

# **Crown Works Certificate**

Under Section 6.28 of the Environmental Planning and Assessment Act 1979 No 203

| <u>Project</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <u>Project</u>                      |                                           |                               |                                                                                                                           |                                                                    |                                                            |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------------|-------------------------------|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|------------------------------------------------------------|--|
| Warnervale                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | e - New Primary                     | School                                    |                               |                                                                                                                           |                                                                    |                                                            |  |
| Applicant's                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <u>details</u>                      |                                           |                               |                                                                                                                           |                                                                    |                                                            |  |
| Title                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Mr X Ms                             | Mrs 0                                     | Other                         |                                                                                                                           |                                                                    |                                                            |  |
| First Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Tim                                 |                                           | name F                        | lastings                                                                                                                  | Position                                                           | Project Engineer                                           |  |
| Company / O<br>Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | rganisation                         | Richard Crookes Co                        | onstructions                  | ;                                                                                                                         |                                                                    |                                                            |  |
| Address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Level 3, 4 Bro                      | adcast Way, Artarr                        | mon NSW 20                    | 64                                                                                                                        |                                                                    |                                                            |  |
| Property details         Property address       Detailed description of the development of the deve |                                     |                                           |                               | lopment - Building Work<br>ificate is only for the following                                                              |                                                                    |                                                            |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                     |                                           |                               | <ul> <li>The façade a</li> <li>In ground se</li> <li>Services rou<br/>excluding he</li> <li>No other works are</li> </ul> | nd roof to t<br>rvices<br>gh in for th<br>aring augm<br>e approved | he proposed buildings<br>e proposed buildings<br>entation. |  |
| Existing BCA<br>Classificatior                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                     | 9b                                        |                               | Proposed BCA<br>Classification                                                                                            |                                                                    | 9b                                                         |  |
| Determinatio                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | on                                  |                                           |                               |                                                                                                                           |                                                                    |                                                            |  |
| Date of determination 20/11/20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                     |                                           | /20                           | Certificate number                                                                                                        |                                                                    | 20213 S6.28 02                                             |  |
| I confirm that<br>the Building (                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | work completed<br>Code of Australia | in accordance with<br>2019 and Building ( | documentatic<br>Code of Austi | on referenced in this ce<br>ralia 2016 Amendment                                                                          | ertificate will<br>1 for the Se                                    | comply with the requirements of ection J requirements.     |  |
| This certifica                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | tion is based on t                  | he documents and c                        | comments ref                  | erenced on the following                                                                                                  | ng pages.                                                          |                                                            |  |
| Name of Certifier Sean Moore                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                     |                                           | oore                          | Signature of Certifier                                                                                                    |                                                                    | - HORE                                                     |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                     |                                           |                               |                                                                                                                           |                                                                    |                                                            |  |

#### metrobc.com.au



#### Comments in relation to the Crown Works Certificate

- This S6.28 Crown Works Certificate is only for the following works: all civil works; all structural works; the façade and roof to the proposed buildings; in ground services and services rough in for the proposed buildings. No other works are approved.
- All works are required to be carried out in accordance with the requirements of the BCA 2019 and its adopted Australian Standards and the Building Code of Australia 2016 Amendment 1 for the Section J requirements.
- All works are required to be carried out in accordance with the comments in the attached BCA report reference 20213R02 R1 dated 30/10/20 and the attached DDA report reference 20213R02 dated 27/10/20 both prepared by Metro Building Consultancy.
- It should be noted that this Crown Works Certificate covers only part of the development's building work (see scope stated above) and further assessment of the client approved design is required to ensure BCA and DDA compliance. This assessment will be undertaken by Metro Building Consultancy as part of an additional review and Crown Works Certificate. Drawings as referenced are only approved for works specifically listed within this Crown Works Certificate.
- All relevant SSD conditions are required to be actioned prior to the commencement of any construction works on site.

#### Drawings referenced under this certificate

Architectural drawings prepared by NBRS Architecture

| Drawing No            | Revision | Description                            |
|-----------------------|----------|----------------------------------------|
| 20018-NBRS-DR-A-0000  | 7        | COVER SHEET                            |
| 20018-NBRS-DR-A-0010  | 6        | ACCOMMODATION SCHEDULE SHEET 1         |
| 20018-NBRS-DR-A-0011  | 6        | ACCOMMODATION SCHEDULE SHEET 2         |
| 20018-NBRS-DR-A-0012  | 6        | ACCOMMODATION SCHEDULE SHEET 3         |
| 20018-NBRS-DR-A-0100  | 6        | DEMOLITION PLAN                        |
| 20018-NBRS-DR-A-0200  | 4        | BUILDING SETOUT PLAN                   |
| 20018-NBRS-DR-A-0300  | 9        | OVERALL LOWER GROUND PLAN – SITE PLAN  |
| 20018-NBRS-DR-A-0301  | 6        | OVERALL UPPER GROUND PLAN              |
| 20018-NBRS-DR-A-0302  | 7        | OVERALL ROOF PLAN                      |
| 20018-NBRS-DR-A-5101  | 4        | TYPICAL CONSTRUCTION DETAILS – SHEET 1 |
| 20018-NBRS-DR-A-5500  | 3        | WASTE BIN AREA DETAILS                 |
| 20018-NBRS-DR-A-8000  | 5        | DOOR SCHEDULE – VISUAL                 |
| 20018-NBRS-DR-A-8100  | 5        | WINDOW SCHEDULE – VISUAL               |
| 20018-NBRS-DR-A-8101  | 5        | WINDOW SCHEDULE – VISUAL               |
| 20018-NBRS-DR-A-8301  | 7        | WALL TYPE SCHEDULE – EXTERNAL          |
| 20018-NBRS-DR-A-8301  | 4        | WALL TYPE SCHEDULE – INTERNAL          |
| 20018-NBRS-DR-A-A1001 | 15       | ADMIN LOWER GROUND PLAN                |
| 20018-NBRS-DR-A-A1011 | 7        | ADMIN ROOF PLAN                        |
| 20018-NBRS-DR-A-A1501 | 8        | ADMIN CONC SETOUT LOWER GROUND         |
| 20018-NBRS-DR-A-A3001 | 8        | ADMIN ELEVATIONS                       |
| 20018-NBRS-DR-A-A4001 | 8        | ADMIN SECTIONS                         |
| 20018-NBRS-DR-A-B1001 | 13       | HALL LOWER GROUND PLAN                 |
| 20018-NBRS-DR-A-B1011 | 6        | HALL LOWER ROOF PLAN                   |

#### metrobc.com.au

# METRO BUILDING CONSULTANCY

| Drawing No            | Revision | Description                                             |
|-----------------------|----------|---------------------------------------------------------|
| 20018-NBRS-DR-A-B1012 | 4        | HALL UPPER ROOF PLAN                                    |
| 20018-NBRS-DR-A-B1501 | 7        | HALL CONC SETOUT PLAN LOWER GROUND                      |
| 20018-NBRS-DR-A-B3001 | 9        | HALL ELEVATIONS 1                                       |
| 20018-NBRS-DR-A-B3002 | 9        | HALL ELEVATIONS 2                                       |
| 20018-NBRS-DR-A-B4001 | 8        | HALL SECTIONS                                           |
| 20018-NBRS-DR-A-B5401 | 3        | HALL WALL SECTIONS – SHEET 1                            |
| 20018-NBRS-DR-A-B5402 | 3        | HALL WALL SECTIONS – SHEET 1                            |
| 20018-NBRS-DR-A-C1001 | 8        | OVERALL TEACHING BUILDING LOWER GROUND PLAN             |
| 20018-NBRS-DR-A-C1002 | 10       | C1 TEACHING BUILDING LOWER GROUND PLAN                  |
| 20018-NBRS-DR-A-C1003 | 7        | C2 TEACHING BUILDING LOWER GROUND PLAN                  |
| 20018-NBRS-DR-A-C1004 | 7        | C3 TEACHING BUILDING LOWER GROUND PLAN                  |
| 20018-NBRS-DR-A-C1005 | 11       | OVERALL TEACHING BUILDING UPPER GROUND PLAN             |
| 20018-NBRS-DR-A-C1006 | 7        | C1 TEACHING BUILDING UPPER GROUND PLAN                  |
| 20018-NBRS-DR-A-C1007 | 7        | C2 TEACHING BUILDING UPPER GROUND PLAN                  |
| 20018-NBRS-DR-A-C1008 | 7        | C3 TEACHING BUILDING UPPER GROUND PLAN                  |
| 20018-NBRS-DR-A-C1011 | 8        | OVERALL TEACHING BUILDING ROOF PLAN                     |
| 20018-NBRS-DR-A-C1501 | 6        | OVERALL TEACHING BUILDING CONC SETOUT PLAN LOWER GROUND |
| 20018-NBRS-DR-A-C1502 | 5        | C1 TEACHING BUILDING CONC SETOUT PLAN LOWER GROUND      |
| 20018-NBRS-DR-A-C1503 | 5        | C2 TEACHING BUILDING CONC SETOUT PLAN LOWER GROUND      |
| 20018-NBRS-DR-A-C1504 | 6        | C3 TEACHING BUILDING CONC SETOUT PLAN LOWER GROUND      |
| 20018-NBRS-DR-A-C1505 | 3        | OVERALL TEACHING BUILDING CONC SETOUT PLAN UPPER GROUND |
| 20018-NBRS-DR-A-C1506 | 3        | C1 TEACHING BUILDING CONC SETOUT PLAN UPPER GROUND      |
| 20018-NBRS-DR-A-C1507 | 3        | C2 TEACHING BUILDING CONC SETOUT PLAN UPPER GROUND      |
| 20018-NBRS-DR-A-C1508 | 3        | C3 TEACHING BUILDING CONC SETOUT PLAN UPPER GROUND      |
| 20018-NBRS-DR-A-C3001 | 8        | TEACHING BUILDING ELEVATIONS 1                          |
| 20018-NBRS-DR-A-C3002 | 8        | TEACHING BUILDING ELEVATIONS 2                          |
| 20018-NBRS-DR-A-C3003 | 8        | C1 TEACHING BUILDING ELEVATIONS                         |
| 20018-NBRS-DR-A-C3004 | 8        | C2 TEACHING BUILDING ELEVATIONS                         |
| 20018-NBRS-DR-A-C3005 | 8        | C3 TEACHING BUILDING ELEVATIONS                         |
| 20018-NBRS-DR-A-C4001 | 8        | TEACHING BUILDING SECTIONS 1                            |
| 20018-NBRS-DR-A-C4002 | 8        | TEACHING BUILDING SECTIONS 2                            |
| 20018-NBRS-DR-A-C5401 | 3        | TEACHING BUILDING WALL SECTIONS – SHEET 1               |
| 20018-NBRS-DR-A-C5402 | 3        | TEACHING BUILDING WALL SECTIONS – SHEET 2               |
| 20018-NBRS-DR-A-C6001 | 5        | TEACHING BUILDING STAIRS – STAIR 3                      |
| 20018-NBRS-DR-A-C6002 | 5        | TEACHING BUILDING STAIRS – STAIR 4                      |
| 20018-NBRS-DR-A-C6003 | 5        | TEACHING BUILDING STAIRS – STAIR 5                      |
| 20018-NBRS-DR-A-D1001 | 10       | LIBRARY LOWER GROUND PLAN                               |
| 20018-NBRS-DR-A-D1002 | 10       | LIBRARY UPPER GROUND PLAN                               |
| 20018-NBRS-DR-A-D1011 | 7        | LIBRARY ROOF PLAN                                       |
| 20018-NBRS-DR-A-D1501 | 6        | LIBRARY CONC SETOUT PLAN LOWER GROUND                   |
| 20018-NBRS-DR-A-D1502 | 3        | LIBRARY CONC SETOUT PLAN UPPER GROUND                   |
| 20018-NBRS-DR-A-D3001 | 8        | LIBRARY ELEVATIONS 1                                    |

## metrobc.com.au

# METRO BUILDING CONSULTANCY

| Drawing No            | Revision | Description          |
|-----------------------|----------|----------------------|
| 20018-NBRS-DR-A-D3002 | 8        | LIBRARY ELEVATIONS 2 |
| 20018-NBRS-DR-A-D4001 | 8        | LIBRARY SECTIONS     |
| 20018-NBRS-DR-A-D6001 | 5        | LIBRARY STAIRS       |

#### Structural drawings prepared by Birzulis Associates

| Drawing No | Revision | Description                                 |
|------------|----------|---------------------------------------------|
| S-0-GE-01  | A        | COVER SHEET                                 |
| S-0-GE-02  | В        | CONSTRUCTION NOTES                          |
| S-0-GE-03  | А        | CONSTRUCTION NOTES                          |
| S-0-GE-04  | А        | GENERAL NOTES                               |
| S-0-GE-10  | Α        | TYPICAL FOOTING DETAILS                     |
| S-0-GE-11  | Α        | TYPICAL FOOTING DETAILS                     |
| S-0-GE-20  | Α        | TYPICAL COLUMN DETAILS                      |
| S-0-GE-30  | Α        | TYPICAL WALL DETAILS                        |
| S-0-GE-40  | Α        | TYPICAL STAIR DETAILS                       |
| S-0-GE-41  | А        | TYPICAL STAIR DETAILS                       |
| S-0-GE-42  | Α        | TYPICAL STAIR DETAILS                       |
| S-0-GE-50  | А        | TYPICAL WAFFLE POD DETAILS                  |
| S-0-GE-51  | А        | TYPICAL POST TENTIONED CONCRETE DETAILS     |
| S-0-GE-52  | А        | TYPICAL SLAB DETAILS                        |
| S-0-GE-60  | А        | STEEL DETAILS SHEET 1                       |
| S-0-GE-61  | А        | STEEL DETAILS SHEET 2                       |
| S-0-GE-62  | А        | STEEL DETAILS SHEET 3                       |
| S-0-GE-63  | A        | STEEL DETAILS SHEET 4                       |
| S-0-GE-70  | А        | COVERED WAY DETAILS                         |
| S-A-GF-01  | A        | ADMIN - GROUND FLOOR PLAN                   |
| S-A-RP-01  | Α        | ADMIN - ROOF FRAMING PLAN                   |
| S-B-GF-01  | В        | HALL - GROUND FLOOR PLAN                    |
| S-B-RP-01  | В        | HALL - LOWER ROOF FRAMING PLAN              |
| S-B-RP-02  | В        | HALL - UPPER ROOF FRAMING PLAN              |
| S-B-RP-40  | A        | HALL - ROOF FRAMING SECTIONS                |
| S-B-RP-41  | A        | HALL - ROOF FRAMING SECTIONS                |
| S-B-RP-50  | В        | HALL - ROOF FRAMING DETAILS                 |
| S-B-RP-51  | A        | HALL - ROOF FRAMING DETAILS                 |
| S-B-RP-52  | Α        | HALL - ROOF FRAMING DETAILS                 |
| S-B-RP-53  | A        | HALL - ROOF FRAMING DETAILS                 |
| S-B-RP-54  | А        | HALL - ROOF FRAMING DETAILS                 |
| S-C-GF-00  | Α        | TEACHING SPACE OVERALL GROUND FLOOR PLAN    |
| S-C-GF-01  | А        | C1 & C2 TEACHING SPACE - GROUND FLOOR PLAN  |
| S-C-GF-02  | Α        | C3 TEACHING SPACE - GROUND FLOOR PLAN       |
| S-C-L1-00  | Α        | TEACHING SPACE OVERALL LEVEL 1 PLAN         |
| S-C-L1-01  | Α        | C1 & C2 TEACHING SPACE - LEVEL 1 FLOOR PLAN |

## metrobc.com.au

# METRO BUILDING CONSULTANCY

| Drawing No | Revision | Description                                      |
|------------|----------|--------------------------------------------------|
| S-C-L1-02  | А        | C3 TEACHING SPACE - LEVEL 1 FLOOR PLAN           |
| S-C-RP-00  | А        | TEACHING SPACE OVERALL ROOF PLAN                 |
| S-C-RP-01  | А        | C1 & C2 TEACHING SPACE - ROOF FRAMING PLAN       |
| S-C-RP-02  | А        | C3 TEACHING SPACE - ROOF FRAMING PLAN            |
| S-C-RP-03  | А        | C1 & C2 TEACHING SPACE - LOWER ROOF FRAMING PLAN |
| S-C-RP-40  | А        | TEACHING SPACE -ROOF FRAMING SECTIONS            |
| S-C-RP-41  | А        | TEACHING SPACE -ROOF FRAMING SECTIONS            |
| S-C-RP-50  | А        | TEACHING SPACE - ROOF FRAMING DETAILS            |
| S-C-WF-01  | А        | TEACHING SPACE - GROUND WALL FRAMING PLAN        |
| S-C-WF-02  | А        | TEACHING SPACE - LEVEL 1 WALL FRAMING PLAN       |
| S-D-GF-01  | А        | LIBRARY - GROUND FLOOR PLAN                      |
| S-D-L1-01  | А        | LIBRARY - LEVEL 1 FLOOR PLAN                     |
| S-D-RP-01  | А        | LIBRARY - ROOF FRAMING PLAN                      |
| S-D-RP-40  | А        | LIBRARY - ROOF FRAMING SECTIONS                  |
| S-D-RP-41  | A        | LIBRARY - ROOF FRAMING SECTIONS                  |
| S-D-RP-50  | А        | LIBRARY - ROOF FRAMING DETAILS                   |

Civil drawings prepared by Birzulis Associates

| Drawing No     | Revision | Description                                         |
|----------------|----------|-----------------------------------------------------|
| 7900-C-0-GE-00 | 9        | COVER SHEET                                         |
| 7900-C-0-GE-01 | 9        | CONSTRUCTION NOTES                                  |
| 7900-C-0-GE-10 | 9        | TYPICAL STORMWATER DETAILS 01                       |
| 7900-C-0-GE-11 | 9        | TYPICAL STORMWATER DETAILS 02                       |
| 7900-C-0-GE-12 | 9        | STORMWATER DETAILS 03                               |
| 7900-C-0-GE-13 | 9        | STORMWATER PIT SCHEDULE                             |
| 7900-C-0-GE-20 | 9        | TYPICAL CIVIL WORKS DETAILS 01                      |
| 7900-C-0-GE-21 | 9        | TYPICAL CIVIL WORKS DETAILS 02                      |
| 7900-C-0-GE-22 | 9        | TYPICAL CIVIL WORKS DETAILS 03                      |
| 7900-C-0-GE-23 | 9        | TYPICAL CIVIL WORKS DETAILS 04                      |
| 7900-C-0-GE-30 | 9        | TYPICAL SOIL EROSION & SEDITMENT CONTROL DETAILS 01 |
| 7900-C-0-GE-31 | 9        | TYPICAL SOIL EROSION & SEDITMENT CONTROL DETAILS 02 |
| 7900-C-0-GE-51 | 9        | SITE OVERALL PLAN                                   |
| 7900-C-1-GF-01 | 9        | GROUND FLOOR STORMWATER PART PLAN 1                 |
| 7900-C-1-GF-02 | 9        | GROUND FLOOR STORMWATER PART PLAN 2                 |
| 7900-C-1-GF-03 | 9        | GROUND FLOOR STORMWATER PART PLAN 3                 |
| 7900-C-1-GF-04 | 9        | GROUND FLOOR STORMWATER PART PLAN 4                 |
| 7900-C-1-GF-30 | 9        | GROUND FLOOR SOIL EROSION & SEDIMENT CONTROL PLAN   |

#### metrobc.com.au



#### Civil drawings prepared by Northrop

| Drawing No | Revision | Description                                 |
|------------|----------|---------------------------------------------|
| DD-C01.01  | 1        | COVER SHEET, DRAWING LIST AND LOCALITY PLAN |
| DD-C01.11  | 1        | SPECIFICATION NOTES – SHEET 1               |
| DD-C01.12  | 1        | SPECIFICATION NOTES – SHEET 2               |
| DD-C01.21  | 1        | GENERAL ARRANGEMENT PLAN                    |
| DD-C02.01  | 1        | EROSION & SEDIMENT CONTROL PLAN             |
| DD-C02.11  | 1        | EROSION & SEDIMENT CONTROL DETAILS          |
| DD-C04.01  | 1        | DETAIL PLAN - SHEET 1                       |
| DD-C04.02  | 1        | DETAIL PLAN – SHEET 2                       |

#### Electrical services drawings prepared by Stowe Australia

| Drawing No      | Revision | Description                                                               |
|-----------------|----------|---------------------------------------------------------------------------|
| WPS-STO-E000.00 | 2        | Cover Page & Drawing List                                                 |
| WPS-STO-E000.01 | 3        | Electrical Services - Legend                                              |
| WPS-STO-E100.01 | 6        | Electrical Services Site Plan - Infrastructure                            |
| WPS-STO-E100.02 | 2        | Electrical Services Site Plan - Security                                  |
| WPS-STO-E200.01 | 5        | Electrical Services - Hall, OSHC & Canteen - Lighting Layout              |
| WPS-STO-E210.01 | 4        | Electrical Services - Admin - Lighting Layout                             |
| WPS-STO-E220.01 | 4        | Electrical Services - Teaching Spaces Lower Ground - Lighting Layout      |
| WPS-STO-E220.02 | 4        | Electrical Services - Teaching Spaces Lower Ground - Lighting Layout      |
| WPS-STO-E220.11 | 2        | Electrical Services - Teaching Spaces Lower Ground - Dry Fire Layout      |
| WPS-STO-E220.12 | 2        | Electrical Services - Teaching Spaces Lower Ground - Dry Fire Layout      |
| WPS-STO-E230.02 | 2        | Electrical Services - Library - Dry Fire Layout                           |
| WPS-STO-E300.01 | 2        | Electrical Services - Hall, OSHC & Canteen - Power & Comms Layout         |
| WPS-STO-E300.11 | 2        | Electrical Services - Hall, OSHC & Canteen - Security Layout              |
| WPS-STO-E300.21 | 1        | Electrical Services - Hall, OSHC & Canteen - PA layout                    |
| WPS-STO-E310.01 | 2        | Electrical Services - Admin - Power & Comms Layout                        |
| WPS-STO-E310.11 | 2        | Electrical Services - Admin - Security Layout                             |
| WPS-STO-E310.21 | 1        | Electrical Services - Admin - PA layout                                   |
| WPS-STO-E320.01 | 3        | Electrical Services - Teaching Spaces Lower Ground - Power & Comms Layout |
| WPS-STO-E320.02 | 2        | Electrical Services - Teaching Spaces Ground Level - Power & Comms Layout |
| WPS-STO-E320.11 | 2        | Electrical Services - Teaching Spaces Lower Ground - Security Layout      |
| WPS-STO-E320.12 | 2        | Electrical Services - Teaching Spaces Ground Level - Security Layout      |
| WPS-STO-E320.21 | 1        | Electrical Services - Teaching Spaces Lower Ground - PA Layout            |
| WPS-STO-E320.22 | 1        | Electrical Services - Teaching Spaces Ground Level - PA Layout            |
| WPS-STO-E330.01 | 2        | Electrical Services - Library - Power & Comms Layout                      |
| WPS-STO-E330.11 | 2        | Electrical Services - Library - Security Layout                           |
| WPS-STO-E330.21 | 1        | Electrical Services - Library - PA Layout                                 |
| WPS-STO-E600.01 | 2        | Electrical Services - Main Single Line Diagram                            |
| WPS-STO-E600.02 | 1        | Electrical Services - DB Single Line Diagrams                             |
| WPS-STO-E750.01 | 2        | MD calcs                                                                  |

#### metrobc.com.au

# METRO BUILDING CONSULTANCY

| Drawing No      | Revision | Description   |
|-----------------|----------|---------------|
| WPS-STO-E750.02 | 1        | Submain calcs |
| WPS-STO-E750.03 | 2        | DB Schedules  |

Hydraulic services drawings prepared by Marline Newcastle Pty Limited

| Drawing No        | Revision | Description                                                     |
|-------------------|----------|-----------------------------------------------------------------|
| MARL-HY-DWG-H-000 | 4        | COVER SHEET                                                     |
| MARL-HY-DWG-H-001 | 4        | LEGEND & NOTES                                                  |
| MARL-HY-DWG-H-002 | 4        | SCHEDULES                                                       |
| MARL-HY-DWG-H-100 | 6        | SITE SERVICES 1:500                                             |
| MARL-HY-DWG-H-101 | 5        | SITE SERVICES 1:250                                             |
| MARL-HY-DWG-H-200 | 5        | BUILDING A – ADMIN & BUILDING B – HALL WATER LAYOUT             |
| MARL-HY-DWG-H-201 | 4        | BUILDING C TEACHING BLOCKS - LOWER GROUND - WATER LAYOUT        |
| MARL-HY-DWG-H-202 | 4        | BUILDING C TEACHING BLOCKS - UPPER GROUND - WATER LAYOUT        |
| MARL-HY-DWG-H-203 | 5        | BUILDING D – LIBRARY LOWER & UPPER GROUND WATER LAYOUT          |
| MARL-HY-DWG-H-300 | 4        | BUILDING A - ADMIN & BUILDING B - HALL - SANITARY DRAINAGE      |
| MARL-HY-DWG-H-301 | 4        | BUILDING C TEACHING BLOCKS - LOWER GROUND - SANITARY DRAINAGE   |
| MARL-HY-DWG-H-302 | 4        | BUILDING C TEACHING BLOCKS - UPPER GROUND - SANITARY DRAINAGE   |
| MARL-HY-DWG-H-303 | 4        | BUILDING D - LIBRARY - LOWER & UPPER GROUND - SANITARY DRAINAGE |
| MARL-HY-DWG-H-304 | 4        | BUILDING A - ADMIN & BUILDING B - HALL - SANITARY DRAINAGE      |
| MARL-HY-DWG-H-400 | 3        | DETAIL - SHEET 1                                                |

