| 1.06                 | Marketing   |   |                                     |  | 4.3%                         |   |  |  |                                 |   |    | 0   |
| 1.07                 | Advance commissi  | on  |                                     |  |                              |   |  |  |                                 |   |    | 0   |
| 1.08                 | Council and randri  |   |                                     |  | 2.0%                         |   |  |  |                                 |   |    | #NVA  |
|                      |   |   |                                     |  | 5                            | lab Total   |  |  |                                 |   |    | #147A   |
| 1.09                 | Developers' Contan  | gency   |                                     |  | 0.5%                         |   |  |  |                                 |   |    | #N/A  |
|                      | NETT CAPITAL  | REQUI   | REMENT                              | 5 C  |                              |   |  |  |                                 |   | \$ | #NVA  |
| 1.11<br>1.12<br>1.13 | Pre-construction In<br>Construction Intere<br>Stamp Duty<br>Establishment Fee<br>Other lending author   | at  |                                     |  |                              | restafter 3<br>restafter 3                        |  |  |                                 |   |    | 0<br>A亞姓<br>A亞姓<br>A亞姓<br>A亞姓<br>A亚伊                  |
|                      | GROSS CAPITAL   | LREQU   | IREMEN                              | T  |                              |   |  |  |                                 |   | 5  | #t%A  |
|                      |   |   |                                     |  |                              |   |  |  |                                 |   |    |   |
| 1.15                 | GST on 1.03 to 1.0  | 07,1.09,1   | 13,1.14 a                           | ad REI   | Q Cammin                     | ui en   |  |  |                                 |   |    | #b@A  |
|                      | GST on 1.03 to 1.0  |   | 13,1.14 a                           | nd REI   | Q Cammin                     | si en   |  |  |                                 |   |    | ANVA<br>S   |
|                      |   | SALES<br>requires   |                                     |  | Q Cammin                     | ui en   |  |  |                                 |   |    |   |
|                      | INCOME FROM   | SALES<br>requires   | confirm:<br>age Sell                |  | Q Cammin                     | 5,700   | m2                                     | 1  | ~                               | /m2   |    | \$  |
|                      | INCOME FROM<br>The following  | SALES<br>requires<br>Aver<br>P                                    | confirma<br>age Sell<br>'rice       | ition  |                              |   | m2<br>m2                               | \$   |                                 | /m2<br>/m2                                    |    | \$  |
|                      | INCOME FROM<br>The following<br>One bed Units   | SALES<br>requires<br>Aver<br>P                                    | confirma<br>age Sell<br>trice       | ition<br>95  | No                           | 5,700   |  |  | 5                               | _   |    | \$  |
|                      | ENCOME FROM<br>The following<br>One bed Units<br>Two bed Units  | SALES<br>requires<br>Avec<br>P<br>\$<br>\$<br>\$                  | confirma<br>age Sell<br>trice       | ntion<br>95<br>110                                       | No<br>No                     | 5,700<br>9,900                                    | m2                                     | \$   | 10.04                           | /m2   |    | <b>S</b><br>0<br>0                                    |
|                      | INCOME FROM<br>The following<br>One bed Units<br>Two bed Units<br>Three Bed Units   | SALES<br>requires<br>Aver<br>p<br>\$<br>\$<br>\$<br>\$<br>\$      | confirma<br>age Sell<br>trice       | 95<br>110<br>20  | No<br>No                     | 5,700<br>9,900<br>2,400                           | m2<br>m2                               | \$<br>\$   | 1.1.1                           | /m2<br>/m2                                    |    | <b>S</b><br>0<br>0<br>0                               |
|                      | INCOME FROM<br>The following<br>One bed Units<br>Two bed Units<br>Three Bed Units<br>Penthouse Units  | SALES<br>requires<br>Aver<br>p<br>\$<br>\$<br>\$<br>\$<br>\$      | confirma<br>age Sell<br>trice       | ntion<br>95<br>110<br>20<br>5                            | No<br>No<br>No               | 5,700<br>9,900<br>2,400<br>950                    | m2<br>m2<br>m2                         | 2<br>2<br>2  | 10.1 10.4                       | /m2<br>/m2<br>/m2                             |    | <b>S</b><br>0<br>0<br>0<br>0<br>0                     |
|                      | INCOME FROM<br>The following<br>One bed Units<br>Two bed Units<br>Three Bed Units<br>Penthouse Units<br>Commercial                                | SALES<br>requires<br>Aver<br>p<br>\$<br>\$<br>\$<br>\$<br>\$      | confirma<br>age Sell<br>trice       | 95<br>110<br>20<br>5<br>Yield                            | No<br>No<br>No<br>No<br>10%  | 5,700<br>9,900<br>2,400<br>950<br>1,700           | m2<br>m2<br>m2<br>m2                   | \$<br>\$<br>\$<br>\$                               | 1.1.1.1.1.1                     | /m2<br>/m2<br>/m2<br>/m2                      |    | \$<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0            |
|                      | INCOME FROM<br>The following<br>One bed Units<br>Two bed Units<br>Three Bed Units<br>Penthouse Units<br>Commercial<br>Retail                      | SALES<br>requires<br>Aver<br>p<br>\$<br>\$<br>\$<br>\$<br>\$      | confirma<br>age Sell<br>trice       | 95<br>110<br>20<br>5<br>Yield<br>Yield                   | No<br>No<br>No<br>10%        | 5,700<br>9,900<br>2,400<br>950<br>1,700<br>0      | m2<br>m2<br>m2<br>m2<br>m2             | 5<br>5<br>5<br>5<br>5                              | 101 101 101                     | /m2<br>/m2<br>/m2<br>/m2<br>/m2               |    | \$<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0            |
|                      | ENCOME FROM<br>The following<br>One bed Units<br>Two bed Units<br>Three Bed Units<br>Penthouse Units<br>Commercial<br>Retail<br>Café              | SALES<br>requires<br>Aver<br>S<br>S<br>S<br>S<br>S<br>S<br>S<br>S | confirma<br>age Sell<br>trice       | 95<br>110<br>20<br>5<br>Yield<br>Yield                   | No<br>No<br>No<br>10%<br>10% | 5,700<br>9,900<br>2,400<br>950<br>1,700<br>0<br>0 | m2<br>m2<br>m2<br>m2<br>m2<br>m2<br>m2 | s<br>s<br>s<br>s<br>s                              | 10. 10. 10. 10. 10. 10. 10. 10. | /m2<br>/m2<br>/m2<br>/m2<br>/m2               |    | <b>S</b><br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 |
|                      | ENCOME FROM<br>The following<br>One bed Units<br>Two bed Units<br>Three Bed Units<br>Penthouse Units<br>Commercial<br>Retail<br>Café<br>Retairant | SALES<br>requires<br>Aver<br>P<br>S<br>S<br>S<br>S<br>S<br>S<br>S | confirm:<br>age Sell<br>-<br>-<br>- | 95<br>110<br>20<br>5<br>Yield<br>Yield<br>Yield<br>Yield | No<br>No<br>No<br>10%<br>10% | 5,700<br>9,900<br>2,400<br>950<br>1,700<br>0<br>0 | m2<br>m2<br>m2<br>m2<br>m2<br>m2<br>m2 | \$<br>\$<br>\$<br>\$<br>\$<br>\$<br>\$<br>\$<br>\$ | 10. 10. 10. 10. 10. 10. 10. 10. | /m2<br>/m2<br>/m2<br>/m2<br>/m2<br>/m2<br>/m2 | 5  |   |