Mechanical services drawings prepared by EVC Pty Ltd

| Drawing No | Revision | Description                                               |
|------------|----------|-----------------------------------------------------------|
| ME-100     | 2        | LEGENDS, GENERAL NOTES & DRAWING LIST                     |
| ME-A-200   | 1        | BUILDING A- ADMIN - EQUIPMENT SCHEDULES                   |
| ME-A-300   | 2        | BUILDING A - ADMIN - GROUND FLOOR & ROOF - HVAC LAYOUT    |
| ME-A-400   | 2        | 3D VIEWS - BUILDING A - ADMIN                             |
| ME-B-200   | 1        | BUILDING B - HALL - EQUIPMENT SCHEDULES                   |
| ME-B-300   | 2        | BUILDING B - HALL - GROUND FLOOR - HVAC LAYOUT            |
| ME-B-301   | 2        | BUILDING B - HALL - ROOF - HVAC LAYOUT                    |
| ME-B-400   | 2        | 3D VIEWS - BUILDING B - HALL                              |
| ME-C1-200  | 1        | BUILDING C1 - EQUIPMENT SCHEDULES                         |
| ME-C1-300  | 2        | BUILDING C1 - TEACHING - LOWER GROUND FLOOR - HVAC LAYOUT |
| ME-C1-301  | 2        | BUILDING C1 - TEACHING - UPPER GROUND FLOOR - HVAC LAYOUT |
| ME-C2-200  | 1        | BUILDING C2 - EQUIPMENT SCHEDULES                         |
| ME-C2-300  | 2        | BUILDING C2 - TEACHING - LOWER GROUND FLOOR - HVAC LAYOUT |
| ME-C2-301  | 2        | BUILDING C2 - TEACHING - UPPER GROUND FLOOR - HVAC LAYOUT |
| ME-C3-200  | 1        | BUILDING C3 - EQUIPMENT SCHDEULES                         |
| ME-C3-300  | 2        | BUILDING C3 - LOWER GROUND FLOOR - HVAC LAYOUT            |
| ME-C3-301  | 2        | BUILDING C3 - UPPER GROUND FLOOR - HVAC LAYOUT            |

## metrobc.com.au

# METRO BUILDING CONSULTANCY

| Drawing No | Revision | Description                                                            |
|------------|----------|------------------------------------------------------------------------|
| ME-C-300   | 1        | BLOCK C OVERALL LOWER GROUND                                           |
| ME-C-301   | 1        | BLOCK C OVERALL UPPER GROUND                                           |
| ME-C-400   | 2        | 3D VIEWS - BUILDING C - TEACHING                                       |
| ME-D-200   | 1        | BUILDING D - EQUIPMENT SCHEDULES                                       |
| ME-D-300   | 2        | BUILDING D - LIBRARY - LOWER GROUND & UPPER GROUND FLOOR - HVAC LAYOUT |
| ME-D-301   | 1        | BUILDING D - LIBRARY - ROOF                                            |
| ME-D-400   | 2        | 3 D VIEWS – BUILDING D - LIBRARY                                       |
| ME-500     | 0        | TYPICAL DETAILS                                                        |

### Attachments to the Crown Works Certificate

- 1. Structural design certificate prepared by Birzulis Associates Pty Ltd, dated 13/11/20.
- 2. Aconex confirmation regarding FRL's from Birzulis Associates Pty Ltd, dated 17/11/20.
- 3. Steel screw pile details prepared by SPS.
- 4. Steel screw piling design certificate prepared by SPS.
- 5. Aconex confirmation regarding pile design from Birzulis Associates Pty Ltd, dated 12/10/20.
- 6. Civil Design Certificate prepared by Birzulis Associates Pty Ltd, dated 30/10/20.
- 7. Civil Design Certificate prepared by Northrop, dated 17/11/20.
- 8. Aconex confirmation regarding carpark design from Northrop, dated 17/11/20.
- 9. Electrical services design certificate prepared by Stowe Australia Pty Ltd, dated 16/11/20.
- 10. Hydraulic services design certificate prepared by Marline, dated 16/11/20.
- 11. Mechanical services design certificate prepared by EVC, dated 13/11/20.
- 12. BCA Weatherproofing Engineering Assessment prepared by Enertren Pty Ltd dated 10/11/20.
- 13. Aconex confirmation regarding the Weatherproofing Engineering Assessment from NBRS Architecture, dated 17/11/20.
- 14. BCA report for the 50% design review prepared by Metro Building Consultancy dated 30/10/20.
- 15. Aconex and table regarding the status of the 50% BCA report from NBRS Architecture, dated 17/11/20.
- 16. DDA report for the 50% design review prepared by Metro Building Consultancy dated 27/10/20.



Consulting Structural + Civil Engineers

ACN 003 797 911 ABN 99 003 797 911

Sydney Office 583 Darling Street, Rozelle NSW 2039 Telephone: 9555 7230 Email: office@birzulisassociates.com Newcastle Office 105 Merewether Street, Merewether NSW 2291 Telephone: 4049 4855 Email: office@birzulisassociates.com

13 November 2020

Principal Certifying Authority c/- RICHARD CROOKES CONSTRUCTION Attention Mr Tim Hastings HastingsT@richardcrookes.com.au

Dear Sir/Madam,

# STRUCTURAL DESIGN CERTIFICATE CROWN CERTIFICATE 2

# NEW PRIMARY SCHOOL AT WARNERVALE (OUR REF. 7900)

This is to certify that we have prepared structural drawings (refer to attached list) for the abovementioned project. The engineering design and detailing has been carried out in accordance with the relevant Australian Standards (as listed below), the requirements of the Building Code of Australia (2019, Vol 1), the Educational Facilities Standards & Guidelines (EFSG),

The section 4.38 of the Environmental Planning and Assessment Act 1979 of the State Significant Development Application (SSDA), Local Council and NSW Government requirements.

## Australian Standards List

- AS/NZS 1170.0 inc amendment 1,3 and 4 (2002)
- AS/NZS 1170.1 inc amendments 1 and 2 (2002)
- AS/NZS 1170.2 inc amendments 1-5 (2011)
- AS 1170.4inc amendments 1 and 2 (2007)
- AS 2159 inc amendment 1 (2009)
- AS 1379 (2007)
- AS 2870 (2011)
- AS 3600 inc amendment 1 (2018)
- AS 3610 (1995)
- AS 3700 (2018) including Amendment 1
- AS 4100 (1998) including Amendment 1
- AS/NZS 4600 (2018)

DIRECTORS

B Fimmano B.E. (Hons), M.I.E. Aust., C.P.Eng. M A Grogan B.E., M.Eng., M.I.E. Aust., C.P.Eng. ASSOCIATE DIRECTOR P W Grogan B.E. (Hons), M.E.(Struct), M.I.E. Aust., C.P.Eng. CONSULTANT A J Birzulis OAM, B.E., M.Eng. Sc., F.I.E. Aust., C.P.Eng.



Yours faithfully

enge /

TOU Structural engineer

| DRAWING No. | DRAWING TITLE                                    | REVISION |
|-------------|--------------------------------------------------|----------|
| S-0-GE-01   | COVER SHEET                                      | А        |
| S-0-GE-02   | CONSTRUCTION NOTES                               | В        |
| S-0-GE-03   | CONSTRUCTION NOTES                               | A        |
| S-0-GE-04   | GENERAL NOTES                                    | A        |
| S-0-GE-10   | TYPICAL FOOTING DETAILS                          | A        |
| S-0-GE-11   | TYPICAL FOOTING DETAILS                          | A        |
| S-0-GE-20   | TYPICAL COLUMN DETAILS                           | A        |
| S-0-GE-30   | TYPICAL WALL DETAILS                             | A        |
| S-0-GE-40   | TYPICAL STAIR DETAILS                            | A        |
| S-0-GE-41   | TYPICAL STAIR DETAILS                            | A        |
| S-0-GE-42   | TYPICAL STAIR DETAILS                            | A        |
| S-0-GE-50   | TYPICAL WAFFLE POD DETAILS                       | А        |
| S-0-GE-51   | TYPICAL POST TENTIONED CONCRETE DETAILS          | А        |
| S-0-GE-52   | TYPICAL SLAB DETAILS                             | A        |
| S-0-GE-60   | STEEL DETAILS SHEET 1                            | Α        |
| S-0-GE-61   | STEEL DETAILS SHEET 2                            | Α        |
| S-0-GE-62   | STEEL DETAILS SHEET 3                            | Α        |
| S-0-GE-63   | STEEL DETAILS SHEET 4                            | Α        |
| S-0-GE-70   | COVERED WAY DETAILS                              | Α        |
| S-A-GF-01   | ADMIN - GROUND FLOOR PLAN                        | A        |
| S-A-RP-01   | ADMIN - ROOF FRAMING PLAN                        | A        |
| S-B-GF-01   | HALL - GROUND FLOOR PLAN                         | В        |
| S-B-RP-01   | HALL - LOWER ROOF FRAMING PLAN                   | В        |
| S-B-RP-02   | HALL - UPPER ROOF FRAMING PLAN                   | В        |
| S-B-RP-40   | HALL - ROOF FRAMING SECTIONS                     | A        |
| S-B-RP-41   | HALL - ROOF FRAMING SECTIONS                     | A        |
| S-B-RP-50   | HALL - ROOF FRAMING DETAILS                      | В        |
| S-B-RP-51   | HALL - ROOF FRAMING DETAILS                      | A        |
| S-B-RP-52   | HALL - ROOF FRAMING DETAILS                      | A        |
| S-B-RP-53   | HALL - ROOF FRAMING DETAILS                      | А        |
| S-B-RP-54   | HALL - ROOF FRAMING DETAILS                      | А        |
| S-C-GF-00   | TEACHING SPACE OVERALL GROUND FLOOR PLAN         | А        |
| S-C-GF-01   | C1 & C2 TEACHING SPACE - GROUND FLOOR PLAN       | А        |
| S-C-GF-02   | C3 TEACHING SPACE - GROUND FLOOR PLAN            | А        |
| S-C-L1-00   | TEACHING SPACE OVERALL LEVEL 1 PLAN              | А        |
| S-C-L1-01   | C1 & C2 TEACHING SPACE - LEVEL 1 FLOOR PLAN      | A        |
| S-C-L1-02   | C3 TEACHING SPACE - LEVEL 1 FLOOR PLAN           | А        |
| S-C-RP-00   | TEACHING SPACE OVERALL ROOF PLAN                 | А        |
| S-C-RP-01   | C1 & C2 TEACHING SPACE - ROOF FRAMING PLAN       | A        |
| S-C-RP-02   | C3 TEACHING SPACE - ROOF FRAMING PLAN            | A        |
| S-C-RP-03   | C1 & C2 TEACHING SPACE - LOWER ROOF FRAMING PLAN | A        |
| S-C-RP-40   | TEACHING SPACE -ROOF FRAMING SECTIONS            | A        |
| S-C-RP-41   | TEACHING SPACE -ROOF FRAMING SECTIONS            | A        |
| S-C-RP-50   | TEACHING SPACE - ROOF FRAMING DETAILS            | A        |
| S-C-WF-01   | TEACHING SPACE - GROUND WALL FRAMING PLAN        | A        |

# STRUCTURAL DRAWINGS SCHEDULE

| S-C-WF-02 | TEACHING SPACE - LEVEL 1 WALL FRAMING PLAN | А |
|-----------|--------------------------------------------|---|
| S-D-GF-01 | LIBRARY - GROUND FLOOR PLAN                | A |
| S-D-L1-01 | LIBRARY - LEVEL 1 FLOOR PLAN               | A |
| S-D-RP-01 | LIBRARY - ROOF FRAMING PLAN                | A |
| S-D-RP-40 | LIBRARY - ROOF FRAMING SECTIONS            | A |
| S-D-RP-41 | LIBRARY - ROOF FRAMING SECTIONS            | A |
| S-D-RP-50 | LIBRARY - ROOF FRAMING DETAILS             | A |

Aconex

**1203 - Warnervale New Primary School** 75 Warnervale Road Warnervale NSW 2259 Australia

MAIL TYPE General Correspondence MAIL NUMBER RCC-GCOR-000912 REFERENCE NUMBER RCC-RFI-000055

RICHARD CROOKES

CONSTRUCTIONS

# Fwd: CC2 - Design Certification

| From   | Mr Chris Hamilton - Richard Crookes Constructions Pty Limited |
|--------|---------------------------------------------------------------|
| То     | Mr Sean Moore - Metro Building Consultancy                    |
| Cc (3) | Katie Lawson-Craig - NBRSARCHITECTURE                         |
|        | James Kim - NBRSARCHITECTURE                                  |
|        | Mr Adrian Connell - Richard Crookes Constructions Pty Limited |
|        |                                                               |

Sent

Tuesday, 17 November 2020

#### ✓ MESSAGE

Hi Sean,

Please see confirmation from Birzulis within the below in response to the matters you have raised per correspondence MetroBC-GCOR-000047. Please confirm this now address all structural items required for the Crown Certificate. Regards,

Chris Hamilton

Mobile 0400 202 829 Suite 1, Level 1, 118a Belford Street, Broadmeadow, NSW 2292 PO Box 835 Hamilton NSW 2303 www.richardcrookes.com.au

From: M Grogan
Sent: 17/11/2020 10:25:40 AM AEDT (GMT +11:00)
To: Terry Ou, Chris Hamilton
Cc: Michael Grogan, Paul Grogan, Sundar Shrestha, James Kim, Katie Lawson-Craig, Adrian Connell
Mail Number: Birzulis-GCOR-000107
Subject: Re: CC2 - Design Certification

Chris,

We can confirm that the clauses mentioned below are meet. To limit the cost not all members within the 18m have been fire rated, those that require rating have been identified. Some members provided are to meet EFSG deflection limits during the

#### Aconex

normal operation of the school. In the event of a fire we have only rated the elements that are required to maintain structural stability for the 120miniuts period.

Regards **Michael Grogan** *Director* 

# **BIRZULIS** ASSOCIATES

583 Darling Street Rozelle NSW 2039 ☎ (02) 9555 7230 ⓒ www.birzulisassociates.com

From: C Hamilton
Sent: 17/11/2020 9:48:07 AM AEDT (GMT +11:00)
To: Terry Ou
Cc: Michael Grogan, Paul Grogan, Sundar Shrestha, James Kim, Katie Lawson-Craig, Adrian Connell
Mail Number: RCC-GCOR-000907
Subject: Re: CC2 - Design Certification

#### Terry,

All I can suggest is that you need to review BCA Specification C1.1 - Clause 2.2 (extract below). Can you review and provide a new response to RCC-GCOR-000902 (confirming all items) ASAP please?

Aconex

#### 2.2 Fire protection for a support of another part

- (a) Where a part of a building required to have an FRL depends upon direct vertical or lateral support from another part to maintain its FRL, that supporting part, subject to (b), must—
  - (i) have an FRL not less than that required by other provisions of this Specification; and
  - (ii) if located within the same fire compartment as the part it supports have an FRL in respect of structural adequacy the greater of that required—
    - (A) for the supporting part itself; and
    - (B) for the part it supports; and
  - (iii) be non-combustible-
    - (A) if required by other provisions of this Specification; or
    - (B) if the part it supports is required to be non-combustible.
- (b) The following building elements need not comply with (a)(ii) and (a)(iii)(B):
  - (i) An element providing lateral support to an external wall complying with Clause 5.1(b) or C1.11.
  - (ii) An element providing support within a carpark and complying with Clause 3.9, 4.2 or 5.2.
  - (iii) A roof providing lateral support in a building-
    - (A) of Type A construction if it complies with Clause 3.5(a), (b) or (d); and
    - (B) of Type B and C construction.
  - (iv) A column providing lateral support to a wall where the column complies with Clause 2.5(a) and (b).

2019 Building Code of Australia - Volume One

#### **Fire resistance**

#### Deemed-to-Satisfy Provisions

(v) An element providing lateral support to a fire wall or fire-resisting wall, provided the wall is supported on both sides and failure of the element on one side does not affect the fire performance of the wall.

Regards,

Chris Hamilton

Mobile 0400 202 829 Suite 1, Level 1, 118a Belford Street, Broadmeadow, NSW 2292 PO Box 835 Hamilton NSW 2303 www.richardcrookes.com.au

From: T Ou
Sent: 16/11/2020 2:02:26 PM AEDT (GMT +11:00)
To: Chris Hamilton
Cc: Michael Grogan, Paul Grogan, Sundar Shrestha, James Kim, Katie Lawson-Craig, Adrian Connell
Mail Number: Birzulis-GCOR-000106
Subject: Re: CC2 - Design Certification

Hi Chris,

3/8

Page 85

2

#### Aconex

My comments are indicated by RED below.

Regards, Terry Ou

From: C Hamilton
Sent: 16/11/2020 12:38:41 PM AEDT (GMT +11:00)
To: Terry Ou
Cc: Michael Grogan, Paul Grogan, Sundar Shrestha, James Kim, Katie Lawson-Craig, Adrian Connell
Mail Number: RCC-GCOR-000902
Subject: Fwd: CC2 - Design Certification

Terry, Can you please review the below and provide confirmation as requested. Regards,

Chris Hamilton

Mobile 0400 202 829 Suite 1, Level 1, 118a Belford Street, Broadmeadow, NSW 2292 PO Box 835 Hamilton NSW 2303 www.richardcrookes.com.au

From: S Moore Sent: 16/11/2020 12:34:33 PM AEDT (GMT +11:00) To: Chris Hamilton Cc: James Kim Mail Number: MetroBC-GCOR-000047 Subject: Re: CC2 - Design Certification

#### Hi Chris

Thank you for the revised structural design certificate.

Can you ask the structural engineer to confirm that all external loadbearing columns of the two storey homebase building that are within 18m of the side boundary and within 18m of the external wall of the hall are provided with an FRL of 120/-/-. Yes, it is confirmed. The FRL table is covered in the drawing S-0-GE-02.

Can you ask the structural engineer to confirm that all loadbearing external walls and all columns incorporated within them of the two storey homebase building that are within 18m of the side boundary and within 18m of the external wall of the hall are provided with an FRL of 120/-/-.

Yes, it is confirmed. The FRL table is covered in the drawing S-0-GE-02.

Can you ask the structural engineer to confirm that all elements providing direct vertical or lateral support to all fire rated building elements are also provided with the same FRL as per clause 2.2 of BCA Spec C1.1. Not quit sure what is the clause 2.2 of BCA Spec C1.1. Please clarify.

https://au1.aconex.com/Logon?Action=View&ENTITY=MAIL&ID=1572090408&USERID=134391581

Aconex

Please provide this prior to the issue of CWC 02.

Kind regards,

Sean Moore

Managing Director sean@metrobc.com.au



#### P: (02) 9692 8477 | M: 0406 920 277 | W: metrobc.com.au

Suite 102, 12 Mount Street, North Sydney NSW 2060

From: C Hamilton Sent: 13/11/2020 5:03:12 PM AEDT (GMT +11:00) To: Sean Moore Mail Number: RCC-GCOR-000888 Subject: Fwd: CC2 - Design Certification

Sean, Update Structural cert attached. Regards,

Chris Hamilton

Mobile 0400 202 829 Suite 1, Level 1, 118a Belford Street, Broadmeadow, NSW 2292 PO Box 835 Hamilton NSW 2303 www.richardcrookes.com.au

From: T Ou

Sent: 13/11/2020 4:23:37 PM AEDT (GMT +11:00) To: Michael Grogan, Terry Ou, Chris Hamilton Cc: James Kim, Adrian Connell, Tim Hastings Mail Number: Birzulis-GCOR-000103 Subject: Re: CC2 - Design Certification

Hi Chris,

The updated structural design certificate for CC2 is attached. The latest drawing list is included.

Regards, Terry Ou



# Screw Piling Solutions Pty Limited

Screw Piling job No. 757

Richard Crookes Constructions Attention: Tim Hastings

# Re: SPS Steel Screw Piles for Warnervale Primary School, 75 Warnervale Rd Warnervale

| 001  |                                                                                            |
|------|--------------------------------------------------------------------------------------------|
| TAG  | WORKING LOAD<br>MINIMUM VERTICAL SAFE<br>WORKING LOAD (kN)<br>Compresion (+) / Tension (-) |
| SP1  | 50 kN                                                                                      |
| SP2  | +50 / -10 kN                                                                               |
| SP3  | 60 kN                                                                                      |
| SP4  | +60 / -20 kN                                                                               |
| SP5  | 100 kN                                                                                     |
| SP6  | 125 kN                                                                                     |
| SP7  | 150 kN                                                                                     |
| SP8  | +150/-50 kN                                                                                |
| SP9  | 175 kN                                                                                     |
| SP10 | 200 kN                                                                                     |
| SP11 | 250 kN                                                                                     |
| SP12 | 300 kN                                                                                     |
| SP13 | 350 kN                                                                                     |
| SP14 | 400 kN                                                                                     |
| SP15 | 500 kN                                                                                     |
| SP16 | 550 kN                                                                                     |
| SP17 | 650 kN                                                                                     |
| SP18 | 800 kN                                                                                     |

- SP1-SP5 76\*5 shaft 150 multiturn helix
- SP6-SP8 89\*5.5 shaft 280 multiturn helix
- SP9-11 114\*4.9 shaft 280 multiurn helix
- SP12-SP15 168\*4.9 shaft 350 multiturn helix
- SP16-17 168\*6.4 350 multiturn helix
- SP18 178\*8.2 450 multiturn helix

Screw Piling Solutions Pty Limited ABN 75 630 201 508 www.screwpilingsolutions.com Suite 203, 24-26 Falcon Street Crows Nest NSW 2065 Phone 02 99061500





HELIX

Screw Piling Solutions Pty Limited ABN 75 630 201 508 <u>www.screwpilingsolutions.com</u> Suite 203, 24-26 Falcon Street Crows Nest NSW 2065 Phone 02 99061500



Screw Piling Solutions Pty Limited ABN 75 630 201 508 <u>www.screwpilingsolutions.com</u> Suite 203, 24-26 Falcon Street Crows Nest NSW 2065 Phone 02 99061500



Screw Piling Solutions Pty Limited ABN 75 630 201 508 <u>www.screwpilingsolutions.com</u> Suite 203, 24-26 Falcon Street Crows Nest NSW 2065 Phone 02 99061500



# **Screw Piling Solutions Pty Limited**

# 3-11-20 Design Certificate Steel Screw Piling Job No. 757

Richard Crookes Constructions Attention: Tim Hastings

# Re: SPS Steel Screw Piles for Warnervale Primary School, 75 Warnervale Rd Warnervale NSW 2259

# **DESIGN INFORMATION**

This design is based on the following information:

- > Engineering plans 7900 by Birzulis
- > Geotechnical report 83313.00 by Douglas.

The piles for the above project have been designed to resist the pile loads and specifications as nominated on the structural engineers' drawings.

The piling design complies with AS2159-2009 Amendt 1.

They have also been designed for a design life on 50 years.

Regards

Thus

Chris Thrush Screw Piling Solutions

0408 407 111 chris@screwpilingsolutions.com

Screw Piling Solutions Pty Limited ABN 75 630 201 508 www.screwpilingsolutions.com Suite 203, 24-26 Falcon Street Crows Nest NSW 2065 Phone 02 99061500

| Б |
|---|
| J |

| 11/10/2020                                                                                     |                                                                               | Aconex                             |                          |
|------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------|--------------------------|
| Tim Hastings<br>RICHARD CROOKES CONSTRUCTIONS PTY LI                                           | WPS - Screw Piling Design           MITED         GENERAL CORRESPONDENCE      | 29/09/2020<br>RCC-GCOR-000489      |                          |
| Chris Thrush<br>SCREW PILING SOLUTIONS PTY LTD                                                 | Re: WPS - Screw Piling Design<br>RESPONSE TO RFI                              | 29/09/2020<br>SCPSPL-RTRFI-000001  |                          |
| Tim Hastings<br>RICHARD CROOKES CONSTRUCTIONS PTY LI                                           | Fwd: WPS - Screw Piling Design           MITED         GENERAL CORRESPONDENCE | 29/09/2020<br>RCC-GCOR-000493      |                          |
| Tim Hastings<br>RICHARD CROOKES CONSTRUCTIONS PTY LI                                           | Re: WPS - Screw Piling Design<br>MITED GENERAL CORRESPONDENCE                 | 08/10/2020<br>RCC-GCOR-000556      |                          |
| Terry Ou<br>BIRZULIS ASSOCIATES PTY LTD                                                        | Re: WPS - Screw Piling Design<br>GENERAL CORRESPONDENCE                       | 09/10/2020<br>BIRZULIS-GCOR-000069 |                          |
| Tim Hastings<br>RICHARD CROOKES CONSTRUCTIONS PTY LI                                           | Fwd: WPS - Screw Piling Design           MITED         GENERAL CORRESPONDENCE | 09/10/2020<br>RCC-GCOR-000563      |                          |
| Chris Thrush<br>SCREW PILING SOLUTIONS PTY LTD                                                 | Re: WPS - Screw Piling Design<br>GENERAL CORRESPONDENCE                       | 09/10/2020<br>SCPSPL-GCOR-000006   |                          |
| Tim Hastings<br>RICHARD CROOKES CONSTRUCTIONS PTY LII                                          | Fwd: WPS - Screw Piling Design           MITED         GENERAL CORRESPONDENCE | 09/10/2020<br>RCC-GCOR-000568      |                          |
| Terry Ou<br>BIRZULIS ASSOCIATES PTY LTD                                                        | Re: WPS - Screw Piling Design<br>GENERAL CORRESPONDENCE                       | 12/10/2020<br>BIRZULIS-GCOR-000070 |                          |
| Tim Hastings<br>RICHARD CROOKES CONSTRUCTIONS PTY LII                                          | Re: WPS - Screw Piling Design<br>MITED GENERAL CORRESPONDENCE                 | 12/10/2020<br>RCC-GCOR-000572      |                          |
| Chris Thrush<br>SCREW PILING SOLUTIONS PTY LTD                                                 | Re: WPS - Screw Piling Design<br>GENERAL CORRESPONDENCE                       | 15/10/2020<br>SCPSPL-GCOR-000007   |                          |
| Tim Hastings<br>RICHARD CROOKES CONSTRUCTIONS PTY LII                                          | Fwd: WPS - Screw Piling Design           MITED         GENERAL CORRESPONDENCE | 17/10/2020<br>RCC-GCOR-000617      |                          |
| Terry Ou<br>BIRZULIS ASSOCIATES PTY LTD                                                        | Re: WPS - Screw Piling Design<br>GENERAL CORRESPONDENCE                       | 12/10/2020<br>BIRZULIS-GCOR-000071 |                          |
| <b>1203 - Warnervale New Primary</b><br>75 Warnervale Road<br>Warnervale<br>NSW 2259 Australia | School                                                                        | 2                                  | BIRZULIS<br>ASSOCIATES   |
| MAIL TYPE<br>General Correspondence                                                            | MAIL NUMBER<br>Birzulis-GCOR-000                                              | 0071 REFERE                        | NCE NUMBER<br>COR-000489 |
| Re: WPS - Screw Piling Design                                                                  |                                                                               |                                    |                          |
| From M                                                                                         | r Terry Ou - Birzulis Associates Pty Ltd                                      |                                    |                          |
| To M                                                                                           | r Tim Hastings - Richard Crookes Constructions Pty Limited                    |                                    |                          |
| Cc M                                                                                           | r Michael Grogan - Birzulis Associates Pty Ltd                                |                                    |                          |

Sent Monday, 12 October 2020 1:52:55 PM AEDT (GMT +11:00)

N/A

Status

MESSAGE

Hi Tim,

We write to advise that our office has perused the proposed pile calculations submitted by 'SPS Screw Piling Solutions' attached from the RCC dated 09/10/2020.

Since the design, installation and certification of the steel screw pile system is the responsibility of the manufacturer/contractor, our office has not carried out a design check of the steel screw pile member sizes and details.

In our opinion there is no apparent conflict between the details submitted and the general intent of the structural design.

Regards, Terry Ou

From: T Hastings Sent: 09/10/2020 3:57:54 PM AEDT (GMT +11:00) To: Terry Ou Cc: Michael Grogan Mail Number: RCC-GCOR-000568 Subject: Fwd: WPS - Screw Piling Design

https://au1.aconex.com/Logon?Action=View&ENTITY=MAIL&ID=1571804068&USERID=1476755201



Consulting Structural + Civil Engineers

ACN 003 797 911 ABN 99 003 797 911

Sydney Office 583 Darling Street, Rozelle NSW 2039 Telephone: 9555 7230 Email: office@birzulisassociates.com Newcastle Office 105 Merewether Street, Merewether NSW 2291 Telephone: 4049 4855 Email: office@birzulisassociates.com

30 October 2020

Principal Certifying Authority c/- RICHARD CROOKES CONSTRUCTION Attention Mr Tim Hastings HastingsT@richardcrookes.com.au

Dear Sir/Madam,

### CIVIL/STORMWATER DESIGN CERTIFICATE (CROWN CERTIFICATE 2)

# NEW PRIMARY SCHOOL AT WARNERVALE (OUR REF. 7900 Rev C)

This is to certify that we have prepared civil & stormwater drawings, (refer to attached list) as listed below for the abovementioned project. The engineering design and detailing has been carried out in accordance with the relevant Australian Standards (as listed below), the requirements of the Building Code of Australia (2019, Vol 1), the Educational Facilities Standards & Guidelines (EFSG), The section 4.38 of the Environmental Planning and Assessment Act 1979 of the State Significant Development Application (SSDA), Local Council and NSW Government requirements.

Drawing List

- 7900-C-0-GE-00 revision 9
- 7900-C-0-GE-01 revision 9
- 7900-C-0-GE-10 revision 9
- 7900-C-0-GE-11 revision 9
- 7900-C-0-GE-12 revision 9
- 7900-C-0-GE-13 revision 9
- 7900-C-0-GE-20 revision 9
- 7900-C-0-GE-21 revision 9
- 7900-C-0-GE-22 revision 9
- 7900-C-0-GE-23 revision 9
- 7900-C-0-GE-30 revision 9
- 7900-C-0-GE-31 revision 9
- 7900-C-0-GE-51 revision 9
- 7900-C-1-GF-01 revision 9
- 7900-C-1-GF-02 revision 9

DIRECTORS B Fimmano B.E. (Hons), M.I.E. Aust., C.P.Eng. M A Grogan B.E., M.Eng., M.I.E. Aust., C.P.Eng. ASSOCIATE DIRECTOR

P W Grogan B.E. (Hons), M.E.(Struct), M.I.E. Aust., C.P.Eng. CONSULTANT

A J Birzulis OAM, B.E., M.Eng. Sc., F.I.E. Aust., C.P.Eng.



6

- 7900-C-1-GF-04 revision 9
- 7900-C-1-GF-30 revision 9
- 7900-C-1-GF-70 revision 9

# Standards/Guidelines List

- Central Coast Council Civil Works Specification Design Guideline (2018)
- Central Coast Council Civil Works Specification Construction Specification (2018)
- Wyong Development Control Plan 2013
- AS/NZS3500.2 (2018)
- AS/NZS3500.3 (2018)
- Pavement design in accordance with Austroads
- AS/NZS 2566.1
- AS/NZS 3725
- AS2890.1
- AS3600
- AS4678
- AS/NZS1170.0
- AS/NZS1170.1
- AS/NZS1170.2
- AS1170.4
- AS3700
- AS3798

This certificate shall not be construed as relieving any other party of their legal and contractual responsibilities.

Yours faithfully

Comeron Ami

<u>CAMERON AMRI</u> Senior Civil & Structural Engineer MIEAust 2514507 CPEng NER

17 November 2020

Level 1, 215 Pacific Highway Charlestown NSW 2290 02 4943 1777 newcastle@northrop.com.au ABN 81 094 433 100

NORTHROP

NL200053-00\_M02V2

Richard Crookes Constructions Pty Ltd Chris Hamilton Level 1, 118A Belford Street Broadmeadow NSW 2292

Dear Chris,

### Re: Potters Creek Primary School – CC2 Internal Carpark Design Certificate

We, Northrop Consulting Engineers Pty Ltd, being professional engineers, certify the civil drawings noted in the attached document transmittal were prepared:

- a) under the supervision of a professional civil engineer registered under NER;
- b) generally in accordance with the relevant civil requirements of the National Construction Code;
- c) to ensure the inclusion of 36 parking spaces and one disable marked space in accordance with the least versions of AS2890.1 and AS2890.6. It is noted that further spaces within the school are shown on Engineering Drawings by Birzulus;
- d) to ensure that the design of the parking and access arrangements incorporate the relevant recommendations of the Road Safety Audit prepared by Billard Leece Partnership dated 12 December 2019; and
- e) in accordance with the swept path of the longest design vehicle proposed to enter and exit as well as manoeuvre through the carpark (B99 vehicle), is in accordance with the latest version of AS2890.1 and AS2890.2. It is noted that larger vehicles than the B99 vehicle will utilise the overflow carpark (see Engineering Drawings by Birzulus) for turning or continue along the Emergency Access.

This certificate shall not be construed as relieving any other part of their responsibilities.

Yours sincerely,

an

Ben Clark Principal | Civil Engineer BEng (Civil), B Business, MIEAust CPEng NER (Civil) RPEQ

This certificate is provided to you for your sole benefit and only for the purpose of the Potters Creek Primary School project. You may not provide this certificate to any third party without our prior written consent. A third party may not rely on this certificate unless otherwise agreed in writing by us, or required by law. To the extent permitted by law, we disclaim and exclude all liability for any loss, damage, cost or expense suffered by any third party relating to or resulting from the unauthorised use of, or reliance on, any information contained in this certificate.

|             |     | Date       |
|-------------|-----|------------|
| Prepared by | BC  | 17/11/2020 |
| Checked by  | CP  | 17/11/2020 |
| Admin       | BBR | 17/11/2020 |

NL200053-00 / 17 November 2020 / Revision A

Y:\YEAR 2020 Jobs\NL200053 - Warnervale Primary School\M - Construction Certificates\NL200053\_M01.V2.BC.docx

Aconex

**1203 - Warnervale New Primary School** 75 Warnervale Road Warnervale NSW 2259 Australia

MAIL TYPE General Correspondence MAIL NUMBER RCC-GCOR-000911 REFERENCE NUMBER RCC-RFI-000054

**RICHARD CROOKES** 

CONSTRUCTIONS

# Fwd: Main Carpark - SSDA B30 - Northrop

| From   | Mr Chris Hamilton - Richard Crookes Constructions Pty Limited                                                                |
|--------|------------------------------------------------------------------------------------------------------------------------------|
| То     | Mr Sean Moore - Metro Building Consultancy                                                                                   |
| Cc (2) | Mr Adrian Connell - Richard Crookes Constructions Pty Limited<br>Mr Tim Hastings - Richard Crookes Constructions Pty Limited |
| Sent   | Tuesday, 17 November 2020                                                                                                    |

#### ✓ MESSAGE

#### Hi Sean,

Please find attached updated certificate.

Also notes from Northrop below on commercial vehicles, essentially they are to use the Service Road (as designed by Birzulas) and not the eastern carpark (Northrop design) that is nominated for Student, teacher and Visitor use only. However can use the overflow parking area to turn around or continue on the Emergency Service track. Regards,

Chris Hamilton

Mobile 0400 202 829 Suite 1, Level 1, 118a Belford Street, Broadmeadow, NSW 2292 PO Box 835 Hamilton NSW 2303 www.richardcrookes.com.au

From: B Clark
Sent: 17/11/2020 11:50:24 AM AEDT (GMT +11:00)
To: Chris Hamilton
Cc: Pat Burl, Adrian Connell, Tim Hastings
Mail Number: NE-ADVICE-000002
Subject: Re: Main Carpark - SSDA B30 - Northrop

Chris,

Please see atatched updated Certificate as requested.

#### Aconex

As discussed the capark has been designed for the B99 passenager vehicle. AS2890.2 relates to Commercial vehicles. While I've referenced AS2890.2 in the certificate I've made a point that Commercial vehicles are not expected to utilise the capark. This was discussioned with Tim early in the design process with the thoughts that large vehicles will need to use the overflow parking area to turn around or continue on the Emergency Access track. The reference to AS2890.2 is alot more relevant to the loading area at the eastern side of the site and covered by Birzulus.

Any queries please let me know.

Rgeards, Ben Clark Principal / Senior Civil Engineer Northrop Consulting Engineers Pty Ltd T: 02 4943 1777 M: 0405 534 055 Level 1, 215 Pacific Highway Charlestown NSW 2290 PO Box 180 Charlestown NSW 2290 www.northrop.com.au

From: C Hamilton
Sent: 17/11/2020 11:02:44 AM AEDT (GMT +11:00)
To: Ben Clark
Cc: Pat Burl, Adrian Connell, Tim Hastings
Mail Number: RCC-GCOR-000908
Subject: Re: Main Carpark - SSDA B30 - Northrop

Ben, This is urgent, can you please review and advise. Regards,

Chris Hamilton

Mobile 0400 202 829 Suite 1, Level 1, 118a Belford Street, Broadmeadow, NSW 2292 PO Box 835 Hamilton NSW 2303 www.richardcrookes.com.au

From: C Hamilton Sent: 13/11/2020 3:38:04 PM AEDT (GMT +11:00) To: Ben Clark Cc: Pat Burl, Adrian Connell, Tim Hastings Mail Number: RCC-GCOR-000879 Subject: Fwd: Main Carpark - SSDA B30 - Northrop

Ben, Can you please review the below comments from the PCA and provide an update.



# g **HUNTER & CENTRAL COAST REGION**

Complete Electrical & Communications Skills

8 Stenhouse Drive Cameron Park NSW 2285 PO Box 285 Wallsend NSW 2287 Phone: (02) 4923-0000

# **DESIGN CERTIFICATION** ELECTRICAL SERVICES

# PROJECT DETAILS: PORTERS CREEK PUBLIC SHOOL 75 Warnervale Rd, Warnervale NSW 2259

CLIENT DETAILS: RICHARD CROOKES CONSTRUCTIONS

Attn: Chris Hamilton

I the undersigned : -

In accordance with our contract conditions hereby certify that all design carried out to date by Stowe Australia have been completed to an acceptable standard in accordance with;

- Relevant Statutory Authorities, Australian Standards as listed below, Design Drawings (refer to attached 1 Drawing Schedule) & Specifications.
  - AS/NZS3000:2018
  - AS/NZS2293.1:2018 •
  - AS/NZS3100:2017
  - AS/NZS3112:2017
  - AS/NZS3123:2005
  - AS/NZS3013:2005
  - AS/NZS3008.1.1:2017
  - AS/NZS4961:2003
  - AS/NZS61000:2016
  - AS/NZS3017:2017
  - AS/NZS3190:2016 •
  - AS/NZS1680.0:2009
  - Part E4.4 of the BCA 2019
  - Part E4.8 of the BCA 2019
  - Section J of the BCA 2019
  - Clause 14.1 of AS1428.1:2009 for Accessible areas
- 2. Any subsequent amendments, instructions, design changes, meetings and correspondence required during the design phase.
- NSW DoE EFSG requirements.

Print Name: Ken Barnett

Signature:

Date: 16/11/20

# STOWE AUSTRALIA PTY LTD ABN 27 002 556 603

www.stoweaustralia.com.au

**HEAD OFFICE** Ph : (02) 9848 2111 Fax : (02) 9898 0200 BRISBANE ✓ Ph : (07) 3209 5955 Fax : (07) 3209 5944

Rev.09 / 04

**MELBOURNE**√ Ph : (03) 9695 2333 Fax : (03) 9695 2399 NEWCASTLE ✓ Ph : (02) 4962 3555 Fax : (02) 4962 3400

NOWRA Ph : (02) 4446 0900 Fax: (02) 4446 1090 PENRITH ✓ Ph : (02) 4731 1088 Fax : (02) 4721 0740

SYDNEY CBD v Ph : (02) 9282 9005 Fax : (02) 9282 9938 TAREE ✓ Ph : (02) 6552 6411 Fax : (02) 6552 2631



| Drawing No      | Revision | Description                                                               |
|-----------------|----------|---------------------------------------------------------------------------|
| WPS-STO-E000.00 | 2        | Cover Page & Drawing List                                                 |
| WPS-STO-E000.01 | 3        | Electrical Services - Legend                                              |
| WPS-STO-E100.01 | 6        | Electrical Services Site Plan - Infrastructure                            |
| WPS-STO-E100.02 | 2        | Electrical Services Site Plan - Security                                  |
| WPS-STO-E200.01 | 5        | Electrical Services - Hall, OSHC & Canteen - Lighting Layout              |
| WPS-STO-E210.01 | 4        | Electrical Services - Admin - Lighting Layout                             |
| WPS-STO-E220.01 | 4        | Electrical Services - Teaching Spaces Lower Ground - Lighting Layout      |
| WPS-STO-E220.02 | 4        | Electrical Services - Teaching Spaces Lower Ground - Lighting Layout      |
| WPS-STO-E220.11 | 2        | Electrical Services - Teaching Spaces Lower Ground - Dry Fire Layout      |
| WPS-STO-E220.12 | 2        | Electrical Services - Teaching Spaces Lower Ground - Dry Fire Layout      |
| WPS-STO-E220.21 | 1        | Electrical Services - Teaching Spaces Lower Ground - Solar System Layout  |
| WPS-STO-E230.01 | 5        | Electrical Services - Library - Lighting Layout                           |
| WPS-STO-E230.02 | 2        | Electrical Services - Library - Dry Fire Layout                           |
| WPS-STO-E300.01 | 3        | Electrical Services - Hall, OSHC & Canteen - Power & Comms Layout         |
| WPS-STO-E300.11 | 2        | Electrical Services - Hall, OSHC & Canteen - Security Layout              |
| WPS-STO-E300.21 | 1        | Electrical Services - Hall, OSHC & Canteen - PA layout                    |
| WPS-STO-E310.01 | 2        | Electrical Services - Admin - Power & Comms Layout                        |
| WPS-STO-E310.11 | 2        | Electrical Services - Admin - Security Layout                             |
| WPS-STO-E310.21 | 1        | Electrical Services - Admin - PA layout                                   |
| WPS-STO-E320.01 | 3        | Electrical Services - Teaching Spaces Lower Ground - Power & Comms Layout |
| WPS-STO-E320.02 | 2        | Electrical Services - Teaching Spaces Ground Level - Power & Comms Layout |
| WPS-STO-E320.11 | 2        | Electrical Services - Teaching Spaces Lower Ground - Security Layout      |
| WPS-STO-E320.12 | 2        | Electrical Services - Teaching Spaces Ground Level - Security Layout      |
| WPS-STO-E320.21 | 1        | Electrical Services - Teaching Spaces Lower Ground - PA Layout            |
| WPS-STO-E320.22 | 1        | Electrical Services - Teaching Spaces Ground Level - PA Layout            |
| WPS-STO-E330.01 | 2        | Electrical Services - Library - Power & Comms Layout                      |
| WPS-STO-E330.11 | 2        | Electrical Services - Library - Security Layout                           |
| WPS-STO-E330.21 | 1        | Electrical Services - Library - PA Layout                                 |
| WPS-STO-E600.01 | 2        | Electrical Services - Main Single Line Diagram                            |
| WPS-STO-E600.02 | 1        | Electrical Services - DB Single Line Diagrams                             |
| WPS-STO-E600.05 | 1        | Electrical Services - PA Schematic Diagrams                               |
| WPS-STO-E600.21 | 1        | Electrical Services - Solar System Schematic Diagram 1                    |
| WPS-STO-E600.22 | 1        | Electrical Services - Solar System Schematic Diagram 2                    |
| WPS-STO-E600.23 | 1        | Electrical Services - Solar System Invertor Mounting                      |
| WPS-STO-E750.01 | 2        | MD calcs                                                                  |
| WPS-STO-E750.02 | 1        | Submain calcs                                                             |
| WPS-STO-E750.03 | 2        | DB Schedules                                                              |



Monday, 16 November 2020 Ref No. MN11430

H L Mullane & Son Pty Ltd PO Box 370 HUNTER REGION MC NSW 2310

Attention: Shaughn Hannigan

# RE: School - Warnervale Primary School – Inground services CERTIFICATE OF DESIGN – HYDRAULIC SERVICES – CC2

## SUBJECT PREMISES: 75 Warnervale Road Warnervale NSW 2259

Pursuant to the provisions of **Clause A2.2 of the Building Code of Australia**, I hereby certify that the above design is in accordance with normal engineering practice and meets the requirements of the Building Code of Australia, Part 7 of the Environmental Planning and Assessment Regulations, relevant Australian Standards and relevant conditions of Development Consent. In particular the design is in accordance with the following:

| Fire Hose Reels                  | NCC 2019 Amendment 1 Clause E1.4 and AS 2441 – 2005   |
|----------------------------------|-------------------------------------------------------|
| Fire Hydrant Systems             | NCC 2019 Amendment 1 Clause E1.3 and AS 2419.1 – 2005 |
| Building Hydraulic Systems:      |                                                       |
| - Cold Water                     | AS/NZS 3500.01: 2018                                  |
| - Sanitary Plumbing and Drainage | AS/NZS 3500.02: 2018                                  |
| - Roof Water                     | AS/NZS 3500.05: 2018                                  |
| - Gas Service                    | AS/NZS 5601.1: 2004                                   |

I am an appropriately qualified and competent person in this area and as such can certify that the design and performance of the design systems comply with the above and which are detailed on the following drawings.

| Dwg No.                 | Title                                             | Revision      |
|-------------------------|---------------------------------------------------|---------------|
| MARL-HY-DWG-H-000       | COVER SHEET                                       | 4             |
| MARL-HY-DWG-H-001       | LEGEND & NOTES                                    | 4             |
| MARL-HY-DWG-H-002       | SCHEDULES                                         | 4             |
| MARL-HY-DWG-H-100       | SITE SERVICES 1:500                               | 6             |
| MARL-HY-DWG-H-101       | SITE SERVICES 1:250                               | 5             |
| MARL-HY-DWG-H-200       | BUILDING A – ADMIN & BUILDING B – HALL            | 5             |
|                         | WATER LAYOUT                                      |               |
| MARL-HY-DWG-H-201       | BUILDING C TEACHING BLOCKS - LOWER                | 4             |
|                         | GROUND - WATER LAYOUT                             |               |
| MARL-HY-DWG-H-202       | BUILDING C TEACHING BLOCKS - UPPER                | 4             |
|                         | GROUND - WATER LAYOUT                             |               |
| MARL-HY-DWG-H-203       | BUILDING D – LIBRARY LOWER & UPPER                | 5             |
|                         | GROUND WATER LAYOUT                               |               |
| CHANICAL · ELECTRICAL · | HYDRAULIC · FIRE · ENERGY · NABERS · STORMWATER · | SECTION J · B |

Managing Director Brendan Maher, AMIEAust, NER Director Daniel White, BE (Hons), B.BUS, MIEAust



| Dwg No.           | Title                                    | Revision |
|-------------------|------------------------------------------|----------|
| MARL-HY-DWG-H-300 | BUILDING A - ADMIN & BUILDING B - HALL - | 4        |
|                   | SANITARY DRAINAGE                        |          |
| MARL-HY-DWG-H-301 | BUILDING C TEACHING BLOCKS - LOWER       | 4        |
|                   | GROUND - SANITARY DRAINAGE               |          |
| MARL-HY-DWG-H-302 | BUILDING C TEACHING BLOCKS - UPPER       | 4        |
|                   | GROUND - SANITARY DRAINAGE               |          |
| MARL-HY-DWG-H-303 | BUILDING D - LIBRARY - LOWER & UPPER     | 4        |
|                   | GROUND - SANITARY DRAINAGE               |          |
| MARL-HY-DWG-H-304 | BUILDING A - ADMIN & BUILDING B - HALL - | 4        |
|                   | SANITARY DRAINAGE                        |          |
| MARL-HY-DWG-H-400 | DETAIL - SHEET 1                         | 3        |

Marline Newcastle possesses Indemnity Insurance to the satisfaction of the building owner.

Full Name of Designer: Qualifications: Address of Designer: Business Telephone No: Name of Employer:

Brendan Maher Dip. Eng AMIE AUST NER Unit F 56 Clyde Street, Hamilton North, NSW 2292 02 4925 9300 Fax No: 02 4926 3811 Marline Newcastle Pty Ltd

Signature: B. Maher



Edwards & Vickerman Consulting Engineers Suite 1, Level 1, 470 King Street, Newcastle West, NSW 2302 Telephone: +61 (02) 4929 2461 E-mail: admin@evconsulting.com.au



13th November 2020

Attn: Chris Hamilton Richard Crookes Constructions

Dear Sir

#### Re: PORTERS CREEK PUBLIC SCHOOL CERTIFICATE OF DESIGN – MECHANICAL SERVICES SUBJECT PREMISES – 75 Warnervale Road, Warnervale, NSW 2259

Pursuant to the provisions of **Clause A2.2 of the Building Code of Australia**, I hereby certify that the above design is in accordance with normal engineering practice and meets the requirements of the Building Code of Australia, Part 7 of the Environmental Planning and Assessment Regulations, relevant Australian Standards and relevant conditions of Development Consent. In particular the design is in accordance with the following:

- The Building Code of Australia 2019 BCA Part E2
- The Building Code of Australia 2019 BCA NSW Clauses F4.5, F4.11, F4.6, F5.7, C3.9, C3.12, C3.13, C3.15, Spec C1.1, C3.15, Spec E2.2a, F5.6, J0.1
- AS1668.1 2015, AS1668.2 2012, AS1668.4 2012, AS 3666.1 2002
- BCA 2016 Amendment 1 Section J
- Smoke hazard management measures comply for a building under 25m in height IMPORTANT – there are no dedicated essential smoke control mechanical systems proposed for this project
- Section J Report Stantec Australia Ref 46376 Revision 2
- Bush Fire Assessment Report Ref 128723 20190633 2<sup>nd</sup> August 2019

I am a competent person in this area and as such can certify that the design and performance of the systems included within the drawings – see list on the following page shall comply with the above.

Edwards & Vickerman Consulting Engineers Pty Ltd possesses Indemnity Insurance to the satisfaction of the building owner or my principal.