### **ESCM Mechanical Services**

#### **Building Detail**

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| ENGINEERING SERVICES COST MANAGEMENT               |             | Bu                                      | ilding   | Detail | Input | (MB1) |
| Job No : 1000 SAMPLE PROJECT F                     | OR DEMONSTR | ΑΤΤΟΝ                                   |          | ====== |       |       |
| Version : 1 Initial Mechanic                       |             |   |          |        |       |       |
| 1. AIR CONDITIONED AREAS                           |             | =======                                 |          | ====== |       |       |
| 1.1 Office, Commercial Space                       | Yes         |   |          |        |       |       |
| 1.2 Residential Apartments                         | No          |   |          |        |       |       |
| 1.3 Hotel Guestrooms                               | No          |   |          |        |       |       |
| 1.4 Retail Space                                   | No          |   |          |        |       |       |
| 1.5 Other Spaces                                   | No          |   |          |        |       |       |
| 2. VENTILATED AREAS :                              |             |   |          |        |       |       |
| 2.1 Commercial Toilets                             | Yes         |   |          |        |       |       |
| 2.2 Residential Wet Area                           | No          |   |          |        |       |       |
| 2.3 Hotel Guestroom Toilets                        | No          |   |          |        |       |       |
| 2.4 Retail Toilets                                 | No          |   |          |        |       |       |
| 2.5 Car Parking Areas                              | Yes         |   |          |        |       |       |
| 2.6 Plantroom Areas                                | Yes         |   |          |        |       |       |
| 2.7 Other Ventilated Areas                         | No          |   |          |        |       |       |
| Enter Line No <n.n> or <return> : _</return></n.n> |             |   |          |        |       |       |
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- This screen allows the user to select different components of the building design and define them.
- Definition includes quantifying of different spaces, as well as definition of typical, nontypical, areas, heights, etc.