Full Name of Designer:

Venkat Narasimhan

**Qualifications:** 

- **T.MIE Aust, NER (5171175)**,
- M.ASHRAE
- \Xi M.IET

Name of Employer:

EDWARDS & VICKERMAN CONSULTING ENGINEERS PTY LTD

Yours faithfully,

Averagen

Venkat Narasimhan



Edwards & Vickerman Consulting Engineers Suite 1, Level 1, 470 King Street, Newcastle West, NSW 2302 Telephone: +61 (02) 4929 2461 E-mail: admin@evconsulting.com.au



# PROJECT DRAWING LIST

PROJECT NAME:

#### PORTERS CREEK PUBLIC SCHOOL CERTIFICATE OF DESIGN – MECHANICAL SERVICES SUBJECT PREMISES - 75 Warnervale Road, Warnervale, NSW 2259

PROJECT NO: 20033 SHEET: 1 of 1

| DRAWING NUMBER | DRAWING REFERENCE                                                      | REVISION |
|----------------|------------------------------------------------------------------------|----------|
| ME-100         | LEGENDS, GENERAL NOTES & DRAWING LIST                                  | 02       |
| ME-A-200       | BUILDING A- ADMIN - EQUIPMENT SCHEDULES                                | 01       |
| ME-A-300       | BUILDING A - ADMIN - GROUND FLOOR & ROOF - HVAC LAYOUT                 | 02       |
| ME-A-400       | 3D VIEWS - BUILDING A - ADMIN                                          | 02       |
| ME-B-200       | BUILDING B - HALL - EQUIPMENT SCHEDULES                                | 01       |
| ME-B-300       | BUILDING B - HALL - GROUND FLOOR - HVAC LAYOUT                         | 02       |
| ME-B-301       | BUILDING B - HALL - ROOF - HVAC LAYOUT                                 | 02       |
| ME-B-400       | 3D VIEWS - BUILDING B - HALL                                           | 02       |
| ME-C1-200      | BUILDING C1 - EQUIPMENT SCHEDULES                                      | 01       |
| ME-C1-300      | BUILDING C1 - TEACHING - LOWER GROUND FLOOR - HVAC LAYOUT              | 02       |
| ME-C1-301      | BUILDING C1 - TEACHING - UPPER GROUND FLOOR - HVAC LAYOUT              | 02       |
| ME-C2-200      | BUILDING C2 - EQUIPMENT SCHEDULES                                      | 01       |
| ME-C2-300      | BUILDING C2 - TEACHING - LOWER GROUND FLOOR - HVAC LAYOUT              | 02       |
| ME-C2-301      | BUILDING C2 - TEACHING - UPPER GROUND FLOOR - HVAC LAYOUT              | 02       |
| ME-C3-200      | BUILDING C3 - EQUIPMENT SCHDEULES                                      | 01       |
| ME-C3-300      | BUILDING C3 - LOWER GROUND FLOOR - HVAC LAYOUT                         | 02       |
| ME-C3-301      | BUILDING C3 - UPPER GROUND FLOOR - HVAC LAYOUT                         | 02       |
| ME-C-300       | BLOCK C OVERALL LOWER GROUND                                           | 01       |
| ME-C-301       | BLOCK C OVERALL UPPER GROUND                                           | 01       |
| ME-C-400       | 3D VIEWS - BUILDING C - TEACHING                                       | 02       |
| ME-D-200       | BUILDING D - EQUIPMENT SCHEDULES                                       | 01       |
| ME-D-300       | BUILDING D - LIBRARY - LOWER GROUND & UPPER GROUND FLOOR - HVAC LAYOUT | 02       |
| ME-D-301       | BUILDING D - LIBRARY - ROOF                                            | 01       |
| ME-D-400       | 3 D VIEWS – BUILDING D - LIBRARY                                       | 02       |
| ME-500         | TYPICAL DETAILS                                                        | 00       |

# ENERTREN PTY. LTD.

ABN: 75 770 323 635

Ph: (02) 8005 4766 E: info@enertren.com.au PO Box 312, Bathurst, NSW, 2795

Ref: GEN-034 V.2

#### 10/11/2020

PANELCORP 25 Abel Street Jamisontown, NSW, 2750

Attn:Gareth LightBy Email:gareth.light@panelcorp.com.au

# **Engineering Advice**

# NCC Volume One FP1.4 Weatherproofing – CeramaPANEL

| Project Name:       | Porters Creek Public School                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Project Address:    | 75 Warnervale Road, Warnervale, NSW 2259                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Client:             | NSW School Infrastructure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Building Company:   | Richard Crookes Constructions NSW                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Reference Drawings: | NBRS Architecture Drawing References:         20018-NBRS-DR-A-8301 Rev 4         20018-NBRS-DR-A-C3001 Rev 5         20018-NBRS-DR-A-C3002 Rev 5         20018-NBRS-DR-A-C3003 Rev 5         20018-NBRS-DR-A-C3004 Rev 5         20018-NBRS-DR-A-C3005 Rev 5         20018-NBRS-DR-A-C3005 Rev 5         20018-NBRS-DR-A-C3001 Rev 5         20018-NBRS-DR-A-D3001 Rev 5         20018-NBRS-DR-A-D3002 Rev 5         20018-NBRS-DR-A-D3002 Rev 5         20018-NBRS-DR-A-5101 Rev 3         20018-NBRS-DR-A-C4001 Rev 7         20018-NBRS-DR-A-C5401 Rev 2         20018-NBRS-DR-A-C5402 Rev 2         20018-NBRS-DR-A-C5402 Rev 2         20018-NBRS-DR-A-C5402 Rev 2         20018-NBRS-DR-A-C5402 Rev 7         20018-NBRS-DR-A-C5402 Rev 14         20018-NBRS-DR-A-C5402 Rev 7         20018-NBRS-DR-A-C1002 Rev 9         20018-NBRS-DR-A-C1002 Rev 9         20018-NBRS-DR-A-C1002 Rev 9         20018-NBRS-DR-A-C1003 Rev 6         20018-NBRS-DR-A-C1004 Rev 6         20018-NBRS-DR-A-C1004 Rev 6         20018-NBRS-DR-A-C1007 Rev 6         20018-NBRS-DR-A-C1007 Rev 6         20018-NBRS-DR-A-C1007 Rev 6         20018-NBRS-DR-A-C1007 Rev 6 |
|                     | 20018-NBRS-DR-A-C1008 Rev 6<br>20018-NBRS-DR-A-D1001 Rev 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |





2


### Context

This Engineering Advice confirms the capability of the Panelcorp CeramaPANEL fibre cement cladding systems, using CeramaPANEL Raw and CeramaPANEL Depth products, to comply with NCC Volume One FP1.4 Weatherproofing for the above project, and as such constitutes evidence of suitability as per NCC Volume One A5.2(1)(e) for the design intent of the specified building.

NCC Volume One FP1.4 specifies that an external wall (including openings around windows and doors) must prevent the penetration of water that could cause –

- a) unhealthy or dangerous conditions, loss of amenity for occupants; and,
- b) undue dampness or deterioration of building elements.

The basis on which this certification is provided is as follows:

- 1. Standards
  - a. EN 12467 Fibre-cement flat sheets Product specification and test methods. This is an alternative to the NCC Volume One Schedule 4 referenced standard AS/NZS 2908.2.
- 2. Specifications
  - a. Architectural drawings referenced in this report.
- 3. Codes of practice
  - a. ASCE Manuals and Reports on Engineering Practice No. 126, Curtain Wall Systems.
- 4. Other publications
  - a. CeramaPANEL Installation Manual.
  - b. Water-Resistant Design and Construction, W L Walker and D J Felice, Sr.

# **NCC Compliance - General**

The CeramaPANEL products (Attachments 1a and 1b) have been assessed in accordance with EN 12467 Fibre-cement flat sheets – Product specification and test methods. That standard is effectively equivalent to the NCC reference document AS/NZS 2908.2 (ISO 8336) Cellulose-cement products – Part 2: Flat sheets, thereby demonstrating adequate durability for use as an external cladding.

The verification method in FV1.1 can be adopted, subject to testing in accordance with FV1.1 (b), (c), (d)(ii) and (e) being successfully completed, and provided the windows comply with AS 2047. The requirements of FV1.1 (a)(i) and (ii) are considered to be satisfied on the basis of the following preliminary assessment:

| Risk Factor                  | Category                                          |             | Risk<br>Score |
|------------------------------|---------------------------------------------------|-------------|---------------|
| Wind region                  | Region A                                          |             | 0             |
| No. of storeys               | Two storeys                                       | Two storeys |               |
| Roof/wall junctions          | Roof to wall junctions fully protected            |             | 0             |
| Eaves width                  | 451-600 mm for two storey                         |             | 2             |
| Envelope complexity          | Complex shape with more than two claddin          | 3           |               |
| Decks, porches and balconies | Balcony exposed in plan view at first floor level |             | 4             |
|                              |                                                   | TOTAL:      | 11            |

i. External walls with a risk score less than or equal to 20 as calculated by Table FV1.1 –

ii. External walls with ultimate limit state wind pressure less than or equal to  $2.50 \text{ kPa} - \text{Estimated external wall ultimate wind pressures (considering net effect of external and internal pressure coefficients) for Region A for V<sub>1000</sub> = 46 m/s:$ 

General windward wall areas –  $W_u = +1.01 \text{ kPa}$ Windward walls subject to local pressures, (AS/NZS 1170.2 Table 5.6, WA1 area) –  $W_u = +1.38 \text{ kPa}$ 

With reference to the CeramaPANEL Installation Manual (Attachment 2), the referenced architectural drawings, and the specifications in this report, and provided the final project detailing and installation is carried out in accordance with these documents, the system will be weatherproof.

# **Detailing Requirements and Specifications for Weatherproofing**

To prevent damp conditions inside the building, it is necessary to ensure that water is prevented from passing from the outside of the facade to the internal surfaces. It is also necessary to ensure that condensation does not occur, or that, in the event that it does occur in certain transient conditions, the resulting moisture is not trapped in wall areas where mould growth or corrosion (or other material degradation) could occur.

There are five modes of water ingress, or forces acting on water that can penetrate the facade of a building – gravity, kinetic energy, air pressure differentials, surface tension and capillary action. Additionally, water vapour in air and the condensation potential with temperature differentials through the cavity also provides a means for water to become present in an external wall element.

In order to manage the above, the CeramaPANEL facade system is designed and detailed as a rain screen with pressure equalised cavity. The outermost barrier to water entry is the CeramaPANEL, and a vapour permeable water barrier in the form of Bradford Enviroseal CW is provided at the outside face of the structural frame. The wall system air barrier is at the internal wall lining. The base of the panel shall be set down below floor level and at least 150 mm below the hob to prevent water entry at the base of the cavity. Drainage shall be provided at the base of each wall to discharge any accumulated water or moisture from the cavity. Flashings shall be provided at the base of the walls and heads of openings to direct water and moisture away from the frame.

The rainscreen type of façade is generally regarded as the most reliable in terms of weatherproofing. The features of the CeramaPANEL external wall system designed on this principle is as follows (as is relevant to the wall types specified for this project):

- Structural frame (cold-formed steel stud framing). Design and specification by others.
- Internal lining that has an effective air seal at the periphery, and to window frames, door frames and other penetrations. Refer to manufacturer's specifications for installation requirements and, in the case of plasterboard linings, AS/NZ 2589.
- Bulk insulation (as required for wall thermal performance). Refer to manufacturer's specifications and AS 3999 for installation requirements.
- An effective water barrier on the outside of the structural frame. In this case CSR Bradford Enviroseal CW has been proposed and is acceptable for this purpose on this project (vapour permeable water barrier). The water barrier must be effectively sealed at the peripheries and at laps. Installation shall be in accordance with the specifications and AS/NZS 4200.2. Upper membranes must lap over lower membranes, and membranes must lap over flashing at the base of the wall.
- A cavity air space between the wrapped outside face of the structural wall frame and the cladding. Typically this is achieved by use of tophats on a grid providing the necessary structural support to the CeramaPANEL cladding. In this case, 15mm horizontal tophats are installed to the frame and 35mm vertical tophats installed on the 15mm tophats, to which the CeramaPANEL is installed. Design and specification of tophats and their fixings by others.
- The cladding. In this case CeramaPANEL. Fixing of the CeramaPANEL cladding shall be in accordance with the Installation Manual. Flashings and gaskets shall be installed as per the Installation Manual, and screw fixing of the cladding to the tophats shall be in accordance with structural design tables therein.

A variation to the above in this project is Wall Type WNC25 where the structural wall element is concrete, and the cavity is achieved by a gap and cold-formed steel stud framing.

The following elements are important to consider when finalising the design documentation:

- Enviroseal CW wall wrap must be installed on the external surface of the structural frame in accordance with the manufacturer's instructions and with all joints taped.
- Flashings and laps in wall wrap shall be installed so that the upper element laps over the lower element to divert water outwards.
- Min. 35mm depth tophat battens to provide cavity between the wrapped structural frame and the CeramaPANEL products.
- In the case of Wall Type WNC25, the stud is considered equivalent to a tophat. At vertical panel joints, replace the Joining Top Hat with separate studs connected with spacers as required to replicate the width of the Joining Top Hat.
- Spacing of tophats and fixings of the CeramaPANEL products shall be as per the capacity tables in the CeramaPANEL Installation Manual for the desired configuration and site wind condition.
- Provide gaskets at panel joints.
- Back-flashing must be incorporated at corners.
- Flashing and sealing of penetrations shall be done in conjunction with the window and door supplier's specifications for weathertightness in a ventilated cavity façade system.
- For penetrations of services through the wall, dress the Enviroseal CW membrane around the element with a membrane cover and tape off. At the CeramaPANEL, provide clearance of 10 mm and seal with external grade sealant. Tape shall be waterproof flashing tape.
- Sealants shall be a durable external grade product compatible with the substrate materials. Sealants shall be installed in accordance with the manufacturer's specifications and tested for compatibility with the bonding surfaces. Observe the recommended joint geometry specifications and use the appropriate backing rod. Typically, the depth of the sealant at the narrowest point is ½ the width of the joint and ½ the depth at the sides where adhesion occurs.

### **CeramaPANEL Wall Type Junction Review**

The typical construction details in the Installation Manual provide general details for achieving weathertightness. The following extracts from the referenced architectural drawings are typical details of the project relevant to the CeramaPANEL cladding wall types and their interfaces with other elements in the buildings. Comments following each detail provide further requirements necessary for satisfying the project's weatherproofing requirements.



Figure 1: CeramaPANEL overlapping hob at upper level by 170 mm in typical slab edge detail

#### Notes to Figure 1:

- This detail incorporates the following features that, subject to the additional notes below, provide a reliable arrangement for weatherproofing:
  - ventilation and drainage to the cavity
  - CeramaPANEL overlapping the top of the hob by 170 mm and finishing 20 mm below the finished floor level
  - Vertical tophats offset from the hob
  - o water runoff and drainage directed onto the finished floor surface away from the wall.
- Waterproof membrane to be applied full height and across the top of the hob upstand.
- Provide a DPC sheet between the hob and the bottom track of the steel framing if required.
- Sarking (Enviroseal CW) shall overlap hob by 100mm and be taped to applied membrane.
- During operation/maintenance of the buildings, water under pressure shall not be directed at the base of the wall.





# 10 TYPICAL SLAB EDGE DETAIL J

# Figure 2: CeramaPANEL overlapping hob at ground level by 170 mm in typical slab edge detail

#### Notes to Figure 2:

- This detail incorporates the following features that, subject to the additional notes below, provide a reliable arrangement for weatherproofing:
  - ventilation and drainage to the cavity
  - CeramaPANEL overlapping the top of the hob by 170 mm and finishing 20 mm below the finished floor level
  - Vertical tophats offset from the hob
  - water runoff and drainage directed onto the finished floor surface away from the wall.
- Waterproof membrane to be applied full height and across the top of the hob upstand.
- Provide a DPC sheet between the hob and the bottom track of the steel framing if required.
- Sarking (Enviroseal CW) shall overlap hob by 100mm and be taped to applied membrane.
- During operation/maintenance of the buildings, water under pressure shall not be directed at the base of the wall.



Figure 3: CeramaPANEL junction at eave

### Notes to Figure 3:

- This detail provides ventilation and drainage to the cavity and protects against water ingress with the eaves overhang. It is therefore a reliable arrangement for weatherproofing, subject to the additional note below.
- The roof sarking shall overlap the wall sarking (Enviroseal CW) and be taped off for air sealing.

8



Figure 4: Eave detail

### Notes to Figure 4 (expanding on notes to Figure 3):

- This detail provides ventilation at the top of the wall cavity and the eaves overhang protects against water ingress. It is therefore a reliable arrangement for weatherproofing, subject to the additional notes below.
- The roof sarking (not pictured) shall overlap the wall sarking (Enviroseal CW) and be taped off for air sealing. Also seal the sarking around the beam.
- In respect of the ventilation gap at the top of the wall and risk of water ingress:
  - When eaves slope downwards away from the external face of the cladding, water ingress is highly unlikely for overhangs of at least 300 mm.
  - When eaves slope upwards away from the external face of the cladding, water ingress risk is increased in high wind gust rain conditions, but for this degree of roof pitch and for overhangs of at least 600 mm, the risk remains low and can be accepted. The orientation of the eaves lining ridges acts to prevent water transport by capillary action on the underside surface.
  - For the remaining case of the eaves lining at sides being at right angle to the wall cladding in cross-section, the risk of water ingress is low for overhangs at least 600 mm as above. If the orientation of the ribs in this case is perpendicular to the wall and not parallel as per Figure 4, a drip feature must be incorporated into the outermost edge of the eave to prevent water tracking along the underside of the eaves lining (as is depicted in the preliminary architectural drawings).





Figure 5: CeramaPANEL horizontal junction to brick veneer overlapping slab

### Notes to Figure 5:

- This detail incorporates the following features that, subject to the additional notes below, provide a reliable arrangement for weatherproofing:
  - $\circ \quad \text{ventilation and drainage to the cavity} \\$
  - CeramaPANEL overlapping the slab edge and finishing below the underside of the slab, below the top of the masonry wall
  - o vertical tophats offset from the slab edge
  - CeramaPANEL overlapping the window frame sub-head
  - water runoff and drainage from the window directed outside the external cladding surface.
- Enviroseal CW at the sill and jambs shall be wrapped over the structural frame and taped off.
- DPC or folded metal flashing shall be installed at the window head to direct water away from the Enviroseal CW. Install under the Enviroseal CW, then overlap the Enviroseal CW and tape off.
- Flexible water barrier window flashing (eg. self-adhesive membrane SAM) shall be installed at the head and sill with 200 mm min. cover on the jambs.

Note – the window head and jamb detailing applies to doors too.

10



*Figure 6: Horizontal interface between CeramaPANEL and brick veneer* 

## Notes to Figure 6:

- The LV penetrations shall be treated as per a window penetration.
- The horizontal interface between the CeramaPANEL cladding and brick veneer requires the following treatment, refer also to sketch in Figure 7:
  - Metal flashing with a min. 150 mm upstand installed over the lower segment of Enviroseal CW to drain water to the outside of the brickwork.
  - Upper segment of Enviroseal CW shall overlap the flashing and be taped off.
  - Joints in the flashing shall be made by using an under-flashing element min. 100 mm wide and sealed to each end of the flashing. Provide a nom. 10 mm gap between the ends of the flashings.





Figure 7: Section through CeramaPANEL / brick interface



Figure 8: CeramaPANEL and brick veneer interface – external corner C2 Teaching Building Lower Ground Plan (20018-NBRS-DR-A-C1003 Rev 6)

### Notes to Figure 8:

- Refer to Figure 9 for recommended detail for the corner junction between CeramaPANEL and brick veneer.
- Installation of brickwork shall be done before the CeramaPANEL cladding is installed.
- Provide a vertical corner back flashing.
- Continue the DPC through the base of the CeramaPANEL wall element. DPC shall not be in contact with the CeramaPANEL or tophats.
- Brickwork and cavity fill below DPC must be transitioned down to the slab edge rebate before the CeramaPANEL cladding zone, and there shall be no bridging across the gap between brickwork and CeramaPANEL / tophats.



Figure 9: CeramaPANEL and brick veneer interface – external corner detail



Figure 10: CeramaPANEL and brick veneer interfaces on setouts C2 Teaching Building Lower Ground Plan (20018-NBRS-DR-A-C1003 Rev 6)

### Notes to Figure 10:

- Refer to Figure 11 for recommended detail for junction between CeramaPANEL and brick veneer. Principle is to have the CeramaPANEL overlap the brick behind.
- Cut brickwork to suit angle and maintain cavity.
- Installation of brickwork shall be done before the CeramaPANEL cladding is installed.
- Provide a vertical back flashing at the junction. Setout the CeramaPANEL with 8-12 mm clearance from the brickwork.
- Continue the brickwork DPC through the base of the CeramaPANEL wall elements.
- Brickwork and cavity fill below DPC must be transitioned down to the slab edge rebate before the CeramaPANEL cladding zone, and there shall be no bridging across the gap between brickwork and CeramaPANEL/tophats.
- Plan the setout of tophats in advance to ensure CeramaPANEL does not cantilever greater than 30 mm.



Figure 11: CeramaPANEL and brick veneer interfaces on setouts



Figure 12: CeramaPANEL junctions on setouts C1 Teaching Building Upper Ground Plan (20018-NBRS-DR-A-C1006 Rev 6)

### Notes to Figure 12:

- Non-90° corners in CeramaPANEL wall to be detailed as per CeramaPANEL Installation Manual except with back flashing to suit the angle
- Plan the setout of tophats in advance to ensure CeramaPANEL does not cantilever greater than 30 mm.

## **Execution**

The final project detailing (CC stage) for CeramaPANEL products must be in accordance with the specifications in this report and any subsequent final design review by Enertren. Installation must be carried out in accordance with the final project drawings and documentation. Should the architects or installation contractors have alternatives to this report, they can be reviewed by Enertren.

The Structural frame supporting the CeramaPANEL cladding system shall be designed and certified by others.

The builder shall coordinate the installation trades for the wall systems incorporating CeramaPANEL products and the interfacing building elements to ensure the construction sequence achieves the weatherproofing function specified.

Weathertightness can be field tested onsite with a water hose prior to installation of wall insulation and plasterboard. Any defects can be appropriately rectified and the construction method modified accordingly.

### Limitations

This engineering advice is for the purpose of evaluating the suitability of PanelCORP CeramaPANEL Raw and CeramaPANEL Depth cladding products for use on the nominated project, and to the extent specified herein.

Excludes:

- 1. Wall types other than those specified.
- 2. Project certification.
- 3. Certification of installation that is the responsibility of the installation contractor.
- 4. Any NCC requirement not specifically addressed in this report.

### References

AS/NZS 1170.0:2002 Structural design actions – Part 1: General principles

AS/NZS 1170.1:2002 (R2016) Structural design actions – Part 1: Permanent, imposed and other actions

AS/NZS 1170.2:2011 (R2016) Structural design actions - Part 2: Wind actions

AS 2047–2014(+A1, A2) Windows and external glazed doors in buildings

AS/NZS 2904:1995(+A1, A2) Damp-proof courses and flashings

AS/NZS 2908.2:2000 Cellulose-cement products – Part 2: Flat sheets

AS/NZ 2589–2007 Gypsum linings – Application and finishing

AS 3566.1–2002 (R2015) Self-drilling screws for the building and construction industries – Part 1: General requirements and mechanical properties

AS 3566.2–2002 Self-drilling screws for the building and construction industries – Part 2: Corrosion resistance requirements

AS 3999:2015 Bulk thermal insulation – Installation

AS/NZS 4200.2:2017 Pliable building membranes and underlays – Part 2: Installation

AS/NZS 4600:2018 Cold-formed steel structures

EN 12467:2012 Fibre-cement flat sheets. Product specification and test methods

ASCE Manuals and Reports on Engineering Practice No. 126, Curtain Wall Systems, American Society of Civil Engineers, Edited by Ali M. Memari, 2013

W L Walker and D J Felice, Sr., Water-Resistant Design and Construction, McGraw-Hill, 2008

NCC 2019 (+A1) National Construction Code, Building Code of Australia (Incorporating Amendment No.1) – Volume One, Class 2 to 9 Buildings, Australian Building Codes Board, 2020

Please contact the undersigned if you have any queries regarding this document.

Yours sincerely, nenettet.

John Trenerry BE MEM MIEAust CPEng NER RPEQ Enertren Pty. Ltd.