### **ESCM Mechanical Services**

**Building Detail: Office, Commercial Space – Typical Floors** 

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| ENGINEERING SERVICES   | Cost Management   | Building Detail Input (MB | 31) |  |  |  |  |  |  |  |  |  |
|  | AMPLE PROJECT FOR DEMONSTRA<br>nitial Mechanical Estimate | ATION                     |     |  |  |  |  |  |  |  |  |  |
| Air Conditioned: 1.1   | Office, Commercial Space                                  |                           |     |  |  |  |  |  |  |  |  |  |
| TYPICAL FLOORS <   | N> : Yes  |                           |     |  |  |  |  |  |  |  |  |  |
| TYPICAL FLOORS <y n=""> : Yes<br/>1. Number of Typical Floors : 7<br/>2. Typical Floor Net Conditioned Area (m2) : 1,000<br/>3. Typical Floor to Floor Height (m) : 3.250<br/>4. Extra Height - floors exceeding typical height (m) :<br/>PERIMETER ZONES : Yes<br/>5. North : Yes Type : Area M2 : 180<br/>6. East : Yes Type : % Fl Area % 18.000<br/>7. West : Yes Type : Dims L(m) : 5.50 D(m) : 15.00<br/>8. South : No</y> |   |                           |     |  |  |  |  |  |  |  |  |  |
| TYPICAL FLOORS: Line No <n> or <c>lear Details, Move to <n>ON-TYPICAL FLOORS<br/>or <return> to Bldg Detail Scn :</return></n></c></n>   |   |                           |     |  |  |  |  |  |  |  |  |  |
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- Typical Floor Definitions include quantity, area, floor to floor height and the definition of perimeter zones as required.
- Perimeter Zones can be defined by area, by dimensions or by percentage of floor area. Reference to Library data is also allowed.



### **ESCM Mechanical Services**

**Building Detail: Office, Commercial Space – Non-Typical Floors** 

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| ENCINEERING SERVICES COST MANAGEMENT Building Detail In  | put (MB1)          |
| Job No : 1888 SAMPLE PROJECT FOR DEMONSTRATION<br>Version : 1 Initial Mechanical Estimate  |                    |
| Air Conditioned: 1.1 Office, Commercial Space  |                    |
| NON-TYPICAL FLOORS <y n=""> : Yes Extra F/F Height (m) :</y>   |                    |
| 1. Ground Floor         Seq: 805         NCA(m2):         1,150         F/F(m)           PZN:         PZE:         PZW:         PZS:           2. Mezzanine Level         Seq: 818         NCA(m2):         358         F/F(m) | : 4.500<br>: 3.250 |
| PZN: PZE: PZW: PZS:  |                    |
| 3. Level 10         Seq: 015         NCA(m2): 1,000         F/F(m)           PZN: % 20,000         PZE: % 20,000         PZW: % 20,000         PZS:  | : 3.600            |
|  |                    |
|  |                    |
|  |                    |
| NON-TYPICAL FLOORS: <a>dd, <dn>elete, Modify <n>, <f>wd or <b>ack, <c>]<br/>E<x>tra Height, Move to <t>YPICAL FLOORS or <return> to Bldg Detail Scr</return></t></x></c></b></f></n></dn></a>                                  |                    |
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- As many Non-typical Floor spaces as required can be defined.
- Definitions include a description, sequence, area, floor to floor height and perimeter zones as required.
- Perimeter Zones can be defined all as for Typical Floors.



### **ESCM Mechanical Services**

**Mechanical System Detail: Method of Calculation** 

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| ENGINEERING SERVICES COST MANAGEMENT Mechanical Systems Detail Input (MM3)                |
| Job No : 1000 SAMPLE PROJECT FOR DEMONSTRATION<br>Version : 1 Initial Mechanical Estimate |
| System: PACKAGED AIR COOLED SYSTEMS (PAC)   |
| =   |
| 1.1 Office, Commercial Space Buildup  |
| 1.2 Residential Apartments  |
| 1.3 Hotel Guestrooms  |
| 1.4 Retail Space  |
| 1.5 Other Spaces  |
|   |
|   |
|   |
| Enter <1>\$/m2, <2>\$/kw, <3>LSum, <4>\$/Rm, <5>Buildup, or <return>.</return>            |
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Within each allocated AC System and for each AC Area at the top level e.g. 1.1 Office, Commercial Space, the user may select one of 5 ways to calculate the Mechanical System Detail.

(1) \$/m2

(2) \$/kw

- (3) Lump Sum
- (4) \$/Room, where appropriate
- (5) Buildup



### **ESCM Mechanical Services**

Mechanical System Detail: AC System - Buildup (PAC)

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| ENCINEERING SERVICES COST MANAGEMENT Mechanical Systems Detai   | 1 Input |
| Job No : 1888 SAMPLE PROJECT FOR DEMONSTRATION<br>Version : 1 Initial Mechanical Estimate                   |         |
| System: PACKAGED AIR COOLED SYSTEMS (PAC)<br>Area: 1.1 - Office, Commercial Space                           |         |
| 1. Air Conditioning Units   |         |
| 2. Ductwork Installation  |         |
| 3. Air Diffusion Installation   |         |
| 4. Power Supplies to Equipment  |         |
| 5. Controls & BMS   |         |
| 6. Miscellaneous Items  |         |
| Enter Selection <n>, &lt;#Job-Vers&gt; to Copy PAC System or <return> to previo<br/>screen : _</return></n> | ous     |
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- A menu is presented that allows you to detail the different components of the system.
- Depending on the type of system selected, a different range of menu options appears.
- At this point you may copy other PAC system details for all components.