# Attachments –

- 1. CeramaPANEL Datasheets
  - a. CeramaPANEL Raw Fibre Cement Cladding Boards
  - b. CeramaPANEL Depth Fibre Cement Cladding Boards
- 2. CeramaPANEL Installation Manual
- 3. Bradford Technical Datasheet Enviroseal CW, 29/11/2019

# **Document Control**

| Date of Issue | Version | Filename                                             | Change Summary                                                                                                                            |
|---------------|---------|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| 22/10/2020    | V.1     | GEN-034 PanelCorp Porters Creek PS Letter 20122      | Original issue.                                                                                                                           |
| 10/11/2020    | V.2     | GEN-034 PanelCorp Porters Creek PS Letter 201110 V.2 | Expanded to include weathertightness<br>specification detail, following a review of<br>the preliminary wall section and plan<br>drawings. |
|               |         |                                                      |                                                                                                                                           |
|               |         |                                                      |                                                                                                                                           |
|               |         |                                                      |                                                                                                                                           |



SYDNEY BRISBANE MELBOURNE Panelcorp Group Pty Ltd ABN 23 633 311 707

Phone 1300 845 750 panelcorp.com.au

Head Office: 25 Abel Street, Jamisontown NSW 2750 PO Box 7577, South Penrith NSW 2750

# **TECHNICAL DATA SHEET**

# **CeramaPANEL Raw Fibre Cement Cladding Boards**

CeramaPANEL facade panel has been comprehensively tested and displays the following typical properties.

| Dimension tolerance (EN 12                                                     | 2467, Level 1)         | Unit               | Result    |
|--------------------------------------------------------------------------------|------------------------|--------------------|-----------|
| Thickness (up to 20mm)                                                         |                        | mm                 | 0.8       |
| Width (1000mm <a< 1600mm)<="" td=""><td></td><td>mm</td><td>± 0,3% a</td></a<> |                        | mm                 | ± 0,3% a  |
| Length (1600mm < Length)                                                       |                        | mm                 | ± 5.0     |
| Physical Properties                                                            |                        | Unit               | Result    |
| Density, dry minimum (EN12467)                                                 |                        | kg/m <sup>3</sup>  | 1475      |
| Density, dry average (EN12467)                                                 |                        | kg/m <sup>3</sup>  | 1550      |
| Weight (incl. 10% moisture) *                                                  |                        | Kg/m <sup>2</sup>  | 12.4      |
| * nominal value may vary depending on the                                      | conditions             |                    |           |
| Mechanical Properties                                                          |                        | Unit               | Result    |
| Bending modulus of elasticity (EN 2                                            | 12467)                 |                    |           |
| E-module along grain, ambient                                                  |                        | GPa                | 12        |
| E-module across grain, ambient                                                 |                        | GPa                | 14        |
| E-module along grain, wet                                                      |                        | GPa                | 9         |
| E-module across grain, wet                                                     |                        | GPa                | 11        |
| Bending Strength (EN 1246                                                      | 7)                     | Unit               | Result    |
| Along grain, ambient                                                           | - /                    | MPa                | 22        |
| Across grain, ambient                                                          |                        | MPa                | 35        |
| Along grain, wet                                                               |                        | MPa                | 18        |
| Across grain, wet                                                              |                        | MPa                | 27        |
| Impact Strength (Pendulum                                                      | Test)                  | IInit              | Result    |
| Along grain, dry                                                               | 1631/                  | k l/m <sup>2</sup> | 27        |
| Across grain, dry                                                              |                        | k.l/m <sup>2</sup> | 36        |
|                                                                                |                        | Ko/m               |           |
| Thermal Properties                                                             | Unit                   |                    | Result    |
| Thermal conductivity (ISO 8301,<br>EN 12667), λ <sub>10</sub>                  | W/mK                   |                    | 0.37      |
| Coefficient of thermal expansion                                               | mm/m °C                |                    | 0.01      |
| Temperature (air) in use                                                       | °C max                 |                    | -40 - +80 |
| Frost resistance (average                                                      | R∟                     |                    | ≥ 0.75    |
| along/across)                                                                  |                        |                    |           |
| Hygrothermal Properties                                                        |                        | Unit               | Result    |
| Water absorption (24 hrs 105°C, 24                                             | hrs in water)          | %                  | 28        |
| Moisture movement (30/90 % RH, I                                               | EN 12467)              | mm/m               | 0.8       |
| Water Vapour Transmission                                                      | Properties             | Unit               | Result    |
| (EN 12572-C)                                                                   |                        |                    |           |
| Water vapour transmission resistance (Z-value)                                 |                        | GPa m² s/kg        | 2.5       |
| Water Vapour transmission resistar                                             | nce (Z-value)          | s/m                | 18500     |
| Water vapour diffusion equivalent a                                            | ir layer thickness, Sd | m                  | 0.5       |
| Water vapour resistivity                                                       |                        | MN s/gm            | 327       |
| Water vapour resistance factor, µ                                              |                        |                    | 58        |
| Water vapour resistance                                                        |                        | MN s/g             | 2.5       |
| Water vapour transmission                                                      |                        | USPerm             | 7.0       |

SIMPLE

SAFE

STUNNING

Panelcorp Group Ptv Ltd ABN 23 633 311 707

Phone 1300 845 750 panelcorp.com.au

Head Office: 25 Abel Street, Jamisontown NSW 2750 PO Box 7577, South Penrith NSW 2750

# **CeramaPANEL Raw Fibre Cement Cladding Boards**

| Unit                                                                                          | Result                                                                                                                              |
|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| Suitable where a deemed non-<br>combustible material is required in<br>accordance with C1.9e. | Deemed to comply<br>with BCA                                                                                                        |
| Rating                                                                                        | A2-s1, d0                                                                                                                           |
| Rating                                                                                        | Passed                                                                                                                              |
| Rating                                                                                        | Passed                                                                                                                              |
|                                                                                               | Unit<br>Suitable where a deemed non-<br>combustible material is required in<br>accordance with C1.9e.<br>Rating<br>Rating<br>Rating |

ested with special requirements. Contact Product Compliance for further information

| Other Properties | Unit     | Result  |
|------------------|----------|---------|
| Category, class  | EN 12467 | NT A4 I |

| Impact resistance test (ETAG 034, ISO 7892), 8 mm |            |             |              |             |            |
|---------------------------------------------------|------------|-------------|--------------|-------------|------------|
|                                                   | Max.       | Category IV | Category III | Category II | Category I |
| Hard Body                                         | 1 Joule    | Passed      |              |             |            |
|                                                   | 3 Joules   |             | Passed       | Passed      | Passed     |
|                                                   | 10 Joules  |             |              | Passed      | Passed     |
| Soft Body                                         | 10 Joules  | Passed      | Passed       |             |            |
|                                                   | 60 Joules  |             |              | Passed      | Passed     |
|                                                   | 300 Joules |             |              | Not Passed  |            |
|                                                   | 400 Joules | Passed      | Passed       |             | Not Passed |
| Evaluation                                        |            | Passed      | Passed       | Not Passed  | Not Passed |

| Ballwurfsicherheit (DIN 18032-3) - (Impact resistance), Wall and Ceiling, 12 mm |                    |                 |                 |                                    |                  |
|---------------------------------------------------------------------------------|--------------------|-----------------|-----------------|------------------------------------|------------------|
|                                                                                 | Angle of<br>Impact | Number of shots | Subconstruction | Centre Distance<br>Subconstruction | Test Result      |
|                                                                                 | 90                 | 30              |                 |                                    | Passed as        |
| Handball                                                                        | 45                 | 12              | Aluminium       | 315mm                              | "Ballwurfsicher" |
|                                                                                 | 45                 | 12              |                 |                                    |                  |
|                                                                                 |                    |                 |                 |                                    | Passed as        |
|                                                                                 |                    |                 | Aluminium       | 315mm                              | "Ballwurfsicher" |
| Hockeyball                                                                      |                    |                 |                 |                                    |                  |

Ballwurfsicherheit (Ball throwing security)

According to DIN 18032-3 Sports halls - halls for gymnastics and games and multi-purpose use: Checking the ball impact safety , components that are used in sports halls and which include wall and ceiling cladding and glazing must be checked for their ball impact security . For this purpose, two types of balls (handball and hockey ball) are shot at an angle of 45 ° or 90 ° on the respective component with a ball-shooting device. Neither the element itself nor the substructure may be impaired in terms of strength, function or safety. The standard does not apply to the impact of impact balls and impact balls.

For further information, please contact your local representative at Panelcorp. E: sales@panelcorp.com.au

SIMPLE

SAFE

STUNNING

2



SYDNEY BRISBANE MELBOURNE Panelcorp Group Pty Ltd ABN 23 633 311 707

Phone 1300 845 750 panelcorp.com.au

Head Office: 25 Abel Street, Jamisontown NSW 2750 PO Box 7577, South Penrith NSW 2750

# **TECHNICAL DATA SHEET**

# **CeramaPANEL Depth Fibre Cement Cladding Boards**

CeramaPANEL facade panel has been comprehensively tested and displays the following typical properties.

| Dimension tolerance (EN 12467, Level 1)              | Unit  | Result |
|------------------------------------------------------|-------|--------|
| Thickness                                            | %     | ±10    |
| Width                                                | %     | ±0.3   |
| Length                                               | mm    | ±5     |
| Physical Properties                                  | Unit  | Result |
| Density, dry minimum (EN12467)                       | kg/m³ | 1770   |
| Weight (incl. 10% moisture) *                        | Kg/m² | 14.2   |
| * nominal value may vary depending on the conditions |       |        |
| Mechanical Properties                                | Unit  | Result |
| Bending modulus of elasticity (EN 12467)             |       |        |
| E-module along grain, ambient                        | GPa   | 16.3   |
| E-module across grain, ambient                       | GPa   | 13.8   |
| Modulus of rupture along grain (ambient condition)   | MPa   | 39.0   |
| Modulus of rupture across grain (ambient condition)  | MPa   | 24.8   |
|                                                      |       |        |

| Thermal Properties               | Unit    |      | Result     |
|----------------------------------|---------|------|------------|
| Heat conductivity                | W/m °C  |      | 0.5        |
| Coefficient of thermal expansion | mm/m °C |      | 0.01       |
| Temperature range                | °C      |      | -40 to +80 |
| Frost resistance                 | Cycles  |      | >100       |
| Hygrothermal Properties          |         | Unit | Result     |
| Moisture movement (30-90 % RH)   |         | mm/m | 1.5        |

| Fire Performance              | Unit                                                                                          | Result                       |
|-------------------------------|-----------------------------------------------------------------------------------------------|------------------------------|
| Combustibility                | Suitable where a deemed non-<br>combustible material is required in<br>accordance with C1.9e. | Deemed to comply<br>with BCA |
| Reaction to fire (EN 13501-1) | Rating                                                                                        | A2-s1, d0                    |
| Other Properties              | Unit                                                                                          | Result                       |
| Category, class               | EN 12467                                                                                      | NT A4 I                      |

| Impact resistance test (ETAG 034, ISO 7892), 8 mm |            |             |              |             |            |
|---------------------------------------------------|------------|-------------|--------------|-------------|------------|
|                                                   | Max.       | Category IV | Category III | Category II | Category I |
| Hard Body                                         | 1 Joule    | Passed      |              |             |            |
|                                                   | 3 Joules   |             | Passed       | Passed      | Passed     |
|                                                   | 10 Joules  |             |              | Passed      | Passed     |
| Soft Body                                         | 10 Joules  | Passed      | Passed       |             |            |
|                                                   | 60 Joules  |             |              | Not Passed  | Not Passed |
|                                                   | 300 Joules |             |              | Not Passed  |            |
|                                                   | 400 Joules |             |              |             | Not Passed |

For further information, please contact your local representative at Panelcorp. E: sales@panelcorp.com.au

SIMPLE

SAFE

STUNNING





# Installation Manual

Pre-Finished Compressed Fibre Cement Facade Panel System

For use with CeramaPANEL Raw; Hewn; Groove; Infuse; Depth; Classic & Natural

panelcorp.com.au 1300 845 750

# CONTENTS

| Product Features         | 3       |
|--------------------------|---------|
| Product Range            | 4       |
| Applications and Design  | 5       |
| Health and Safety        | 6       |
| Storage and Handling     | 7       |
| Product and Accessories  | 8 - 9   |
| Installation Overview    | 10      |
| Ventilation              | 11      |
| Panel and Top Hat Layout | 12      |
| Top Hat Spacing          | 13 - 14 |
| Top Hat Installation     | 15      |
| Cutting                  | 16      |
| Edge Sealing             | 17      |
| Panel Joints             | 18      |
| Panel Installation       | 19      |
| Panel Fixing             | 20      |
| General Distances        | 21      |
| Panel Fixing             | 22 - 23 |
| Fixing Detail            | 24 - 30 |
| Care and Maintenance     | 31      |

#### Disclaimer

The information contained in this publication and otherwise supplied to users of CeramaPANEL products is based on Panelcorp's general experience, best knowledge and belief. However, due to factors which fall beyond Panelcorp's knowledge and control, which can affect the use of the products, no warranty is given, express or implied with respect to fitness for particular purpose or otherwise.

It is the responsibility of the architect, designer and various engineering parties to ensure that the details in this Installation Manual are appropriate for the intended application.

Panelcorp reserves the right to alter specifications at any time and without notice. Products are subject to natural variation as part of the manufacturing process, colours and textures may vary according to light and weather conditions. Due to this and limitations of the printing accuracy, colours in this brochure may vary. In case of doubt, please contact your local Panelcorp representative.

# PRODUCT FEATURES

CeramaPANEL CFC (Compressed Fibre Cement) façade system by Panelcorp Group is a modern building material that provides a versatile and durable façade suitable for an extensive range of buildings utilizing a self-ventilated facade.

CeramaPANEL CFC facade boards provide architects with freedom to apply and exploit the visual opportunities on any building facade. With multiple options for colour, shading and texture, we have created countless possibilities when designing your stunning facade.

CeramaPANEL CFC is manufactured from natural and environmentally friendly raw materials and is deemed a noncombustible material in accordance with C1.9(e) of the National Construction Code. The panels are pre-finished, offer high impact strength and excellent sound and weather insulation.



# KEY FEATURES



### LOW MAINTENANCE

CeramaPANEL Raw, Hewn and Groove is virtually a maintenance free material that is scratch resistant with no re-sealing, painting or ongoing maintenance ever required during install or anytime thereafter.



#### ROBUST DURABILITY

COST EFFECTIVE

CeramaPANEL panels are an exceptionally durable panel making it impact resistant. Even in the most demanding applications and harsh environments CeramaPANEL has a life expectancy exceeding 50 years.

CeramaPANEL allows installers to provide a rapid and cost effective installation.



# EASILY CUT AND INSTALLED ONSITE

CeramaPANEL is easily cut to size and installed onsite minimising lengthy lead time between site measure, production and delivery of pre-finished panels.



#### ENVIRONMENTALLY FRIENDLY

CeramaPANEL panels are installed on a ventilated sub-construction system allowing for the building envelope to breathe which increases thermal and energy efficiency and promotes healthier buildings.



#### THROUGH COLOURED MATERIAL

CeramaPANEL Raw, Hewn, Groove, Infuse and Depth are all through-coloured fibre cement material that offers elegant shades of natural colour.

# PRODUCT RANGE

| Raw     | <b>Properties</b><br>Length<br>Width<br>Thickness<br>Weight<br>Surface                         | CeramaPANEL Raw<br>2500 / 3050mm<br>1250mm<br>8mm<br>12.4kg/m²<br>Natural textured                        |
|---------|------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Hewn    | <b>Properties</b><br>Length<br>Width<br>Thickness Top<br>Weight<br>Surface                     | CeramaPANEL Hewn<br>2500 / 3050mm<br>1250mm<br>8mm<br>12.4kg/m²<br>Structured, velvety                    |
| Groove  | <b>Properties</b><br>Length<br>Width<br>Thickness Top<br>Thickness Groove<br>Weight<br>Surface | CeramaPANEL Groove<br>2500 / 3050mm<br>1250mm<br>9.5mm<br>8mm<br>14.1kg/m <sup>2</sup><br>Linear grooves  |
| Infuse  | <b>Properties</b><br>Length<br>Width<br>Thickness<br>Weight<br>Surface                         | CeramaPANEL Infuse<br>2500 / 3050mm<br>1250mm<br>8mm<br>14.2kg/m <sup>2</sup><br>Smooth painted           |
| Depth   | <b>Properties</b><br>Length<br>Width<br>Thickness<br>Weight<br>Surface                         | <b>CeramaPANEL Depth</b><br>2500 / 3050mm<br>1250mm<br>8mm<br>14.2kg/m <sup>2</sup><br>Smooth matt finish |
| Classic | <b>Properties</b><br>Length<br>Width<br>Thickness<br>Weight<br>Surface                         | CeramaPANEL Classic<br>2500 / 3050mm<br>1250mm<br>8mm<br>14.2kg/m <sup>2</sup><br>Smooth Coated           |
| Vogue   | Properties<br>Length<br>Width<br>Thickness<br>Weight<br>Surface                                | CeramaPANEL Classic<br>2500 / 3050mm<br>1250mm<br>8mm<br>12.4kg/m²<br>Natural Textured                    |

# APPLICATIONS

CeramaPANEL façade panels have been designed for use as external cladding on buildings. They are an ideal solution for Schools, Hospitals, Commercial Buildings and Residential Apartments that require a pre-finished and maintenance free façade.

CeramaPANEL CFC facade boards provide architects with freedom to apply and exploit the visual opportunities on any building facade. With multiple options for colour, shading and texture, we have created countless possibilities when designing your stunning façade.

# DESIGN

### 1. Compliance

All design and construction must comply with the appropriate requirements of the current National Construction Code (NCC), regulations and standards.

#### 2. Slab and Footings

The slab and footings on which the building is situated must be designed and certified by a qualified structural engineer according to all relevant codes, regulations and standards.

#### 3. Ground Clearance

Install CeramaPANEL façade boards with a minimum 150mm clearance to the earth on the exterior of the building or in accordance with local building codes if greater than 150mm is required. Also, maintain a minimum 50mm clearance between CeramaPANEL façade boards and roofs, decks, paths, steps and driveways. Adjacent finished grade must slope away from the building in accordance with local building codes, typically a minimum slope of 50mm over the first metre.

Do not install external cladding in areas where it may remain in contact with standing water or debris.

#### 4. Moisture Management

CeramaPANEL façade boards acts as a rain screen. To achieve a particular level of weather-tightness and ensure occupant comfort and protection of the building frame, the designer must determine the appropriate moisture management detailing for the project.

It is the responsibility of the builders and designers to identify moisture related risks associated with any particular building design. It is the responsibility of the builder to ensure appropriate moisture management is provided during framed wall construction through effective use of flashings, sealants and vapour permeable membranes such as RapidPANEL Wall Wrap weather barrier, building wraps, vapour retarders and damp proof course. Before installing panels, all wall openings, penetrations, intersections, connections, window sills, heads and jambs must incorporate appropriate flashing and waterproofing. Materials, components and the installation practices that are used to manage moisture in framed wall construction must, at a minimum, comply with the requirements of relevant standards, building codes and the manufacturer's specifications.

### 5. Movement Control Joints

When installing CeramaPANEL facade boards, the movement of the façade boards and the support structure must be considered in the overall design of the system. Movement joints in the panel layout should be aligned with movement control joints provided in the structural framing.

#### **Horizontal Control Joints**

A horizontal control joint is required beneath every floor junction to accommodate any expected deflection. The magnitude of the deflection must be verified by the project engineer.

#### **Vertical Control Joints**

Vertical control joints to allow for differential movement are required every 12m along the façade, at supports of fascia trusses and at the junction of structural elements of different stiffness, such as between concrete walls and stud frames.

A control joint must also be installed when a masonry wall adjoins framed construction, and at the junction of framed additions or existing buildings, to allow for differential movement.

Vertical joints in panels must be aligned and extend for the full height of continuous panelling, although additional joints may be placed over openings for ease of installation.

### 6. Directional Grain

The CeramaPANEL Raw, Hewn, Groove, Vogue, Natural and Rustik panels are manufactured with a unique surface texture. This unique finish is enhanced by a process which adds a directional grain to the board - leaving the boards with a different appearance dependent on lighting and the angle of the board. By rotating boards within the facade makes it possible to obtain a playful visual effect - depending on the viewer's position and the lighting conditions



2500/3050mm

# HEALTH & SAFETY

# WARNING - DO NOT BREATHE DUST AND CUT ONLY IN WELL VENTILATED AREA

CeramaPANEL products contain sand, a source of respirable crystalline silica which may cause cancer. Breathing excessive amounts of respirable silica dust can also cause a disabling and potentially fatal lung disease called silicosis, and has been linked with other diseases.

During installation or handling:

- 1. work in outdoor areas with ample ventilation;
- 2. minimise dust when cutting by using a dust-reducing circular saw attached to an appropriate, well maintained, filtered vacuum;
- 3. warn others in the immediate area to avoid breathing dust;
- 4. wear a properly-fitted, approved dust mask or respirator (e.g. P1 or P2) in accordance with applicable government regulations and manufacturer instructions to further limit respirable silica exposures.

During clean-up use a vacuum and filter, both of which are well maintained and appropriate for capturing fine (respirable) dust. Alternatively, use wet clean-up methods - never dry sweep. For further information, refer to our Safety Data Sheets.

FAILURE TO ADHERE TO OUR WARNINGS, SAFETY DATA SHEETS, AND INSTALLATION INSTRUCTIONS MAY LEAD TO SERIOUS PERSONAL INJURY OR DEATH.

### **RECOMMENDED SAFE WORKING PRACTICES**

#### **Cutting Outdoors**

- 1. Position cutting station so wind will blow dust away from the user or others in working area.
- 2. Position the cutting station in a well-ventilated area. Use a dust-reducing circular saw attached to an appropriate, well maintained, filtered vacuum appropriate for capturing fine (respirable) dust.

#### **Drilling/Other Machining**

When drilling or machining you should always wear a P1 or P2 dust mask and warn others in the immediate area.

### **IMPORTANT NOTES**

- 1. For maximum protection (lowest respirable dust production) Panelcorp recommends always using best practice cutting methods where feasible.
- 2. **NEVER** use a power saw indoors.
- 3. **ALWAYS** use a saw blade that is purpose-made for cutting fibre cement products.
- 4. **NEVER** dry sweep Use wet suppression or appropriate vacuum and filter.
- 5. **NEVER** use grinders.
- 6. ALWAYS follow tool manufacturers' safety recommendations.

#### **Dust Masks and Respirators**

Panelcorp recommends the use of P2 respirators as best practice. As a minimum, an AS/NZS1716 P1 respirator must be used when doing any activity that may create dust. For more extensive guidance and options for selecting respirators for workplaces please refer to Australian/New Zealand Standard 1715:2009 "Selection, Use and Maintenance of Respiratory Protective Equipment". P1 or P2 respirators should be used in conjunction with the above cutting practices to minimise dust exposure.

For further information, refer to Safety Data Sheet (SDS). If concern still exists about exposure levels or you do not comply with the above practices, you should always consult a qualified industrial hygienist or contact Panelcorp for further information.

# STORAGE & HANDLING

### Storage

- 1. CeramaPANEL façade boards are delivered on pallets with a plastic protection cover. If undamaged, the plastic cover provides protection against dust and weather conditions during transportation. Always store CeramaPANEL products on a flat, dry and level surface and support at 300mm maximum centres.
- 2. Do not stack the pallets more than two high, and ensure protective material is placed between the pallets
- 3. If the pallets are stored outside, the plastic cover should be removed and replaced with a heavy-duty waterproof tarpaulin. Ensure ventilation around the tarpaulin to ensure condensation is reduced.
- 4. If the CeramaPANEL façade boards are stored on site for more than 2 weeks, they should be kept indoors in a dry and well-ventilated location.

### Lifting CeramaPANEL facade boards

When lifting CeramaPANEL facade boards, consider your lifting procedures in terms of both safety and avoiding damage to the boards.

- 1. Always lift panels cleanly off each other, do not slide panels over one another as scratching and damage may occur.
- 2. Panels should be carried horizontally on edge by at least two people.
- 3. When lifting large boards, use mechanical lifting gear if possible. If this lifting gear uses suction/vacuum, be careful not to apply too much suction, as this may damage the surface or leave permanent marks.