### **Schedules**

| 🔀 N           | licroso   | ft Excel                  | - Colun           | nn Re        | eo Rem        | easure           |                |                |                |          |              |                   |                                 |             |               |            |               |             | 7 🗙        |
|---------------|---|---------------------------|-------------------|--------------|---------------|------------------|----------------|----------------|----------------|----------|--------------|-------------------|---------------------------------|-------------|---------------|------------|---------------|-------------|------------|
| 8             | <u>F</u> ile <u>E</u>   | <u>i</u> dit <u>V</u> iev | w <u>I</u> nser   | t F          | <u>o</u> rmat | <u>T</u> ools    | <u>D</u> ata y | <u>W</u> indow | <u>H</u> elp   |          |              |                   |                                 |             | Type a (      | question   | for help      |             | ₽×         |
| E <u>x</u> it |   | i 🗃 层                     | l 🔁 s             | ave <u>A</u> | s Paç         | je <u>B</u> reak | <i>6</i> 🖪     | PBC 3          | S   10         | • 0      | - <b>H</b>   | Σ • j             | f <sub>≈</sub> <mark>A</mark> ↓ | ZI 🛍        | <b>90%</b>    | - 2        | 2 🐝 (         | 2) .        |            |
| Aria          | Arial - 10 - A´ A` B Z U ≡ ≡ ≡ ∭ ₩ ₩ ⊠ \$ % , 18 +8 ∉ ∉ ⊡ - 2 - A |                           |                   |              |               |                  |                |                |                |          |              |                   |                                 |             |               |            |               |             |            |
|               | H6  | -                         | ţ.                | € R1         | 0             |                  |                |                |                |          |              |                   |                                 |             |               |            |               |             |            |
|               | A   | В                         | С                 | D            | E             | F                | G              | Н              | 1              | J        | K            | L                 | М                               | N           | 0             | Р          | Q             | R           | {          |
| 1             | 1   | 2                         | 3                 | 4            | 5             | 6                | 7              | 8              | 9              | 10       | 11           | 12                | 13                              | 14          | 15            | 16         | 17            | 18          | 1          |
| 2             | COL   | UMN S                     | ECTIO             | DNS          | ;             |                  |                |                |                |          | e cover to   | ties (mm):        | 35                              |             |               |            | Cog for tie   | s (factor): | 2          |
| 3             |   |                           |                   |              |               |                  |                | M              | ain Tie S      | Set      |              |                   |                                 | Seco        | ond Tie       | Set        |               |             |            |
|               | Column  | Main bar                  |                   | Bar          | No. of        |                  |                |                |                | Bar      | Main Tie     | Spacing           | No of                           | <u>ح</u> ے  |               | Bar Size   | 2nd Tie       | Spacing     | Nc         |
| 4             | section   | size                      | Barkg             | Size         | bars          | Column           | size (mm)      | Size of        | Barkg          | Size     | Set          | of ties           | Ties in                         | Size of     | Barkg         | mm         | Set           | of ties     | Tie        |
|               | codes   |                           |                   | mm           |               |                  |                | ties           |                | mm       |              | (mm)              | Set                             | ties        |               |            |               | (mm)        | S          |
| 6             | A1  | _ Y32                     | 6.310             | 32           | 32            | 1200             | 1600           | R10            | 0.616          |          | -5.720       | 350               | 1                               | R10         | .616          | 10         | 1.530         | 350         |            |
| 7             | A2  | Υ <u>36</u> -             | i 7 aan<br>Look-u |              | AA            |                  | 1600           | Y12            | 0.887          | 12       | 5.8Bar       | weight<br>a look- | una tab                         | erteu<br>Jo | 0.887         | 12         | 1.610         | 350         |            |
| 8             | B1  | 120                       | for eac           |              |               |                  |                | R10            | 0.616          | 10       |              |                   | up tau                          | le          | D.616         | 10         | 0.880         | 350         | -          |
| 9             | B2  | 120                       | allow d           |              |               |                  | ۲ L            | R10            | 0.616          |          |              |                   |                                 |             | 10            | 0.880      | 300           |             |            |
| 10            | C1  | Y32                       | automa            |              |               | ted int          | :o  -          | R10            | 0.616          | 10       | 6.720        | 350               | 1                               | R10         | 0.616         | 10         | 2.030         | 350         |            |
| 11            | D1<br>E1  | 1 1.510 I                 | the me            |              | •             |                  |                | R10<br>R10     | 0.616<br>0.616 | 10<br>10 | 3.940        | 350<br>300        | 1                               | R10         | 0.616<br>#N/A | 10<br>#N/A | 1.640<br>#N/A | 350         |            |
| 12            | F1  | 128<br>Y32                | 6.310             |              | 38            | 2200             | 600            | R10            | 0.616          | 10       | 5.720        | 300               | 1                               | R10         | #N/A<br>0.616 | #NVA<br>10 | #N/A<br>2.530 | 350         |            |
| 14            | F1+   | 132                       | 0.310             | 32           | 30            | 1200             | 750            | R10            | 0.616          | 10       | 4.020        | 350               | 1                               | RIU         | #N/A          | #N/A       | #N/A          | 300         |            |
| 15            | G1  | Y20                       | 2.460             | 20           | 20            | 300              | 1200           | R10            | 0.616          | 10       | 3.120        | 300               | 1                               | R10         | 0.616         | 10         | 0.630         | 300         |            |
| 16            | H1  | Y20                       | 2.460             | 20           | 18            | 350              | 1200           | R10            | 0.616          | 10       | 3.220        | 300               | 1                               | R10         | 0.616         | 10         | 0.680         | 300         |            |
| 17            | H2  | Y24                       | 3,550             | 24           | 18            | 350              | 1200           | R10            | 0.616          | 10       | 3.220        | 350               | 1                               | R10         | 0.616         | 10         | 0.680         | 350         |            |
| 18            | H3  | not used                  |                   |              |               |                  |                |                |                | ###      | #N/A         |                   |                                 |             | #N/A          | #N/A       | #N/A          |             |            |
| 19            | H4  | Y32                       | 6.310             | 32           | 18            | 350              | 1200           | R10            | 0.616          | 10       | 3.220        | 350               | 1                               | R10         | 0.616         | 10         | 0.680         | 350         |            |
| 20            | H5  | Y28                       | 4.840             | 28           | 18            | 350              | 1200           | R10            | 0.616          | 10       | 3.220        | 350               | 1                               | R10         | 0.616         | 10         | 0.680         | 350         |            |
| 21            | J1  | Y20                       | 2.460             | 20           | 20            | 450              | 1500           | R10            | 0.616          | 10       | 4.020        | 300               | 1                               | R10         | 0.616         | 10         | 0.780         | 300         |            |
| 22            | J2  | Y32                       | 6.310             | 32           | 20            | 450              | 1500           | R10            | 0.616          | 10       | 4.020        | 350               | 1                               | R10         | 0.616         | 10         | 0.780         | 350         | 1          |
| 23            | J3  | Y24                       | 3.550             | 24           | 20            | 450              | 1500           | R10            | 0.616          | 10       | 4.020        | 350               | 1                               | R10         | 0.616         | 10         | 0.780         | 350         | ( <b>•</b> |
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#### Schedules (continued)

| Kicrosoft Excel - Partitions                                      | Measure             |                            |                |        |               |        |                               | _ 7 ×    |
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| A   | В                   | С                          | D              | E      | F             | G      | Н                             |          |
| 1 W3a wall within units (   | _                   | _                          |                | L      | Г             | 9      |                               |          |
| 2 Annotation  | Dim 1               | Dim 2                      | Times          | Blank  | Flag          |        |                               |          |
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| 4 W3bc U03 Kit  | 2.50                | 2.57                       | 1              |        | 9-23          |        |                               |          |
| 5 W3bc U03 Kit  | 0.70                | 2.57                       | 1              |        | 9-23          |        | Add lining to end             |          |
| 6 W3bc U03 Bath   | -1.70 Da            | <u>257</u>                 | 1              | end in | <b></b> 23    |        |                               |          |
| 7 W3bc U03 Laun   | 0.60                | rtitions are               | then fi        | ltere  | d by 23<br>23 |        |                               |          |
| 8 W3bc U03 Laun   | 0.90 tvr            | quence and<br>be and tran  | sferred        | to     |               |        |                               |          |
| 9 W3bc U03 Laun   | 2.90 set            | parate woo                 | rksheet        | ts     | 23            |        |                               |          |
| 10 W3bc U03 Bath  | 0.60                |                            | -              |        | 23            |        |                               |          |
| 11 W3d U03 Laun   | 0.80                | 2.57                       | 1              |        | 9-23          |        |                               |          |
| 12 W3d U03 Laun   | 0.80                | 2.57                       | 1              |        | 9-23          |        |                               |          |
| 13 W3a U03 C/bd   | 0.70                | 2.57                       | 1              |        | 9-23          |        |                               |          |
| 14 W3bc U04 Kit   | 2.50                | 2.57                       | 1              |        | 9-23          |        |                               |          |
| 15 W3bc U04 Kit   | 0.70                | 2.57                       | 1              |        | 9-23          |        | Add lining to end             |          |
| 16 W3bc U04 Bath  | 1.70                | 2.57                       | 1              |        | 9-23          |        |                               |          |
| 17 W3bc U04 Laun  | 0.60                | 2.57                       | 1              |        | 9-23          |        |                               |          |
| 18 W3bc U04 Laun  | 0.90                | 2.57                       | 1              |        | 9-23          |        |                               |          |
| 19 \M/3bc   [04   aun<br>I¤ ◀ ▶ ₱ <mark>\ ₩10 ₩all \ ₩3 ₩a</mark> | 2.90                | 2.57                       | 1              | 1.000  | 9-23          |        |                               |          |
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#### Schedules (continued)