# Transport

- 1. Moving panels that are stacked or palletized should be done with a forklift or crane
- 2. If using a forklift, ensure tines are wide enough apart to adequately support the panels
- 3. If using a crane, use wide, soft lifting straps that will not damage the panels
- 4. Panels should be strapped and secured to pallets before transporting or handling with a forklift or crane

# PRODUCTS & ACCESSORIES

| CeramaPANEL Façade Board<br>Through colour, pre-finished<br>Compressed Fibre Cement board.       Width Length Thickness<br>Standard<br>1250 2500 8<br>1250 3050 8         Image: Compressed Fibre Cement board.       Width Length Thickness<br>Standard         Image: Compressed Fibre Cement board.       Standard         Image: Compressed Fibre Cement board.       Standard <th></th> <th>Description</th> <th colspan="2">Size / Qty</th>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Description                                                                                                                                  | Size / Qty                                   |  |  |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|--|--|--|
| Through colour, pre-finished<br>Compressed Fibre Cement board.       Image: Compressed Fibre Cement board.       Image: Compressed Fibre Cement board.         Image: Compressed Fibre Cement board.       Image: Compressed Fibre Cement board.       Image: Compressed Fibre Cement board.       Image: Compressed Fibre Cement board.         Image: Compressed Fibre Cement board.       Image: Compressed Fibre Cement board.       Image: Compressed Fibre Cement board.       Image: Compressed Fibre Cement board.       Image: Compressed Fibre Cement board.         Image: Compressed Fibre Cement board.       Image: Compressed Fibre Cement board.       Image: Compressed Fibre Cement board.       Image: Compressed Fibre Cement board.       Image: Compressed Fibre Cement board.         Image: Compressed Fibre Cement board.       Image: Compressed Fibre Cement board.       Image: Compressed Fibre Cement board.       Image: Compressed Fibre Cement board.       Image: Compressed Fibre Cement board.       Image: Compressed Fibre Cement board.       Image: Compressed Fibre Cement board.       Image: Compressed Fibre Cement board.       Image: Compressed Fibre Cement board.       Image: Cement board. <td< th=""><th></th><th colspan="2">CeramaPANEL Façade Board</th></td<>                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CeramaPANEL Façade Board                                                                                                                     |                                              |  |  |  |
| Compressed Fibre Cement board.       1250       2500       8         1250       3050       8         1250       3050       8         1250       3050       8         1250       3050       8         1250       3050       8         1250       3050       8         1250       3050       8         1250       3050       8         1250       3050       8         1250       3050       8         1250       3050       8         1250       3050       8         1250       2500       8         1250       3050       8         1250       3050       8         1250       3050       8         1250       35 x 1.0       10         1250       250 x 15 x 1.0       10         1250       25 x 1.0       10       10         1250       250 x 15 x 1.0       10       6m (RPTH-50151-60)         1260       20 x 55 x 1.0       10       10       10         1250       20 x 15 x 1.0       10       10       10         1250 x 15 x 1.0       10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Through colour, pre-finished                                                                                                                 | Standard                                     |  |  |  |
| Image: |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Compressed Fibre Cement board.                                                                                                               | 1250 2500 8                                  |  |  |  |
| RapidPANEL Intermediate Top Hat<br>Metal top hat installed vertically for<br>intermediate sheet support.<br>59 x 35 x 1.10 mm BMT       6m (RPITH-50351-60)<br>7.2m (RPITH-50351-72)         RapidPANEL Joining Top Hat<br>Designed to span vertically across<br>the building structure to support the<br>facade panels at vertical joints.<br>120 x 35 x 1.10 mm BMT       6m (RPJTH-120351-60)<br>7.2m (RPJTH-120351-60)         RapidPANEL Joining Top Hat<br>Designed to span vertically across<br>the building structure to support the<br>facade panels at vertical joints.<br>120 x 35 x 1.10 mm BMT       6m (RPJTH-120351-60)<br>7.2m (RPJTH-120351-60)         RapidPANEL Horizontal Top Hat<br>Fixed horizontally to structural steel<br>framing to support the Joining and<br>Intermediate Top Hats.<br>50 x 15 x 1.10mm BMT       6m (RPTH-50151-60)<br>7.2m (RPTH-50151-72)         RapidPANEL S.Smm Back Flashing<br>Used as a weather seal for horizontal<br>joints between CeramaPANEL boards<br>3.5mm x 0.48 BMT       3m (RPBF3.5-30)         CeramaPANEL Window Flashing<br>windows       A pre-fabricated profile for use under<br>windows       3m (RPBF3.5-30)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                              | 1250 3050 8                                  |  |  |  |
| RapidPANEL Joining Top Hat<br>Designed to span vertically across<br>the building structure to support the<br>façade panels at vertical joints.<br>120 x 35 x 1.10 mm BMT       fm (RPJTH-120351-60)<br>0.2m (RPJTH-120351-60)         RapidPANEL Horizontal Top Hat<br>Facade panels at vertical joints.<br>120 x 35 x 1.10 mm BMT       fm (RPTH-50151-60)<br>0.2m (RPTH-50151-72)         RapidPANEL Horizontal Top Hat<br>Fixed horizontally to structural steel<br>framing to support the Joining and<br>Intermediate Top Hats.<br>50 x 15 x 1.10mm BMT       fm (RPTH-50151-72)         Structure Top Hats.<br>So x 15 x 1.10mm BMT       Sm (RPBF3.5-30)         Structure Top Hats.<br>S.5mm x 0.48 BMT       3m (RPBF3.5-30)         CeramaPANEL Window Flashing<br>Nichows       A pre-fabricated profile for use under<br>windows                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>RapidPANEL Intermediate Top Hat</b><br>Metal top hat installed vertically for<br>intermediate sheet support.<br>50 x 35 x 1.10 mm BMT     | 6m (RPITH-50351-60)<br>7.2m (RPITH-50351-72) |  |  |  |
| Designed to span vertically across the building structure to support the facade panels at vertical joints.<br>120 x 35 x 1.10 mm BMT       7.2m (RPJTH-120351-60)         Image: Construct of the building structure to support the facade panels at vertical joints.<br>120 x 35 x 1.10 mm BMT       6m (RPTH-50151-60)<br>7.2m (RPTH-50151-72)         Image: Construct of the building structure to support the joining and intermediate Top Hats.<br>S0 x 15 x 1.10mm BMT       6m (RPTH-50151-60)<br>7.2m (RPTH-50151-72)         Image: Construct of the part o                                                                                                               | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | RapidPANEL Joining Top Hat                                                                                                                   | 6m (RPJTH-120351-60)                         |  |  |  |
| Image: A standard of the standa |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Designed to span vertically across<br>the building structure to support the<br>façade panels at vertical joints.<br>120 x 35 x 1.10 mm BMT   | 7.2m (RPJTH-120351-60)                       |  |  |  |
| RapidPANEL Horizontal Top Hat       6m (RPTH-50151-60)         Fixed horizontally to structural steel       framing to support the Joining and       1.2m (RPTH-50151-72)         Intermediate Top Hats.       50 x 15 x 1.10mm BMT       3m (RPBF3.5-30)         Used as a weather seal for horizontal       joints between CeramaPANEL boards       3m (RPBF3.5-30)         Image: Stress of the search of the searc                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                              |                                              |  |  |  |
| Fixed horizontally to structural steel       framing to support the Joining and       framing to support the Joining and         Intermediate Top Hats.       50 x 15 x 1.10mm BMT       3m (RPBF3.5-30)         Used as a weather seal for horizontal       joints between CeramaPANEL boards       3m (RPBF3.5-30)         Used as a weather seal for horizontal       3.5mm x 0.48 BMT       3m (RPBF3.5-30)         CeramaPANEL Window Flashing       A pre-fabricated profile for use under windows         Local CeramaPANEL Ventilated Profile       CeramaPANEL Ventilated Profile                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | and the second s | RapidPANEL Horizontal Top Hat                                                                                                                | 6m (RPTH-50151-60)<br>7 2m (RPTH-50151-72)   |  |  |  |
| 50 x 15 x 1.10mm BMT       So x 15 x 1.10mm BMT         Image: So x 15 x 1.10mm BMT       So x 15 x 1.10mm BMT         Image: So x 15 x 1.10mm BMT       So x 15 x 1.10mm BMT         Image: So x 15 x 1.10mm BMT       So x 15 x 1.10mm BMT         Image: So x 15 x 1.10mm BMT       So x 15 x 1.10mm BMT         Image: So x 15 x 1.10mm BMT       So x 15 x 1.10mm BMT         Image: So x 15 x 1.10mm BMT       So x 15 x 1.10mm BMT         Image: So x 15 x 1.10mm BMT       So x 0x 10 x 10 x 10 x 10 x 10 x 10 x 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Fixed horizontally to structural steel framing to support the Joining and Intermediate Top Hats.                                             |                                              |  |  |  |
| RapidPANEL 3.5mm Back Flashing       3m (RPBF3.5-30)         Used as a weather seal for horizontal joints between CeramaPANEL boards       3.5mm x 0.48 BMT         CeramaPANEL Window Flashing       A pre-fabricated profile for use under windows         CeramaPANEL Ventilated Profile       CeramaPANEL Ventilated Profile                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 50 x 15 x 1.10mm BMT                                                                                                                         | 50 x 15 x 1.10mm BMT                         |  |  |  |
| Used as a weather seal for horizontal<br>joints between CeramaPANEL boards<br>3.5mm x 0.48 BMT<br>CeramaPANEL Window Flashing<br>A pre-fabricated profile for use under<br>windows<br>CeramaPANEL Ventilated Profile                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | RapidPANEL 3.5mm Back Flashing 3m (RPBF3.5-30)                                                                                               |                                              |  |  |  |
| 3.5mm x 0.48 BMT CeramaPANEL Window Flashing A pre-fabricated profile for use under windows CeramaPANEL Ventilated Profile                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Used as a weather seal for horizontal                                                                                                        |                                              |  |  |  |
| CeramaPANEL Window Flashing A pre-fabricated profile for use under windows CeramaPANEL Ventilated Profile                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 55mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 3.5mm x 0.48 BMT                                                                                                                             |                                              |  |  |  |
| A pre-fabricated profile for use under<br>windows CeramaPANEL Ventilated Profile                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CeramaPANEL Window Flashing                                                                                                                  |                                              |  |  |  |
| CeramaPANEL Ventilated Profile                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A pre-fabricated profile for use under windows                                                                                               |                                              |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CeramaPANEL Ventilated Profile                                                                                                               |                                              |  |  |  |
| Used at the base of wall to exclude<br>vermin and allow ventilation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Used at the base of wall to exclude vermin and allow ventilation                                                                             |                                              |  |  |  |
| RapidPANEL Wall Wrap/Sarking                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | RapidPANEL Wall Wrap/Sarking                                                                                                                 |                                              |  |  |  |
| A highly breathable, vapor permeable<br>weather barrier designed for use<br>behind the CeramaPANEL façade<br>boards to protect the building.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | A highly breathable, vapor permeable<br>weather barrier designed for use<br>behind the CeramaPANEL façade<br>boards to protect the building. |                                              |  |  |  |

# PRODUCTS & ACCESSORIES

|         | Description                                                                                              | Size / Qty                                    |
|---------|----------------------------------------------------------------------------------------------------------|-----------------------------------------------|
|         | RapidPANEL Facade Gasket Tape                                                                            | 48 x 3mm x 25m Roll<br>(RPGT48-25)            |
| ~       | single sided self-adhesive. For use on vertical top hats.                                                | 25 x 3mm x 25m Roll<br>(RPGT25-25)            |
|         | CeramaPANEL Fibre Cement Drill Bit                                                                       | 5 x 35/70mm<br>(CPDD-0570)                    |
|         | boards.                                                                                                  | 8 x 35/70mm<br>(CPDD-0870)                    |
|         | RapidPANEL Centering Drill<br>Used for pre-drilling top hats.                                            | 8G 9/64"<br>(RPCD-8G9/64)                     |
|         |                                                                                                          |                                               |
|         | CeramaPANEL Façade Screw                                                                                 | 4.8 x 29mm SS Screw<br>(SCR-S-colour)         |
| and the | alternative to face fixing with rivets. Colour                                                           | 4.8 x 29mm SS Screw                           |
|         | coded to match board. For CeramaPANEL<br>Infuse, Depth and Classic, screws with<br>washers must be used. | w/washer<br>(SCR-SW-colour)                   |
|         | CeramaPANEL Stainless Steel Rivet                                                                        | 4.8 x 20mm SS Rivet<br>(RVT-S-colour)         |
|         | Colour coded to match board. For                                                                         | 4.8 x 20mm SS Rivet                           |
|         | rivets with washers must be used.                                                                        | (RVT-SW- colour)                              |
|         | Fixing sleeves must be used for all fixed points on the board.                                           | Sleeve for SS Rivet<br>(RVT-S-SLV)            |
|         | Gesipa Powerbird Pro                                                                                     | Rivet gun kit                                 |
|         | Battery operated rivet tool with 2 x 18V /<br>2.1AH Batteries & charger                                  | (RG-GPBP-KIT)                                 |
|         | CeramaPANEL Stand-Off Nosepice                                                                           | Stand-off nosepiece                           |
|         | Special nosepiece that must be used for<br>CeramaPANEL Façade Rievts                                     | (RO-SNP)                                      |
|         | CeramaPANEL Edge Sealer                                                                                  | 250mL Edge Sealer Kit                         |
|         | For use with CeramaPANEL Infuse, Depth and Classic to seal edges after cutting.                          | (LSN-230)                                     |
|         | CeramaPANEL Saw Blade                                                                                    | 160mm Dia x 4T x 20mm                         |
|         | Saw blade designed for fast and clean                                                                    | (CPSB-160-41-20-TCT)<br>185mm Dia x 4T x 20mm |
|         | using a plunge or circular saw.                                                                          | (CPSB-185-4T-20-DT)                           |

# INSTALLATION OVERVIEW

# **Installation Overview**



#### Figure 1.

- A. Structural Support
- B. RapidPANEL Gasket Tape
- C. SarkingD. RapidPANEL Joining Top Hat
- E. RapidPANEL Intermediate Top Hat
- F. CeramaPANEL Facade Board

# VENTILATION

CeramaPANEL facade boards are installed as a naturally ventilated façade, resulting in a temperature difference between the face of the cladding panel and the air cavity behind. This in turn creates a variation in air density causing air to flow upwards within the cavity resulting in a chimney effect.

Air enters at the base of the cladding creating an airflow that transports heat from the cavity out through openings at the top of the wall, reducing humidity and increasing the efficiency of insulation.

Benefits of ventilated facades:

#### Thermal

Significant reductions in HVAC reliance through:

- A reduction in the amount of heat the building absorbs in hot weather conditions from the partial reflection of solar radiation by the outside facade, and the naturally ventilated air cavity.
- In cold weather conditions ventilated walls retain heat, resulting in a lower reliance on heating. HVAC electricity consumption typically accounts for around 40% of total building consumption.

### Acoustic

Ventilated facade systems provide an increase in the reflection of external noise, with some projects achieving an average reduction of up to 8dB. With the primary external noise sources affecting buildings being road traffic noise, a reduction of this level can greatly improve occupant comfort.

### Structural

Ventilated facades don't suffer from mould, fungi and rot, making them extremely durable and virtually maintenance free. The natural bottom-to-top airflow through the cavity assists in eliminating moisture accumulation on the facades, helping to prolong the structural integrity and ultimately the lifespan of a building.

Ventilation cavities are required at the top and bottom of the façade as well as under and over openings such as doors, windows and cut outs.

These openings need to be protected against the entry of birds and vermin into the cavity space.

Effective protection is normally achieved by fitting a perforated profile to the opening. Perforations must be sized correctly in order to allow air flow and prevent entry of vermin.

A minimum ventilation gap of 10mm is required, or equivalent to 100cm<sup>2</sup> per meter.

If perforated profiles are used, a minimum ventilation area of 100cm<sup>2</sup> per meter is required.

The opening at the base is also required to drain moisture from within the facade cavity.



Figure 2. Ventilation air flow

# PANEL AND TOP HAT LAYOUT

# Panel & Top Hat Layout

CeramaPANEL facade boards can be installed upright horizontally or vertically. The panel layout will determine the location of the RapidPANEL Joining Top Hat and RapidPANEL Intermediate Top Hat. The vertical expressed joints may be aligned or offset in a brick pattern layout.

#### KEY

- JTH: RapidPANEL Joining Top Hat
- ITH: RapidPANEL Intermediate Top Hat



Figure 3. Vertical Layout Aligned Grid Pattern.



Figure 4. Horizontal Layout Aligned Grid Pattern.



Figure 5. Vertical Layout Brick Grid Pattern.



Figure 6. Horizontal Layout Brick Grid Pattern.

# TOP HAT SPACING

|                                        |     | Maximum span of vertical RapidPANEL Top Hats |      |      |      |
|----------------------------------------|-----|----------------------------------------------|------|------|------|
|                                        |     | Spacing of Vertical Top Hats (mm)            |      |      |      |
|                                        |     | 300                                          | 400  | 450  | 630  |
| Design Wind Pressure<br>(Ultimate) kPa | 1.0 | 2450                                         | 2250 | 2150 | 1950 |
|                                        | 1.5 | 2150                                         | 1950 | 1900 | 1700 |
|                                        | 2.0 | 1950                                         | 1800 | 1700 | 1550 |
|                                        | 2.5 | 1800                                         | 1650 | 1600 | 1350 |
|                                        | 3.0 | 1700                                         | 1550 | 1450 | 1200 |
|                                        | 3.5 | 1600                                         | 1400 | 1350 | 1100 |
|                                        | 4.0 | 1550                                         | 1300 | 1200 | NA   |
|                                        | 4.5 | 1450                                         | 1200 | 1150 | NA   |
|                                        | 5.0 | 1350                                         | 1150 | 1050 | NA   |
|                                        | 5.5 | 1300                                         | 1100 | 1000 | NA   |
|                                        | 6.0 | 1200                                         | 1000 | 950  | NA   |
|                                        | 6.5 | 1150                                         | 950  | NA   | NA   |
|                                        | 7.0 | 1100                                         | 950  | NA   | NA   |

# **RapidPANEL Joining and RapidPANEL Intermediate Top Hats**

Table 2.

- **Note:** The design capacities of the CeramaPANEL façade system are in limit state format and intended for use with AS/NZS 1170.2. To obtain equivalent permissible load capacity, divide the "ultimate wind capacity" in Table 6.04 or Table 6.06 by 1.5.
  - Indicates values suitable only where CeramaPANEL boards are fixed to three or more top hats.
  - Cantilever maximum 0.2 x adjacent span
  - RapidPANEL Intermediate and RapidPANEL Joining Top Hats connection to horizontal RapidPANEL Horizontal Top Hat or structural steel support of minimum 1.10mm BMT use 2 x 12g-14TPI x 20mm screws.



- A. RapidPANEL Intermediate Top Hat
- B. RapidPANEL Joining Top Hat
- C. Steel Framing
- D. Concrete Flooring

Figure 7.

# TOP HAT SPACING

# **RapidPANEL Horizontal Top Hat**

|                                        |     | Spacing of RapidPANEL Horizontal Top Hat fixed to three or more studs |      |                                 |      |
|----------------------------------------|-----|-----------------------------------------------------------------------|------|---------------------------------|------|
|                                        |     | Studs 0.75BMT Stud Spacing (mm)                                       |      | Studs 1.10BMT Stud Spacing (mm) |      |
|                                        |     | 450                                                                   | 600  | 450                             | 600  |
| Design Wind Pressure<br>(Ultimate) kPa | 1.0 | 1768                                                                  | 1473 | 1974                            | 1769 |
|                                        | 1.5 | 1179                                                                  | 982  | 1316                            | 1179 |
|                                        | 2.0 | 884                                                                   | 737  | 987                             | 885  |
|                                        | 2.5 | 707                                                                   | 589  | 790                             | 708  |
|                                        | 3.0 | 589                                                                   | 491  | 658                             | 590  |
|                                        | 3.5 | 505                                                                   | 421  | 564                             | 505  |
|                                        | 4.0 | 442                                                                   | 368  | 494                             | 442  |
|                                        | 4.5 | 393                                                                   | 327  | 439                             | 393  |
|                                        | 5.0 | 354                                                                   | 295  | 395                             | 354  |
|                                        | 5.5 | 322                                                                   | 268  | 359                             | 322  |

Table 1.

**Note:** RapidPANEL Horizontal Top Hats connection to steel stud frame of minimum 0.75mm BMT use 2 x 14g hex head screws at each stud.



- A. Structural Steel
- B. RapidPANEL Intermediate Top Hat
- C. RapidPANEL Joining Top Hat
- D. Concrete Flooring
- E. RapidPANEL Horizontal Top Hat

Figure 8.

# TOP HAT INSTALLATION

CeramaPANEL facade boards can be installed on the RapidPANEL top hat fixing system. Certification for the structural stability of any supporting frame should be in accordance with local building regulations and must be obtained by the building owner or official representatives, such as the project engineer.

The RapidPANEL system includes the RapidPANEL Joining Top Hat and the RapidPANEL Intermediate Top Hat.

- Before installing on a load bearing wall, ensure the wall is plumb and straight and that the support system can be mounted safely.
- Horizontal tolerance (+/- 1.5mm over 1m)
- Vertical tolerance (+/- 0.5mm over 600mm)
- Top hats must be installed in accordance with Table 1 and Table 2.
- Top hats must be installed vertically and must be broken at floor levels.
- Top hats must be fixed to the structure as per the structural engineer specifications.
- CeramaPANEL facade boards must never cross a joint in the top hat subframe. Ensure the top hat joints align with the panel joints.
- Ensure a minimum 20mm gap between the top hats (see Figure 9)
- Install vertical gasket to central section of the RapidPANEL Top Hats for the full extent of panels. Be careful not to stretch the gasket when installing. When joining gasket, cut ends cleanly and push together before adhering.



Figure 9.

- A. Steel Frame
- B. Sarking
- C. RapidPANEL Intermediate Top Hat
- D. CeramaPANEL Facade Board
- E. RapidPANEL 3.5mm Back Flashing





# CUTTING

When cutting CeramaPANEL facade boards, it is important to use the correct blade. Panelcorp recomends using a special purpose fibre cement saw blade used with a dust-reducing saw. A dust-reducing saw uses a dust deflector or a dust collector which can be connected to a vacuum extraction system.

To achieve the best quality cut and to know which side to cut from, ensure to follow these instructions. The direction varies depending on which saw you use.



When using a table saw, place the board with the face uppermost on the table and cut from therear of the board.



When using a mitre saw or drop saw, cut the board from the front.



When using a circular saw or dive saw, cut the board from the rear.

Once boards are cut, edges should be bevelled with sand paper to reduce the posibility of damage and improve the panel appearance. Use 80-grit sand paper on a block of flat timber or board to sand edges.

Dust from cutting or drilling must be removed immediately after the work has been completed, otherwise it can mark the surface of the boards.

All cut edges on CeramaPANEL Infuse, Depth and Classic boards must be sealed with CeramaPANEL Edge Sealer to ensure protection of the cut edges.

# EDGE SEALING

CeramaPANEL Edge Sealer should be used to protect all edges of CeramaPANEL Infuse, Depth and Classic boards when cut on-site. Factory-cut edges are always factory pre-sealed.

### **Before Treating Boards**

The boards must be dry, and edges clean and free from dust and dirt before applying the Edge Sealer. It is useful to roughen the edges with sandpaper (grade 80). Edges must be sealed immediately after cutting.

#### **Application Conditions**

Board and air temperature should be between + 5°C to + 30°C and relative humidity should

be below 85%.

### Application

If application is not to be carried out in a well-ventilated room or outdoors, use respiratory equipment. Wear goggles and gloves while applying Edge Sealer as set out in the safety data sheet.

If there is protective film on the board, leave it in place until the Edge Sealer has dried.

Shake Edge Sealer before use. Apply it in a thin layer with the sponge applicator supplied in the CeramaPANEL Edge Sealer set.

Avoid getting excess Edge Sealer on board faces. If this does occur, remove immediately with a lint free cloth.

Ensure that the entire edge has been sealed with a thin layer before continuing to the next edge. Apply Edge Sealer to individual boards separately, not while stacked.

# Disposal

Disposal of CeramaPANEL Edge Sealer should be done in accordance with local and national regulations.

**Note:** CeramaPANEL Raw, Hewn, Groove and Natural should NOT be sealed with CeramaPANEL Edge Sealer.





# PANEL JOINTS

CeramaPANEL facade boards are installed with an expressed joint between adjacent panels, vertically and horizontally. The joint is to be a minimum of 8mm and maximum of 16mm.

#### **Horizontal Joints**

CeramaPANEL facade boards can be joined horizontally either closed with a RapidPANEL 3.5mm Back Flashing (see Figure 11) or as an open joint (see Figure 12).

Note: if using an open horizontal joint, the supporting frame is visible. The joints may need to be concealed using tape or paint.





Figure 11.

Figure 12.

### **Vertical Joints**

CeramaPANEL facade boards are always joined vertically on a continuous top hat. RapidPANEL Facade Gasket Tape is applied to the central section of the RapidPANEL Joining Top Hat for the full extent of the panels, creating a black-out of the vertical joint (see Figure 14).

RapidPANEL Facade Gasket Tape is also applied to the RapidPANEL Intermediate Top Hat to assist with movement and minimize any vibration in the panels (see Figure 13).

#### Horizontal Cross Section Intermediate Top Hat



### **Horizontal Cross Section Vertical Joint**



#### Figure 13.

- A. Steel Framing
- B. Sarking
- C. RapidPANEL Intermediate Top Hat
- D. RapidPANEL Gasket Tape
- E. CeramaPANEL Facade Board
- F. CeramaPANEL Facade Screw

#### Figure 14.

- A. Steel Framing
- B. Sarking
- C. RapidPANEL Joining Top Hat
- D. RapidPANEL Gasket Tape
- E. CeramaPANEL Facade Board
- F. CeramaPANEL Facade Screw
## PANEL INSTALLATION

CeramaPANEL facade boards are installed with an expressed joint between adjacent panels, vertically and horizontally. The joint is to be a minimum of 8mm and maximum of 16mm.

- When installed in a vertical layout, the boards must have at least two fixed points as close to the centre of the panel as possible. (see Figure 15 & 16)
- If the panel is installed horizontally or runs across two intermediate top hats, the board must have two fixed points as close to the centre of the panel as possible and must be aligned horizontally. (see Figure 17)
- All other fixing positions must be sliding points.
- CeramaPANEL facade boards must be fixed in accordance with Table 3 and minimum edge distances as specified in Figure 11 and Figure 12. Appropriate panel fixing layout should be selected for the project Design Wind Pressure, Top Hat Spacing and Panel Fixing Type.
- All panels must be pre-drilled using a fibre cement drill bit. The hole sizes depend if you are using rivets or screws to fix the boards to the top hats. Refer to page 24 for hole pre-drilling size requirements.
- When installing Cembrit, begin with the two fixed points (1 then 2), followed by the remaining gliding points above the fixing positions and finally the gliding points below. (see Figure 18)
- CeramaPANEL facade boards must never cross a joint in the top hat subframe, rather the panel joints should align with the top hat joints.
- \* Screws MUST NOT be overtightened. An overtightened screw will prevent movement, leading to panel bowing and cracking.



Sliding Point

Figure 15.

KEY

X Fixed Point



Figure 17.



Figure 16.



Figure 18.

## PANEL FIXING

|           |     | Panel Fixing Requirements and Maximum Top Hat Spacings |                                        |  |
|-----------|-----|--------------------------------------------------------|----------------------------------------|--|
|           |     | Spacing of Vertical Top Hats (mm)                      | Max Fixing Spacing (mm) along Top Hats |  |
|           | 1.0 | 630                                                    | 600                                    |  |
|           | 1.5 | 630                                                    | 600                                    |  |
|           | 2.0 | 630                                                    | 600                                    |  |
|           | 2.5 | 630                                                    | 600                                    |  |
| e         | 3.0 | 630                                                    | 500                                    |  |
| a         | 3.5 | 600                                                    | 500                                    |  |
| Pre<br>KP | 4.0 | 400                                                    | 500                                    |  |
| ate)      | 4.5 | 400                                                    | 500                                    |  |
| Ei K      | 5.0 | 400                                                    | 500                                    |  |
| igi<br>⊖  | 5.5 | 400                                                    | 400                                    |  |
| Des       | 6.0 | 400                                                    | 400                                    |  |
|           | 6.5 | 400                                                    | 400                                    |  |
|           | 7.0 | 400                                                    | 300                                    |  |

#### Table 3.

**Note:** - The CeramaPANEL façade boards fixed to RapidPANEL Joining Top Hats and RapidPANEL Intermediate Top Hats using CeramaPANEL stainless steel screws (4.8x29mm) or CeramaPANEL stainless steel rivet fasteners (4.8x29mm).