| 🔀 Mi          | icrosoft Excel - Stairc               | ase Measure                      |                       |                           |              |          |                  |             |              | (            | _ @ 🗙 |
|---------------|---------------------------------------|----------------------------------|-----------------------|---------------------------|--------------|----------|------------------|-------------|--------------|--------------|-------|
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|               | A                                     | В                                | C                     | D                         | Ε            | F        | G                | H           |              | J            | K.▲   |
| 4             | Concrete in F                         | light Wais                       | _                     | _                         |              |          | _                |             |              |              |       |
| 1             |                                       |                                  | -L<br>                | -                         |              | -        | •                |             |              |              |       |
| 3             | Annotation                            | Dim 1                            | Dim 2                 | Dim 3                     | Times        | Blank    | Flag             |             | LEN          |              |       |
| 4             | *** Concrete to Sta                   | air Elight Wais                  | :t                    |                           |              |          |                  |             |              |              |       |
| 5             | FS1, Flat 1                           | 3.910                            | -<br>- 1.2            | 0.2                       | 1            |          | 2B               |             | 11           |              |       |
| 6             | FS1, Flgt 2                           | 3.910                            | Hypo                  | tenuse                    | calcul       | ated     | B                |             | 11           |              |       |
| 7             | FS2, Flgt 1                           | 3.910                            | by re                 | ference                   | to da        | ita o    | n B<br>et B      |             | 11           |              |       |
| 8             | FS2, Flgt 2                           | 3.910                            | the F                 | LIGHTS                    | work         | shee     | et B             |             | 11           |              |       |
| 9             | FS3, Flgt 1                           | 3.910                            | ······[               |                           |              |          | B                |             | 11           |              |       |
| 10            | FS3, Flgt 2                           | 3.910                            | 1.2                   | 0.2                       | 1            |          | 2B               |             | 11           |              |       |
| 11            | FS4, Flgt 1                           | 3.910                            | 1.2                   | 0.2                       | 1            |          | 2B               |             | 11           |              |       |
| 12            | FS4, Flgt 2                           | 3.910                            | 1.2                   | 0.2                       | 1            |          | 2B               |             | 11           |              |       |
| 13            | FS5, Flgt 1                           | 3.910                            | 1.2                   | 0.2                       | 1            |          | 2B               |             | 11           |              |       |
|               | FS5, Flgt 2                           | 3.910                            | 1.2                   | 0.2                       | 1            |          | 2B               |             | 11           |              |       |
|               | FS6, Flgt 1                           | 3.910                            | 1.2                   | 0.2                       | 1            |          | 2B               |             | 11           |              |       |
|               | FS6, Flgt 2                           | 3.910                            | 1.2                   | 0.2                       | 1            |          | 2B               |             | 11           |              |       |
|               | FS1, Flgt 1                           | 4.545                            | 1.2                   | 0.2                       | 1            |          | 1B               |             | 11           |              |       |
| 18            | FS1, Flat 2                           | 4.545                            | 1.2<br>aist / Con     | 0.2<br>c to Treads        | 1<br>- / Con | to Le    | 1B               | to Lndng Ed | 11           |              |       |
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#### Schedules (continued)

| R 12          | licrosoft Excel -  | Staircas | e Measu           | re            |       |                         |                  |             |         |     |           |          |         |          |   | ₽× |
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| -             | P74 <del>v</del> fx  |          |                   |               |       |                         |                  |             |         |     |           |          |         |          |   |    |
|               | A B C D E F G H I J K L M N O 🔺  |          |                   |               |       |                         |                  |             |         |     |           |          |         |          |   |    |
| 1             | 1 Staircase Schedule (Flights) for Concrete, Reinforcement & Formwork measure  |          |                   |               |       |                         |                  |             |         |     |           |          |         |          |   |    |
| 2             |  |          |                   |               |       |                         |                  |             |         |     |           |          |         |          |   |    |
| -             |  |          |                   |               |       |                         |                  |             |         |     |           |          |         |          |   |    |
| Δ             | 4       Stair Ref'       Str       Flight       Flight       Flight       Flight       Flight       Treads       Risers       Treads       Risers       Type       to form       Type  |          |                   |               |       |                         |                  |             |         |     |           |          |         |          |   |    |
| <u> </u>      | Blk D U2   | BIKD U2  |                   | 1B            |       | - iignx<br>1            | 2.3              | 4.2         | 15      | 14  | 0.28      | 0.1643   | F1      | 2        | A |    |
|               | BIKD U3  | BIK D U3 |                   | 18            |       | 1                       | 2.3              | 4.2         | 15      | 14  | 0.28      | 0.1643   | F1      | 2        | A |    |
| 40            | BIK D U3   | BIK D U3 | Figt 2            | 1B            |       | 1                       | 2.3              | 4.2         | 15      | 14  | 0.28      | 0.1643   | F1      | 2        | A |    |
| 41            | BIK D U4   | BIKD U4  | Figt 1            | 18            |       | 1                       | 2.3              | 4.2         | 15      | 14  | 0.28      | 0.1643   | F1      | 2        | A |    |
| 42            | BIKD U4  | BIKD U4  | Figt 2            | ΝВ            |       | 1                       | 2.3              | 4.2         | 15      | 14  | 0.28      | 0.1643   | F1      | 2        | A |    |
| 43            | BIKD US  | BIK D U5 | Figt 1            |               | tai   | f <mark>or eac</mark> h | flight           | <b>4</b> .2 | 15      | 14  | 0.28      | 0.1643   | F1      | 2        | A |    |
| 44            | BIKD U5  | BIK D U5 | Figt 2            | 111           |       | ed on th                |                  | 4.2         | 15      | 14  | 0.28      | 0.1643   | F1      | 2        | A |    |
| 45            | BIK D U6   | BIK D U6 | Figt 1            | 1111          |       | heet an                 |                  | an 4.2      | 15      | 14  | 0.28      | 0.1643   | F1      | 2        | A |    |
| 46            | BIK D U6   | BIK D U6 | Figt 2            | 18            |       | EASURE                  |                  | 4.2         | 15      | 14  | 0.28      | 0.1643   | F1      | 2        | A |    |
| 47            | BIKD U7  | BIK D U7 | -                 | 16            | C 171 | LAGORE                  | Sheets           | 4.2         | 15      | 14  | 0.28      | 0.1643   | F1      | 2        | A |    |
|               | BIKD U7  | BIK D U7 |                   | 18            |       | 1                       | 2.3              | 4.2         | 15      | 14  | 0.28      | 0.1643   | F1      | 2        | A |    |
|               | C1 Steps   | C1 Steps |                   | 101           |       | 4.1                     | 1.5              | 2.8         | 10      | 9   | 0.28      | 0.1667   | F1      | 2        | A |    |
|               | C1 Steps   | C1 Steps | Figt 1            | 1C1           |       | 3                       | 1.5              | 2.8         | 10      | 9   | 0.28      | 0.1667   | F1      | 2        | A |    |
|               | C1 FS1   | C1 FS1   | Figt 1            | 1C1           |       | 1.2                     | 1.5              | 2.8         | 10      | 9   | 0.28      | 0.1667   | F1      | 1        | A |    |
| 52            | C1 FS1   | C1 FS1   | Figt 2            | 1C1           |       | 1.2                     | 1.5              | 2.8         | 10      | 9   | 0.28      | 0.1667   | F1      | 1        | A |    |
| 53            | C1 FS1   | C1 FS1   | Figt 3            | 101           |       | 1.2                     | 1.5              | 2.8         | 10      | 9   | 0.28      | 0.1667   | F1      | 1        | A |    |
|               | C1 FS1   | C1 FS1   | Figt 4            | 101           |       | 1.2                     | 1.5              | 2.8         | 10      | 9   | 0.28      | 0.1667   | F1      | 1        | A |    |
| -             | Flights  | Landings | K Conc            |               |       |                         | o Treads         |             | o Lndng |     | ) Lndng E |          |         |          |   |    |
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#### Schedules (continued)