- When using screws, the use of a screw gun with torque control to prevent overtightening screws is recommended





## GENERAL DISTANCES

Ensure to install according to the following guidelines regarding distances described in this manual.

- The facade board should finish between 10 and 30mm below the bottom end of the substructure.
- For overhang and similar, the maximum distance is 100mm.
- The distance to terrain from the bottom edge of the facade board should be a minimum of 150mm.
- The distance to flat roofs, balconies and other horizontal structures, where the water can drain away, should be a minimum of 50mm.
- Vertical clearance to profiles such as RapidPANEL Back Flashing or corner profiles should be a minimum of 4mm.
- For horizontal clearances at windows and doors etc., you must leave a minimum of 10mm for ventilation.
- The clearance to other building materials should be minimum 8mm for movement and water drainage.



Figure 20.

#### **Cut Outs**

To avoid cracking the CeramaPANEL facade boards when installing around windows, doors and other openings, ensure the boards are installed in accordance with the following instructions.

- Avoid cutting single, exact apertures in boards, rather to cut smaller sections and install them individually.
- Ensure that there is support behind the joints, onto which the facade board can be mounted.
- If the small cut outs are no wider than 150mm, they can be mounted with one screw fixing in the middle of the board width (see Figure 13).



## PANEL FIXING

CeramaPANEL Façade Boards can be installed using either CeramaPANEL Façade Screws or CeramaPANEL Façade Rivets.

## **CeramaPANEL Façade Screws**

#### **CeramaPANEL Façade Screw**

For CeramaPANEL Raw, Natural, Hewn, Groove and Vogue, use the CeramaPANEL Facade Screw SCR-S without washer.

For CeramaPANEL Infuse, Depth and Classic, use CeramaPANEL Façade Screw SCR-SW with washer. This washer prevents moisture from entering the hole. Remove the washer for all Fixing Positions.



**Fixing Position** 

#### **Pre-Drilling Boards**

When pre-drilling the CeramaPANEL boards, it is recommended to use the CeramaPANEL Fibre Cement Drill Bit. This leaves you with the best results and the optimum number of drilled holes per drill bit. Dust from cutting or drilling must be removed immediately after the work has been completed, otherwise it can mark the surface of the boards.

Hole diameter is as follows:

- Fixing Position hole diameter Ø5 mm.
- Sliding Position hole diameter Ø8 mm.

#### **Top Hats**

The RapidPANEL top hats must be pre-drilled for every Sliding Position. Pre-drill the top hats using a centring drill with a 9/64" or 3.5mm drill bit. Position the centring tool through the pre-drilled hole in the board to ensure accurate fixing hole positions in the steel profiles that perfectly match the board's hole positions.

#### Fixing

When installing the CeramaPANEL Façade Screws, use a screw gun with torque control to prevent overtightening screws.

Screws MUST NOT be overtightened. An overtightened screw will prevent movement, leading to panel bowing and cracking.



## PANEL FIXING

CeramaPANEL Façade Boards can be installed using either CeramaPANEL Façade Screw or CeramaPANEL Façade Rivets.

## **CeramaPANEL Façade Rivet**

#### **CeramaPANEL Façade Rivet**

CeramaPANEL Stainless Steel Rivet's are to be used when fixing CeramaPANEL façade boards to steel top hats.

For all Fixing Positions, the CeramaPANEL Fixing Sleeves must be used. Insert the rivet into the CeramaPANEL Fixing Sleeve.

#### **Pre-Drilling Boards**

For pre-drilling the CeramaPANEL boards it is recommended to use the CeramaPANEL Fibre Cement Drill Bit. This leaves you with the best results and the optimum number of drilled holes per drill bit. Dust from cutting or drilling must be removed immediately after the work has been completed, otherwise it can mark the surface of the boards.

The hole diameter is to be Ø9 mm.

#### **Top Hats**

The RapidPANEL top hats must be pre-drilled once the board is in the correct position. Pre-drill the top hats using a centring drill with a 4.9mm drill bit.

Pre-drilling the top hats using the centring tool ensures the screw is fixed in the centre of the hole, allowing for movement of the board.

#### Fixing

The Stand-Off Head must be used on the rivet gun when fixing all CeramaPANEL Façade Rivets. This provides a small space between the board and the rivet head to allow for movement caused by moisture or temperature changes.



#### 3D Model - Vertical Joint



Figure 22.

- A. Steel Framing
- B. Sarking
- C. RapidPANEL Joining Top Hat
- D. RapidPANEL Gasket
- E. CeramaPANEL Facade Board
- F. CeramaPANEL Facade Screw

#### Vertical Cross Section - Foundation



Figure 23. A. Anti-vermin perforated angle



#### 3D Model - Foundation

Figure 24.A.Anti-vermin perforated angle to sit<br/>flush against facade board



#### Horizontal Cross Section - Exterior Corner Closed Joint

#### Figure 25.

A. Metal angle supplied by others (0.5mm)

#### Horizontal Cross Section - Exterior Corner Closed Joint



#### Figure 26.

A. Metal angle supplied by others (0.5mm)



Horizontal Cross Section - Interior Corner Open Joint

Figure 27.





Figure 28.

#### Vertical Cross Section - Parapet



3D Model - Parapet



Figure 29.

Figure 30.



**Vertical Cross Section Soffit** 

Figure 31.

3D Model - Soffit



Figure 32.

#### Vertical Cross Section - Window Sill



#### Figure 33.

3D Model - Window Sill



**Vertical Cross Section - Window Head** 



Figure 34.

Figure 35.



3D Model - Window Head

Figure 36.

#### **3D Model - Expansion Joint Closed Joint**

- A. Steel Framing
- B. Sarking
- C. RapidPANEL Intermediate Top Hat
- D. RapidPANEL Joining Top Hat
- E. CeramaPANEL Facade Board
- F. Expansion Joint



Figure 37.

#### **Vertical Cross Section - Horizontal Joint**

- A. Steel Framing
- B. Sarking
- C. RapidPANEL Intermediate Top Hat
- D. CeramaPANEL Facade Board
- E. RapidPANEL 3.5mm Back Flashing





## CARE & MAINTENANCE

#### **Annual Inspection**

Normally, a CeramaPANEL facade does not require maintenance to maintain its strength, properties and function. Environmental impacts may, however, influence the visual appearance of the facade. Therefore, an annual inspection of the surface, ventilation gaps, joints and fixings is recommended. Detection and repair of possible damages secure a prolonged lifetime for the facade.

#### Cleaning

CeramaPANEL facade boards can be cleaned with cold or lukewarm water, if necessary with the addition of a mild household detergent not containing solvents. Rinse with plenty of clean water until the facade is perfectly clean. Before cleaning full scale, it is recommended to test the selected cleaning method on a smaller area to ensure it works and does not damage the board surface.

#### Warning: High pressure cleaning is not recommended as it may damage the surface.

#### **Moss and Algae**

Moss and algae growth can be removed with common detergents available on the market. Care should be taken to ensure that the cleaning agent does not cause damage to the surface of the CeramaPANEL facade boards. Confirm the compatibility of your cleaning agent with your cleaning agent supplier, and ensure it is applied according to the supplier's instructions. It is advised that before conducting a large-scale application a test is carried out on a small, inconspicuous area to ensure that the cleaning agent has no effect on the colour of CeramaPANEL facade boards.

#### Efflorescence

Efflorescence is a naturally occurring, white, powdery deposit that can appear on cement-based building materials (including bricks, cement walls, grout, and fibre cement). It is the result of a process in which moisture draws salt crystals to the surface, evaporates, and leaves a chalky substance behind.

Efflorescence occurs when all three of the following conditions exist:

- 1. Water-soluble salts are present in the building meatrial.
- 2. There is enough moisture in the wall to turn the salts into a soluble solution.
- 3. There is a path for the soluble salts to get to the surface.

Efflorescence may also be a sign of water ingress behind the facade. Make certain that all openings are properly covered and there is no water intrusion due to over-driven screws. While some efflorescence may weather away naturally on its own, it is best to take steps to treat it. Efflorescence can be removed with household white vinegar and water. For most cases of efflorescence, Step 1 - 3 works well. But for substantial deposits of efflorescence go to Step 4.

For best results, follow these cleaning instructions:

- 1. Protect areas that are not to be cleaned. Rinse all plants and vegetation around the facade with water before and after application of the vinegar.
- 2. Generously coat the entire surface area with vinegar. Allow the solution to sit on the surface for 10 minutes.
- 3. Rinse the treated area thoroughly with water from the top down and allow the area to air dry.
- 4. For extra tough efflorescence: Use a 10% acetic acid solution and apply to affected erea with cotton cloth. A light scrubbing with the cotton cloth may be required. After about 20 seconds rinse with water.

## PANELCORP

#### 1300 845 750

sales@panelcorp.com.au Warehouse: 25 Abel St, Jamisontown NSW 2750

PO Box 7577, South Penrith NSW 2750





## **Technical Datasheet**

Visit bradfordinsulation.com.au for the latest version of this datasheet 29 Nov 19

# **ENVIROSEAL CW**

DESCRIPTION: Light Wall, Vapour Permeable Wall Wrap SUITABILITY: Commercial brick veneer and lightweight clad walls



#### IMPORTANT INFORMATION

- This product is only recommended for the applications listed in this datasheet unless advised otherwise by an official Bradford technical representative.
- O This product is not recommended in tropical climate zones where the humidity outside is higher than the inside of the building.
- This product is not designed to withstand prolonged exposure to UV or weather. Once installed the exterior wall must be applied as soon as possible.
- Prior to installation, this product should be stored in a cool dry place away from sunlight, and should not come into contact with wet concrete or alkaline based materials.

#### PRODUCT DESCRIPTION

Bradford Enviroseal™ CW is a triple layer polyolefin non-woven textile weather barrier that is calendared together. This product is also available with pre-applied integrated tape release liners.

O This product meets the requirements of the AS/NZS 4200.1 and is suitable for use in Australian residential applications

#### **CLIMATE ZONE**

This product is recommended for use in warm to cold climate zones where there are higher levels of insulation used in the wall cavity and vapour permeable and water barrier properties are required.

#### CLASSIFICATION

| This product meets the req                             | uirements of AS/NZS 4      | 200.1                          |  |
|--------------------------------------------------------|----------------------------|--------------------------------|--|
| CRITERIA                                               |                            | RESULT                         |  |
| Product Identifier                                     |                            | Enviroseal CW                  |  |
| Duty Classification (AS/NZS 4200.1)                    |                            | Light Wall                     |  |
| Burst Strength (AS 2001.2.19)                          |                            | ≥ 200 N                        |  |
| Machine                                                |                            | ≥ 90                           |  |
| Edge Tear Resistance (TAPPI 1470)                      | Lateral                    | ≥ 90                           |  |
| Water Control Classification (AS/NZS 4201.4)           | Water Barrier              |                                |  |
| Vapour Classification (ASTM E96)                       |                            | Class 4 Vapour Permeable       |  |
| Vapour Permeability (ASTM E96)                         |                            | > 1.1403 µg/N.s                |  |
| Ended the (AC 4201 E)                                  | Inward Facing              | Non-Reflective (0.9)           |  |
| Emissivity (AS 4201.5)                                 | Outward Facing             | Non-Reflective (0.9)           |  |
| Flammability Index (AS 1530.2)                         |                            | ≤ 5 (Low)                      |  |
| Electrical Conductivity (AS/NZS 3100)                  |                            | Non-Conductive                 |  |
| Resistance to Dry Delamination (AS/NZS 4201.1)         |                            | Pass                           |  |
| Resistance to Wet Delamination (AS/NZS 4201.2)         | Pass                       |                                |  |
| Shrinkage (AS/NZS 4201.3)                              |                            | ≤ 0.5%                         |  |
| Nominal Thickness                                      |                            | <1.0 mm                        |  |
| Classifications in accordance with AS/NZS 4200.1. This | product should be installe | d in accordance with AS 4200.2 |  |

#### APPLICATION TABLES



CSR Bradford Locked Bag 1345 North Ryde BC NSW 1670 bradfordinsulation.com.au

R, 2.8

R, 3.1

CSR Bradford is a business division of CSR Building Products Limited ABN 55 008 631 356 The contents of this brochure are copyright protected and may not be reproduced in any form without prior written consent of CSR Bradford. Recommendations and advice regarding the use of the products described in this brochure are to be taken as a guide only, and are given without liability on the part of the company or its employees. We reserve the right to change product specifications without prior notification, please refer to the CSR Bradford website for the latest revision of this document. The purchaser should independently determine the suitability of the product for the intended use and application.

APPLICATION DETAIL Bradford Enviroseal<sup>™</sup> CW is suitable behind both residential brick veneer and lightweight clad walls in warm to cold climate zones where condensation control may be required. Bradford Enviroseal CW is recommended where humidity is higher inside the building than outside. It is also recommended that the higher insulation R value used in construction that vapour permeable products are used to minimise the risk of

condensation related damage. This product does not provide a reflective R-Value.

• This product is suitable for use in BAL regions 12.5 to FZ in accordance with AS 3959.

For more information on how to install this product correctly see the Bradford Wall Wrap Installation guide at bradfordinsulation.com.au

#### PRODUCT DIMENSIONS

| PRODUCT NAME WIDTH (mm) LENGTH (m) m <sup>2</sup> PER ROLL WEIGHT (kg) PRODUCT COL |                  |               |            |                         |             |              |
|------------------------------------------------------------------------------------|------------------|---------------|------------|-------------------------|-------------|--------------|
| Environment CW 1500 50 75 10.7 114175                                              | PRODUCT NAME     | IE WIDTH (mm) | LENGTH (m) | m <sup>2</sup> PER ROLL | WEIGHT (kg) | PRODUCT CODE |
| Eliviloseal GW 1500 50 75 10.7 114175                                              | Enviroseal CW    | V 1500        | 50         | 75                      | 10.7        | 114175       |
| Enviroseal CW-IT 1500 50 75 108 134863                                             | Enviroseal CW-IT | -IT 1500      | 50         | 75                      | 10.8        | 134863       |

\*CW-IT is a variant of CW that includes integrated tape release liners

#### **PRODUCT CONSTRUCTION**



#### CONDENSATION RISK

There are a large number of factors that need to be considered in assessing and managing condensation risk including local climate, building use, position, thickness and type of bulk insulation, location and integrity of vapour barriers, and mechanical or passive ventilation both in the roof space and wall cavities where applicable. It is highly recommended that designers run a condensation risk analysis. CSR Bradford can assist in assessing condensation risk.

For further information on the risks of condensation please refer to the Australian Building Codes Board Handbook, 'Condensation in Buildings.'

Weather Exposure: This product is a secondary sarking material and is not designed to withstand prolonged direct exposure to the elements - accordingly, the exterior cladding should be installed without delay. Product exposed to harsh weather conditions, or UV for more than 8 weeks in wall applications, should be inspected for damage prior to installation of the exterior cladding and damaged product should be repaired or replaced to comply with the product warranty.

#### For further technical advice call 1300 850 305 or visit bradfordinsulation.com.au

CSR

Aconex

#### 1203 - Warnervale New Primary School 75 Warnervale Road Warnervale NSW 2259 Australia

MAIL TYPE General Correspondence MAIL NUMBER NBRS-GCOR-000382 REFERENCE NUMBER NBRS-GCOR-000360

NBRSARCHITECTURE.

## Re: re: WVPS - SSDA B4 External wall compliance table - MBC Comment 161120

| From   | James Kim - NBRSARCHITECTURE                                  |
|--------|---------------------------------------------------------------|
| То     | Mr Sean Moore - Metro Building Consultancy                    |
| Cc (4) | Katie Lawson-Craig - NBRSARCHITECTURE                         |
|        | Ms Stephanie Wong - NBRSARCHITECTURE                          |
|        | Mr Chris Hamilton - Richard Crookes Constructions Pty Limited |
|        | Mr Adrian Connell - Richard Crookes Constructions Pty Limited |
| Sent   | Tuesday, 17 November 2020                                     |

Sent

✓ MESSAGE

Hi Sean

as discussed, please find attached response to BCA report R05 (50%) for your information. also confirm we will implement additional notes in the Cerama PANEL report dated 10/11/2020

regards

James

From: J Kim Sent: 17/11/2020 2:06:16 PM AEDT (GMT +11:00) To: Sean Moore Cc: Katie Lawson-Craig, Stephanie Wong, Adrian Connell, Chris Hamilton Mail Number: NBRS-GCOR-000381 Subject: Re: re: WVPS - SSDA B4 External wall compliance table - MBC Comment 161120

Good afternoon Sean

Majority of detail screenshots in Cerama PANEL report is from NBRS wall details and slab edge details, except for Figure7, 9, 11 and 12.

Figure 7 is not proposed and Figure 5 will be used throughout.

Also we will implement detail figures 9, 11 an 12 in the report

#### 18/11/2020

regards

James

From: S Moore
Sent: 16/11/2020 12:18:55 PM AEDT (GMT +11:00)
To: James Kim
Cc: Katie Lawson-Craig, Stephanie Wong, Adrian Connell, Chris Hamilton
Mail Number: MetroBC-GCOR-000046
Subject: Re: re: WVPS - SSDA B4 External wall compliance table - MBC Comment 161120

Hi James

Thank you for the revised report, will you be updating your drawings to incorporate the requirements stated in the report?

If so please confirm by return Aconex so that we can attach the confirmation to the CWC.

The updated drawings and details will be required for CWC 03. These updated drawings are to include all required design changes and the notes regarding the operation / maintenance of the building.

The updated drawings will then need to be sent to the report author and a revised report issued confirming acceptance of the design changes. This is required to ensure there is no miscommunication in the resolution of the design changes.

Kind regards,

Sean Moore Managing Director sean@metrobc.com.au



Suite 102, 12 Mount Street, North Sydney NSW 2060

From: J Kim
Sent: 12/11/2020 2:49:45 PM AEDT (GMT +11:00)
To: Sean Moore
Cc: Katie Lawson-Craig, Stephanie Wong, Adrian Connell, Chris Hamilton
Mail Number: NBRS-GCOR-000360
Subject: re: WVPS - SSDA B4 External wall compliance table

Good afternoon Sean

#### 18/11/2020

#### Aconex

Please find attached SSDA condition B4 external wall compliance table including CERAMA panels + supplementary engineering report & appendices for your information

regards

James



#### WARNERVALE PRIMARY SCHOOL

**BUILDING CODE OF AUSTRALIA VOL 1 2019** 50% DESIGN REVIEW

**OCTOBER 2020** 

| Report prepared for | Richard Crookes Constructions<br>Level 3, 4 Broadcast Way,<br>Artarmon, NSW 2064   |
|---------------------|------------------------------------------------------------------------------------|
|                     | Attention: Tim Hastings                                                            |
| Report prepared by  | Metro Building Consultancy<br>Suite 102, 12 Mount Street,<br>North Sydney NSW 2059 |
|                     | Consultant: Sean Moore / Simon Bond                                                |
| Report reference    | 20213R02 R1                                                                        |
| Job number          | 20213                                                                              |
| Date                | 30 <sup>th</sup> July 2020                                                         |
| menoncicomiau       |                                                                                    |



#### CONTENTS

| 1.0        | Introduction and Documentation           |
|------------|------------------------------------------|
| 2.0        | Use and Class of Building                |
| 3.0        | Construction and fire resistance ratings |
| 4.0        | Egress                                   |
| 5.0        | Accessibility                            |
| 6.0        | Services & Equipment                     |
| 7.0        | Health and Amenity                       |
| 8.0        | Class 9b Buildings                       |
| 9.0        | Energy Efficiency                        |
| 10.0       | Conclusion                               |
| Appendix A | Drawings reviewed                        |
| Appendix B | Type of Construction Requirements        |

#### DOCUMENT ACCEPTANCE

| Company                    | Name       | Signed | Date     |
|----------------------------|------------|--------|----------|
| Metro Building Consultancy | Sean Moore | -tope  | 26/10/20 |

#### **REVISION HISTORY**

| Description               | Prepared by | Revision No. | Date     |
|---------------------------|-------------|--------------|----------|
| BCA Report Initial Tender | Sean Moore  | R01          | 15/07/20 |
| BCA Report 50% Design     | Sean Moore  | R02          | 26/10/20 |
| BCA Report 50% Design     | Sean Moore  | R02r1        | 30/10/20 |

#### metrobc.com.au

20213-Wps-Bca R02-301020r1



#### 1.0 Introduction and Documentation

#### Introduction

NBRS Architecture has requested Building Code of Australia Volume 1 2019 advice in relation to the BCA compliance of the design documents for the proposed redevelopment of Warnervale Primary School located at 75 Warnervale Road, Warnervale NSW 2259.

The tender documents state that the scope of works are as follows:

- 20 Teaching Spaces
- Special program spaces
- Library
- Administrative spaces
- Canteen
- Out of school hours care
- Hall
- Infrastructure works
- Landscaping (hard and soft)

The information submitted to date has been reviewed for compliance with the Deemed-to-Satisfy provisions of the Building Code of Australia 2019 excluding Section B structure, Part G5 bushfire, NSW Part H101 entertainment venues & Section J energy efficiency. This report is for the exclusive use of NBRS Architecture and cannot be used for any other purpose without the prior permission of Metro Building Consultancy. The report is only valid in its entire form. As the tender date was December 2019 the Section J requirements from BCA 2016 Amendment 1 can be applied.

#### Documentation available and assessed

The drawings provided by NBRS Architecture to Metro Building Consultancy on 15<sup>th</sup>, 19<sup>th</sup> and 21<sup>st</sup> of October 2020 have been assessed for compliance to the Building Code of Australia Volume 1 2019. The list of drawings reviewed is as per the table in Appendix A of this report. It is noted that the structural and civil drawings have not been provided.

#### 2.0 Use and class of building

The following table lists the uses and classifications of the new buildings.

#### Admin Building

| Level              | Use                   | Class | Approx. floor<br>area |
|--------------------|-----------------------|-------|-----------------------|
| Lower ground level | Offices and amenities | 5     | 447m <sup>2</sup>     |

The building has a rise of storey of 1.

The effective height of the building is not applicable as it is single storey.

#### Hall Building

| Level              | Use                                               | Class   | Approx. floor<br>area |
|--------------------|---------------------------------------------------|---------|-----------------------|
| Lower ground level | Storerooms, hall, amenities and ancillary canteen | 7b & 9b | 755m <sup>2</sup>     |

The building has a rise of storey of 1.

The effective height of the building is not applicable as it is single storey.



#### Homebase Building

| Level                 | Use                                    | Class | Approx. floor<br>area |
|-----------------------|----------------------------------------|-------|-----------------------|
| Lower ground<br>level | Teaching spaces and amenities          | 9b    | 2648m <sup>2</sup>    |
| Ground level          | Teaching spaces, library and amenities | 9b    | 2647m <sup>2</sup>    |

The building has a rise of storey of 2.

The effective height of the building is 5m.

#### 3.0 Construction and fire resistance ratings

The class 5 Admin Building with rise of storey of 1 is required to comply with the Building Code of Australia Type C Construction requirements. These are listed in Appendix B.

The class 7b & 9b Hall Building with rise of storey of 1 is required to comply with the Building Code of Australia Type C Construction requirements. These are listed in Appendix B.

The class 9b Homebase Building with rise of storey of 2 is required to comply with the Building Code of Australia Type B Construction requirements. These are listed in Appendix B.

#### Exposure to a fire source feature

A part of a building element is exposed to a fire-source feature if any of the horizontal straight lines between that part and the fire-source feature, or vertical projection of the feature, is not obstructed by another part of the building that has an FRL of not less than 30/–/–.

#### Fire-source feature means-

(a) the far boundary of a road, river, lake or the like adjoining the allotment; or

- (b) a side or rear boundary of the allotment; or
- (c) an external wall of another building on the allotment which is not a Class 10 building.

The loadbearing parts of the external walls of the proposed Type B construction Homebase Building that are within 18m of the side boundary and the adjacent Class 9b Hall Building are required to be provided with the fire resistance levels as per the Type B Construction requirements in Appendix B.







The drawings indicate that the masonry wall within 18m of the hall is not loadbearing and that the load bearing element on the ground floor are the concrete columns. Confirmation of the FRL's achieved by all loadbearing building elements (ground floor concrete columns, level 1 floor, external columns, columns in external wall within 18m of a FSF) is required to be included on the final plans.



The columns incorporated into the external walls that are within 18m of the adjacent hall which is a fire source feature (FSF) and are required to be provided with an FRL of 120/-/-. The external columns within 18m of the adjacent fire source feature (hall) are required to be provided with an FRL of 120/-/-.

The final design drawings should show an 18m arch from the nearest corner of the hall so that all loadbearing elements can be identified.



Please provide confirmation from the structural engineer that the steel columns (SC) around the windows are non-load bearing, if so they are not required to be provided with an FRL.

The steel columns circled in blue in the markups below (and all other similar columns holding up the roof) are either external or are not internal and are within 18m of a fire source feature and are required to be provided with an FRL of 120/-/-. Refer to the Type B Construction requirements for external columns in Appendix B.



The drawings should differentiate the steel columns on the upper floor that are built into the external walls into those that are required for the windows and door supports (ie assumed non loadbearing TBC by engineer) and those that are loadbearing. The loadbearing ones are required to be provided with an FRL of 120/-/-.



Fire protection for a support of another part

The BCA states that where a part of a building required to have an FRL depends upon direct vertical or lateral support from another part to maintain its FRL, that supporting part, subject to must:

(i) have an FRL not less than that required by other provisions of this Specification; and

(ii) if located within the same fire compartment as the part it supports have an FRL in respect of structural adequacy the greater of that required—

- (A) for the supporting part itself; and
- (B) for the part it supports; and

(iii) be non-combustible-

- (A) if required by other provisions of this Specification; or
- (B) if the part it supports is required to be non-combustible.