| Microsoft Excel - Co   | olumn Re                        | o Remeas          | sure                            |                |                |                      |                  |          |                     |          |                   |               | JX          |
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| D19 🗸  | fx =∨                           | LOOKUP            | (K19,'Colu                      | ımn Sec        | tions'!\$.     | -<br>A\$6:\$AI       | D\$112           | 25,3,FAL | SE)                 |          |                   |               |             |
| A  | В                               | С                 | D                               | E              | F              | G                    | Н                | 1        | Ĵ                   | К        | L                 | М             |             |
| 1 Bar Reinforcement  |                                 |                   |                                 |                |                |                      |                  |          |                     |          |                   |               |             |
| 2 Anotation  | Dim 1                           | Dim 2             | Dim 3                           | Times          | Leave<br>Blank | Flag                 | Lev              | Col      | Bars:<br>Ties       | Section  | Floor to<br>Floor | Lap<br>Lenath |             |
| ⊃<br>I2 TC1-5-Main   | 4.55                            | <b>_</b>          | 4.84                            | 56             |                | E                    | 5                | TC1      | Main                | AA1      | -<br>3.700        | 0.85          | -           |
| 3 TC1-6-Main   | 4.55                            | 1                 | 4.04<br>7.99                    | 22             |                | 5<br>6               | 5<br>6           | TC1      | Main                | M1       | 3.700             | 1.10          |             |
| 4 TC1-7-Main   | 4.00                            | 1                 | 7.99                            | 22             |                | 7                    | 7                | TC1      | Main                | M1       | 3.850             | 1.10          |             |
| 5 TC1-8-Main   | 4.80                            | 1                 | 7.99                            | 22             |                |                      | 8                | TC1      | Main                | M1       | 3.700             | 1.10          |             |
| 6 TC1-9-Main   | 4.70                            | 1                 | 6.31                            | 22             |                | 9                    | 9                | TC1      | Main                | M2       | 3.700             | 1.00          |             |
| 7 TC1-10-Main  | 4.70                            | 1                 | 6.31                            | 22             |                | 10                   | 10               | TC1      | Main                | M2<br>M2 | 3.700             | 1.00          |             |
| 8 TC1-11-Main  | 4.55                            | 1                 | 4.84                            | 22             |                | 11                   | 11               | TC1      | Main                | M3       | 3.700             | 0.85          | -           |
| 9 TC1-12-Main  | 4.55                            | 1                 | 4.84                            | ×-22           |                | 12                   | 12               | TC1      | Main                | M3       | 3,700             | 0.85          |             |
| 0 TC1-13-Main  | 4.60                            | 1                 | 3.55                            |                |                |                      |                  |          | n Main              | M4       | 3,850             | 0.75          | -           |
| 1 TC1-14-Main  | 4.55                            | 1                 | 4.84                            | an l           |                | a in YE:<br>ells are |                  | y and    | Main                | B1       | 3.700             | 0.85          |             |
| 2 TC1-15-Main  | 4.55                            | 1                 | 4.84                            |                |                |                      | -                | rted by  |                     | B1       | 3.700             | 0.85          |             |
| 3 TC1-16-Main  | 4.55                            | 1                 | 4.84                            |                |                | iaucaliy<br>ng infor |                  |          | Main                | B1       | 3.700             | 0.85          |             |
| 4 TC1-17-Main  | 4.30                            | 1                 | 2.46                            |                |                | iy initi<br>ev", "C  |                  |          | Main                | B2       | 3.700             | 0.60          | -           |
| 5 TC1-18-Main  | 4.30                            | 1                 | 2.46                            | - <u>-</u>     |                | ev, c<br>and "Se     | -                |          | Main                | B2       | 3.700             | 0.60          |             |
| 6 TC1-19-Main  | 4.30                            | 1                 | 2.46                            |                |                |                      |                  | s Look-  | Main                | B2       | 3.700             | 0.60          |             |
| 7 TC1-20-Main  | 4.30                            | 1                 | 2.46                            | i ne l         | Up Tał         |                      | anou             | S LOOK   | Main                | B2       | 3.700             | 0.60          |             |
| 8 TC1-21-Main  | 4.30                            | 1                 | 2.46                            | 26 l           |                |                      |                  |          | Main                | B2       | 3.700             | 0.60          |             |
| 9 TC1-22-Main  | 4.30                            | 1                 | 2.46                            | 26             |                | 22                   | 22               | TC1      | Main                | B2       | 3.700             | 0.60          |             |
| TC1-23-Main<br>▲ ▶ ♥ Main Bars   | <mark>4 30</mark><br>( Ties 1 ( | 1<br>Ties 2 / T   | 2 46<br>Fies 3 / <mark>C</mark> | 26<br>olumn Se | ctions         | 23<br>🗸 Reo E        | 23<br>Bar S      | TC1<br>▲ | Main                | R2       | 3 700             | 0.60          | <b>▶</b>  [ |
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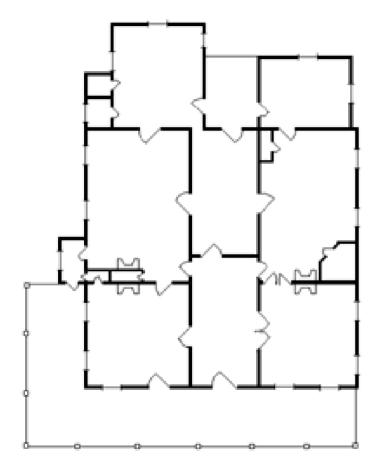
## **Master Quantities**

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### **Room measurement**

- WF
- FF
- CF
- Skirting
- Cornice





**Rider Hunt** 

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### Room measurement

- WF
- FF
- CF
- Skirting
- Cornice



## **Rules of Measurement**

#### **Similar to International Standards**

#### **Building elements**

The sum of all such areas at all building floor levels, including basements (except unexcavated portions), floored roof spaces and attics, garages, penthouses, enclosed porches and attached enclosed covered ways alongside buildings, equipment rooms, lift shafts, vertical ducts, staircases and any other fully enclosed spaces and usable areas of the building, computed by measuring from the normal inside face of exterior walls but ignoring any projections such as plinths, columns, piers and the like which project from the normal inside face of exterior walls.

It shall not include open courts, lightwells, connecting or isolated covered ways and net open areas or upper portions of rooms, lobbies, halls, interstitial spaces and the like which extend through the storey being computed.

#### Area

The sum of all such areas at all building floor levels, including roofed balconies, open verandahs, porches and porticos, attached open covered ways alongside buildings, undercrofts and usable space under buildings, unenclosed access galleries (including ground floor) and any other trafficable covered areas of the building which are not totally enclosed by full height walls, computed by measuring the area between the enclosing walls or balustrade (i.e. from the inside face of the U.C.A. excluding the wall or balustrade thickness).

When the covering element (i.e. roof or upper floor) is supported by columns, is cantilevered or is suspended, or any combination of these, the measurements shall be taken to the edge of the paving or to the edge of the cover, whichever is the lesser. U.C.A. shall not include eaves, overhangs, sun shading, awnings and the like where these do not relate to the clearly definded trafficable areas, nor shall it include connecting or isolated covered ways.



# Need to Understand

### **Better Research Parametric Estimating System**

- Hospitals
- Schools
- Industrial
- Office Fitouts



## **Automated Quantities**

### **Better analysis tools**

- Flexible
  - As per Billy Connelly Business Plan
  - Want it now
  - Has to be flexible
  - All change tomorrow
- Input by more team members
- Architect and Designers own the documentation
  - Other users ownership of interactive components



- Improve documentation quality
- Improve coordination of documentation
- Improve (cost) rate storage and retrieval
- Improve predictability of future rates in mobile marketplace