The following building elements need not comply with the 'fire protection for a support of another part' requirements:

• An element providing lateral support to a concrete external wall that could collapse as complete panels (e.g. tilt-up and pre-cast concrete).



- A roof providing lateral support in a building of Type B construction.
- A column providing lateral support to a wall where the column is a steel column, other than one in a fire wall or common wall, in a building that contains only 1 storey.
- An element providing lateral support to a fire wall or fire-resisting wall, provided the wall is supported on both sides and failure of the element on one side does not affect the fire performance of the wall.

As stated above the columns incorporated into the external walls that are within 18m of a fire source feature (eastern boundary and the hall) are required to have an FRL of 120/-/-. If the columns on level 1 rely on the slab for support the slab is required to be provided with the same FRL and the FRL of the slab is required to be stated on the final documents.



#### Method of attachment not to reduce the fire-resistance of building elements

The method of attaching or installing a finish, lining, ancillary element or service installation to the building element must not reduce the fire-resistance of that element to below that required.

#### Stair shaft

If the stair shaft in the Homebase Building supports any floor or a structural part of it—

(i) the floor or part must have an FRL of 60/-/- or more; or

(ii) the junction of the stair shaft must be constructed so that the floor or part will be free to sag or fall in a fire without causing structural damage to the shaft.

#### Loadbearing internal walls

A loadbearing internal wall and a loadbearing fire wall (including those that are part of a loadbearing shaft) in the Homebase Building must be constructed from concrete or masonry.

#### Internal columns

In the Class 9 Homebase Building, in the storey immediately below the roof, internal columns and internal walls other than fire walls and shaft walls, need not be provided with a fire resistance level.

As stated previously this concession does not extend to the columns incorporated into the external wall as they are not deemed to be internal.

#### Homebase Building – Floor FRL

In the Class 9b Homebase Building, a floor separating storeys must-

(i) be constructed so that it is at least of the standard achieved by a floor/ceiling system incorporating a ceiling which has a resistance to the incipient spread of fire to the space above itself of not less than 60 minutes; or

(ii) have an FRL of at least 30/30/30; or

(iii) have a fire-protective covering on the underside of the floor, including beams incorporated in it, if the floor is combustible or of metal.



As stated above the columns incorporated into the external walls that are within 18m of a fire source feature (eastern boundary and the hall) are required to have an FRL of 120/-/-. If the columns on level 1 rely on the slab for support the slab is required to be provided with the same FRL and the FRL of the slab is required to be stated on the final documents.

#### <u>Roof</u>

The roof of all the proposed buildings are not required to be fire rated.

#### Lightweight construction

Lightweight construction used to provide an FRL must comply with Clause C1.8, Clause C3.17 and Specification C1.8 of the Building Code of Australia.

#### Non-combustible building elements

The external walls of the proposed 2 storey Type B Construction Homebase Building are required to be noncombustible i.e. be constructed of a material that is not deemed combustible by AS1530.1 1994 or has a CodeMark Certificate of Conformity confirming compliance to BCA CP2 and CP4.

Further details of the external walls (eg Codemark certificates) are required to be provided prior to design completion.

#### Fire Hazard Properties

All new floor, wall and ceiling linings are required to comply with the requirements of Clause C1.10 and Specification C1.10 of Building Code of Australia 2019.

Provide the laboratory test results for the fire hazard indices of the proposed timber flooring prior to the completion of the design.

#### Performance of external walls in fire

Concrete external walls that could collapse as complete panels (e.g. tilt-up and pre-cast concrete), in a building having a rise in storeys of not more than 2, must comply with BCA Specification C1.11.

#### Ancillary elements

An ancillary element (i.e. an element that is secondary to and not an integral part of another element to which it is attached) must not be fixed, installed or attached to the internal parts or external face of an external wall that is required to be non-combustible unless it is also non-combustible or one of the permitted elements listed under BCA clause C1.14.

#### Compartmentation - Admin Building

The Building Code of Australia 2019 requirement for a Type C Class 5 building is that the maximum floor area of each fire compartment must not exceed 3,000m<sup>2</sup> and the maximum volume must not exceed 18,000m<sup>3</sup>. The proposed size of the Admin Building is not proposed to exceed these limitations.

#### Compartmentation - Hall Building

The Building Code of Australia 2019 requirement for a Type C Class 7b & 9b building is that the maximum floor area of each fire compartment must not exceed 2,000m<sup>2</sup> and the maximum volume must not exceed 12,000m<sup>3</sup>. The Hall Building is not proposed to exceed these limitations.

#### Compartmentation - Homebase Building

The Building Code of Australia 2019 requirement for a Type B Class 9b building is that the maximum floor area of each fire compartment must not exceed 5,500m<sup>2</sup> and the maximum volume must not exceed 33,000m<sup>3</sup>. The Homebase Building is not proposed to exceed these limitations.

#### Compartmentation - Design Development

The size of the buildings fire compartments will continue to be assessed as the design is developed.

#### Lift Shaft

As the lift shaft does not connect more than 2 storeys it is not required to be fire rated.



#### **Boilers**

Any rooms that contain boilers must be fire separated from the remainder of the building by construction that achieves an FRL of at least 2 hours.

**Boiler** means a vessel or an arrangement of vessels and interconnecting parts, wherein steam or other vapour is generated, or water or other liquid is heated at a pressure above that of the atmosphere, by the application of fire, the products of combustion, electrical power, or similar high temperature means, and—

(a) includes superheaters, reheaters, economisers, *boiler* piping, supports, mountings, valves, gauges, fittings, controls, the *boiler* settings and directly associated equipment; but

(b) excludes a fully flooded or pressurised system where water or other liquid is heated to a temperature lower than the normal atmospheric boiling temperature of the liquid.

#### Battery Rooms

Any rooms that contain a battery or batteries that have a voltage exceeding 24 volts and a capacity exceeding 10 ampere hours (eg UPS) must be fire separated from the remainder of the building by construction that achieves an FRL of at least 2 hours.

#### Electricity supply equipment

If the main switchboard sustains emergency equipment operating in the emergency mode it must be separated from the remainder of the building by construction having an FRL of not less than 120/120/120 and have any door protected with a self closing fire door having an FRL of not less than -/120/30.

Emergency equipment operating in the emergency mode includes any fire indicator panel.

It is noted that the MSB is located in the Hall Building and as it is not required to be provided with smoke detection or an FIP the BCA does not require it to be enclosed in fire rated construction. We note however that the design shows an FRL of 120/120/120 specified to the MSB room. Please provide details of the fire rated ceiling as the roof elements are not permitted to span across the fire rated walls.





The BCA only requires the walls separating the MSB room from the remainder of the building to be fire rated. If the ESFG requires all enclosing walls to be fire rated (as documented) then the louvers shown on ME-B-300(01) are also required to be fire rated.

#### Openings in floors and ceilings for services - Homebase Building

Where a service passes through the fire rated floor of the 2 storey Type B Construction Homebase building the service must be protected by a shaft that will not reduce the fire performance of the building elements it penetrates or in accordance with BCA Clause C3.15 and BCA Specification C3.15.

The kiln exhaust is required to be contained within a shaft that has an FRL of 30/30/30 from both sides that goes to the underside of the roofsheeting.



#### metrobc.com.au

Address: Suite 102, 12 Mount Street, North Sydney NSW 2060 | Email: admin@metrobc.com.au | Phone: (02) 9692 8477 | Fax: (02) 8209 4955



The fire damper specified to the toilets exhaust penetration of the level 1 slab shown on drawing ME-D-300(01) is noted.



#### **Openings for Services Penetrations**

Openings for services penetrations in any fire rated construction must be fire sealed in accordance with the requirements of BCA Clause C3.15 and Specification C3.15.

#### 4.0 Egress

#### **Principles**

The building's egress system should be designed to ensure compliance with the following principles:

- At least one exit is required from the Admin Building and one from the Hall Building.
- At least two exits are required from each storey of the Homebase Building.
- The maximum distance of travel to an exit will be 40 metres, and to a point of choice will be 20 metres, the distance between alternate exits is not to exceed 60 metres.
- The distance between alternate exits is to be not less than 9 metres.
- The construction and discharge of exits, landings, thresholds, balustrades and handrails are required to meet the requirements of the BCA.
- All paths of travel are to be a minimum of 1000mm in clear width.
- Exit doors are required to swing in the direction of travel ie outwards and are required to have a minimum clear width of 750mm (850mm for accessible doors).
- All doors are required to be free passage from the side that a person is seeking egress.
- The threshold of all doors must be flush or provided with a threshold or kerb ramp.
- Handrails along stairs and ramps are required to have a minimum height of 865-1000mm.
- Handrails in Class 9b buildings used as a primary school are required to have a second handrail fixed at a height between 665 mm and 750 mm.
- Balustrades are required to have a minimum height of 865mm along stair flights and 1m along landings and walkways where the drop is greater than 1m.
- Balustrades protecting a drop of more than 1m are not permitted to have an opening greater than 125mm.
- Balustrades protecting a drop of more than 4m are not permitted to have any horizontal or near horizontal elements between 150mm and 760mm above the floor that facilitates climbing. (Note that this clashes with the requirement for a handrail at a height of 665-750mm to the stairs serving the Homebase Building.)
- The balustrade provisions apply to the tops of all new retaining walls that form part of or are directly associated with a delineated path of access to a building from the road, or a delineated path of access between buildings.
- Electrical, comms or mechanical distribution boards installed along a path of travel to an exit are required to be enclosed by non-combustible construction or a fire protective covering with doorways or openings suitably sealed against smoke spreading from the enclosure.

#### Number of exits

The Homebase Building is required to be provided with at least two exits per storey as they accommodate more than 50 persons per storey. The current design shows multiple exits serving both storeys.



#### Egress

Please provide the furniture layouts so that the travel distances can be assessed in C1 on the upper ground level.



It is noted that the swing door to the Library on the Ground Level (upper level) of the Homebase Building is provided with a fire trip so that it can act as an egress route from the walkway side as it is required for egress.



#### **Breakout Spaces**

The breakout spaces in the Homebase Building are required to be provided with door hardware that provides free passage egress from breakout space side of the door.



#### <u>Dimensions of exits and paths of travel</u> The BCA states that all paths of travel are required to have a minimum clear width of 1m.



The clear width of the two stairs to the stage are required to be at least 1m after the installation of the two handrails. The dimensions should be provided on the plans and currently there is little tolerance provided for.



#### Discharge from exits

The path of travel from the discharge point of the proposed exits to the road must have an unobstructed width throughout of not less than 1m to a road or open space.

If an exit discharges to open space that is at a different level than the public road to which it is connected a path of travel to the road must be a ramp not steeper than 1:8 at any part or not steeper than 1:14 if required by required by part D3 of the BCA or a stairway complying with the deemed-to-satisfy provisions of the BCA. The treads of the stairs serving the library in the Homebase Building are required to be a constant dimension and not as shown below.

#### Installations in exits and paths of travel

Electrical, comms or mechanical distribution boards installed along a path of travel to an exit are required to be enclosed by non-combustible construction or a fire protective covering with doorways or openings suitably sealed against smoke spreading from the enclosure.

#### Enclosure of space under stairs and ramps

The space below a required stairs must not be enclosed to form a cupboard or other enclosed space unless the enclosing walls and ceilings have an FRL of not less than 60/60/60 and any access doorway to the enclosed space is fitted with a self-closing –/60/30 fire door.

The sports store under stair 8 is enclosed and is required to be provided with an FRL of 60/60/60. This FRL is required to be stated on the drawings. (Refer to comments under ceiling heights about the underside of this stairs.)



#### Stairs

The proposed stairs are required to be provided with risers and goings that have a constant dimension throughout the flight and with a handrail with a height of 865-1000mm.

The BCA states that risers are not permitted to have any openings that would allow a 125mm sphere to pass through between the treads.



The treads or nosing strips of the proposed external stairs must have a slip-resistance classification not less than P4 when tested in accordance with AS 4586 2013.

The treads or nosing strips of the proposed internal stairs must have a slip-resistance classification not less than P3 when tested in accordance with AS 4586 2013.

Stair 3 and 4 are required to be redesigned so that the treads have a constant dimension. Provide further details for review.



#### Landings

Proposed landings are required to have a maximum gradient of 1:50 and must be not less than 750mm long, and where this involves a change in direction, the length is measured 500mm from the inside edge of the landing.

The edge of any proposed landings or the nosing strips of the proposed new landings must have a slipresistance classification not less than P4 when wet and P3 when dry when tested in accordance with AS 4586 2013.

The compliance of all the stair landings will be continually assessed as the design is developed.

#### Door thresholds

The threshold of a doorway must not incorporate a step or ramp at any point closer to the doorway than the width of the door leaf unless it is provided with a threshold ramp or step ramp in accordance with AS1428.1 2009.

Provide internal and external FFL's on the final design drawing showing that there are level thresholds across all doorways. Please confirm how the 100mm difference is made up across the ground floor slab.







#### **Balustrades**

A balustrade with a minimum height of 1m is required to be provided to protect a fall of more than 1m eg 1100mm.

A balustrade with a minimum height of 865mm is required to be provided alongside any stairs or ramps that protect a drop of more than 1m.

A balustrade with a minimum height of 1m is required to be provided to a retaining wall if the retaining wall forms part of, or is directly associated with a delineated path of access to a building from the road, or a delineated path of access between buildings.

A balustrade with a minimum height of 865mm is required to be provided alongside landings to stairs or ramps that protect a drop of more than 1m and that have a length not exceeding 500mm. Where the landing length exceeds 500mm the balustrade is required to have a minimum height of 1m.

The balustrades to all communication stairs and protecting drops of more than 1m are required to not have any openings greater than 125mm and a construction tolerance should be added e.g. 100mm.

As the balustrades that protect the stairs serving the ground floor (upper level) of the Homebase Building protect a fall of more than 4m the balustrade is not permitted to have any horizontal or near horizontal elements between 150 mm and 760 mm above the floor that facilitates climbing.

The barrier climbability requirements state that 'any horizontal or near horizontal elements between 150 mm and 760 mm above the floor must not facilitate climbing'. Where a balustrade protects a drop of more than 4m above the surface beneath if the proposal is to measure the climbability above the upper handrail rather than the floor this is required to be addressed in a performance solution. Where a balustrade does not protect a drop of more than 4m above the surface beneath (such as the detail below) the BCA balustrade climbability requirements do not apply.



#### metrobc.com.au

Address: Suite 102, 12 Mount Street, North Sydney NSW 2060 | Email: admin@metrobc.com.au | Phone: (02) 9692 8477 | Fax: (02) 8209 4955



As the proposed design shows a height of exactly 4m (ie not more than 4m) the BCA balustrade climbability requirements do not apply and a performance solution is not required for the BCA Crown Works Certificate.

Prior to the completion of the works and prior to the issue of the BCA Completion Certificate we will request RCC to building a survey of the finished FFL's at the top of Stairs 3, 4 & 5 to determine if the balustrades protect a drop of more than 4m. If they do a performance solution will be required to address the height of the balustrade being measured above the upper handrail and not above the floor.

Provide additional details of the balustrade shown on landscaping drawing LWD-501(4)



Provide the balustrade workshop drawings for review so that we can assess the proposed balustrade fixings for compliance eg height of bolt connections between balustrade panels etc.

#### Handrails

Handrails are required to be provided along a least one side of stairs and ramps and are required to have a height of 865-1000mm. The recommended height for this handrail is 900mm.

The stairs in the landscaping that show the handrail in the middle of the stairs are required to be modified to show the handrail along one side. Note the comments in the access report stating that handrails are required to both sides. If the handrails remain in the middle of the stairs they are required to be addressed in a performance solution prior to the issue of the BCA Crown Works Certificate.





The BCA states that handrails are required to be located along each side if the total width of the stairway or ramp is 2m or more.

Stair 5 from landscaping drawing LWD-104(5) an the stair between the Admin and the Hall have a width of more than 2m and are required to be provided with a handrail to both sides of the stair. Please consider changing the numbers of the stairs to avoid duplication as stair 5 is also the internal stair serving homebase cluster C2.





Handrails in Class 9b buildings used as a primary school are required to have a second handrail fixed at a height between 665 mm and 750 mm. The recommended height for this handrail is 700mm.

Please clarify why the handrail to the library stair is not located on the edge of the stair.



Handrails are required to be continuous between stair flight landings and have no obstruction on or above them that will tend to break a hand-hold.

#### Fixed platforms, walkways, stairways and ladders

A fixed platform, walkway, stairway, ladder and any going and riser, landing, handrail or barrier attached thereto may comply with AS 1657 2018 in lieu of BCA Clauses D2.13, D2.14, D2.16 and D2.17 if it only serves machinery rooms, boiler houses, lift-machine rooms, plant-rooms and the like.

The final design documents are required to include details of any AS1657 ladders etc that are required to access to any plant room / space.

#### Swinging Doors

A swinging door in a required exit or forming part of a required exit is required to swing in the direction of egress.

#### Door hardware

The door hardware to all proposed swing doors must be readily openable without a key from the side that faces a person seeking egress by:



- a single hand downward action on a single device which is located between 900 mm and 1.1 m from the floor and be such that the hand of a person who cannot grip will not slip from the handle during the operation of the latch and have a clearance between the handle and the back plate or door face at the centre grip section of the handle of not less than 35 mm and not more than 45mm or
- a single hand pushing action on a single latch operation device which is located between 900 mm and 1.2 m from the floor.

Note that the sliding doors in the path of travel to an exit must be readily openable without a key from the side that faces a person seeking egress, by a single hand downward action on a single device which is located between 900 mm and 1.1 m from the floor be such that the hand of a person who cannot grip will not slip from the handle during the operation of the latch and have a clearance between the handle and the back plate or door face at the centre grip section of the handle of not less than 35 mm and not more than 45 mm. This requires the sliding doors to be provided with a lever handle as well as a 'D' pull handle.

#### 5.0 Accessibility

All works are required to comply with the requirements of Part D3 of Building Code of Australia 2019 and the relevant parts of AS1428.1 2009 and AS1428.4.1 2009. For further details please refer to the separate DDA report.

#### 6.0 Services and Equipment

The following is a status of the services required to be provided to the buildings.

Fire Hydrants

Fire hydrant coverage is required to be provided to the Hall Building and the Homebase Building in accordance with AS2419.1-2005 as they are greater than 500m2.

The Admin Building has a floor area of less than 500m2 and is not required to be provided with fire hydrant coverage.

The developed design drawing are required to show compliance with the fire hydrant booster location requirements including that if remote from the building (served), the booster shall be—

- (i) at the boundary of the site and be within sight of the main entrance of the building;
- (ii) adjacent to the principal vehicular access to the site; and
- (iii) located not less than 10 m from the external wall of any building served

Currently the booster is not within sight of the entrance to the Homebase Building and due to landscaping may not be visible from the entrance to the Hall Building.



#### metrobc.com.au

Address: Suite 102, 12 Mount Street, North Sydney NSW 2060 | Email: admin@metrobc.com.au | Phone: (02) 9692 8477 | Fax: (02) 8209 4955



The fire hydrant to the west of Stair 4 is required to be located at least 10m from the stair as it is required for egress and considered part of the building.



Provide revised hydrant coverage drawings for review.

Provide confirmation that the fire hydrants are used as attack hydrants and not feed hydrants. If feed hydrants confirm that the brigade appliance can be located at least 10m from the building.

Provide confirmation that the fire hydrant line that goes through the homebase building is below ground. If above ground it is required to be provided with protection as the building is not sprinkler protected.



The hydrant standard requires attack hydrants to be located within 50m of a hardstand and it states that a hardstand is an identifiable and clearly marked trafficable all-weather pavement providing access and capable of supporting a fire brigade pumping appliance during firefighting operations. Provide confirmation of the compliance of the western hydrant serving the homebase building.



#### metrobc.com.au

Address: Suite 102, 12 Mount Street, North Sydney NSW 2060 | Email: admin@metrobc.com.au | Phone: (02) 9692 8477 | Fax: (02) 8209 4955


#### Fire Hose-Reels

Fire Hose Reel coverage is not required to the Admin Building as it has a floor area of less than 500m2.

Fire Hose Reel coverage is required to the Hall Building as it has a floor area of more than 500m2.

The BCA does not require fire hose reel coverage to the classrooms and associated corridors in primary schools ie the classrooms and corridors in the Homebase Building.

Fire Hose Reel coverage is required to the library as it is in a building with a floor area of more than 500m2.

The door from the library to the external walkway is not an exit door as it does not lead to a road or open space. The exit from the library is the top riser of the internal stairs to the lower ground and the FHR should be located within 4m of it.



The door from the Hall to the COLA is not the exit door from the Hall as it does not open to the sky. The exit is the edge of the roof line and the FHR should be located within 4m of the roof line.



#### Portable Fire Extinguishers

Portable fire extinguishers must be provided in accordance with BCA Clause E1.6 and AS 2444 2001.

#### Smoke hazard management

The NSW Variation of the BCA states that Class 9b assembly buildings (eg schools) are required to be provided with automatic shutdown of any air-handling system (other than non-ducted individual room units with a capacity not more than 1000 l/s and miscellaneous exhaust air systems installed in accordance with Sections 5 and 6 of AS 1668.1 2015) on the activation of smoke detectors installed complying with Clause 6 of BCA Specification E2.2a and any other fire detection and alarm system.

#### metrobc.com.au

Address: Suite 102, 12 Mount Street, North Sydney NSW 2060 | Email: admin@metrobc.com.au | Phone: (02) 9692 8477 | Fax: (02) 8209 4955



Clause 6 of BCA Specification E2.2a states that detectors must be spaced not more than 20m apart and not more than 10m from any wall, bulkhead or smoke curtain and have a sensitivity in accordance with AS1670.1 2018.

Smoke hazard management - Stages

The NSW Variation of the BCA states that a building or part of a building used as an assembly building which has a stage—

(A) with a floor area of more than 50 m2 and not more than 150 m2 must, over the stage, be provided with (aa) an automatic smoke exhaust system complying with Specification E2.2b (including Figure 2); or (ab) roof mounted automatic smoke-and-heat vents complying with NSW H101.22, in a single storey building or the top storey of a multi storey building.

NSW H101.22 Automatic smoke-and-heat vents for stages

An automatic smoke-and-heat vent system required by NSW Table E2.2b "Stages and backstage" must— (a) be capable of automatic operation by the inclusion of a heat sensing device designed to activate the system at a temperature of not more than 71°C; and

(b) be capable of being released manually from positions at each side of the stage and of being fully activated from either position; and

(c) have a notice, prominently displayed at each position referred to in (b), clearly indicating the method of activation; and

(d) have an openable area of not less than 1/10 of the total area of the stage

Stage means a floor or platform in a Class 9b building on which performances are presented before an audience.

Drawing DR-A-B1001(9) states that the performance area of the stage has a floor area of 49m2 and therefore smoke and heat vents are not required to be provided.



### Lift

A warning sign is required to be provided to the passenger lift ie Do not use lifts if there is a fire.

Handrails are required to be provided to the lift in accordance with the requirements of AS1735.12 1999.



### Emergency Lighting and Exit Signs

Exit signs and an emergency lighting system must be provided and must be in accordance with the BCA Clause E4.2, E4.4, E4.5, E4.6, E4.8 and AS 2293.1 2005.

The note referring to the exit signs be installed to the requirements of AS2293 includes the requirement that the exit signs be located at a maximum height of 2700mm from FFL to the top of the exit signs. Exit signs fixed to the underside of the ceiling or roof located higher than 2700mm will be requested to be lowered.

# 2. ALL EXIT SIGNAGE SHALL BE INSTALLED IN ACCORDANCE WITH AS2293

Additional exit signs are required to be provided in the Hall Building.

Emergency lighting is required to be provided to the communal space in the Hall Building.



Emergency lighting is required to be provided to the reception in the Admin Building as it is a part of the path of travel to an exit.



### metrobc.com.au

Address: Suite 102, 12 Mount Street, North Sydney NSW 2060 | Email: admin@metrobc.com.au | Phone: (02) 9692 8477 | Fax: (02) 8209 4955

20213-Wps-Bca R02-301020r1



The exit signs circled in the lower ground mark up below are required to be removed and the exit sign in boxes in the mark up below are required to be added.



The exit signs in boxes in the upper ground mark up below are required to be added. The emergency lights (EM) in boxes in the upper ground mark up below are required to be added.



### metrobc.com.au

Address: Suite 102, 12 Mount Street, North Sydney NSW 2060 | Email: admin@metrobc.com.au | Phone: (02) 9692 8477 | Fax: (02) 8209 4955



The emergency lights (EM) in boxes in the lower ground and upper ground mark ups below are required to be added because the BCA states that non fire isolated stairs that are required for egress are required to be provided with emergency lighting.



### 7.0 Health and Amenity

#### Damp & weatherproofing

The roof and external walls of the proposed buildings are required to comply with BCA Performance Requirement FP1.4.

Where a wall cladding is proposed it is required to have a CodeMark Certificate of Conformity confirming compliance to BCA FP1.4.

Provide the CodeMark Certificate of Conformity for review prior to the completion of the design.

#### Stormwater drainage

Stormwater drainage must comply with AS/NZS 3500.3 2018.

#### Roof coverings

The proposed roofs must be covered with:

- concrete roofing tiles complying with AS 2049 2002 and fixed, except in cyclonic areas, in accordance with AS 2050 2018, as appropriate; or
- terracotta roofing tiles complying with AS 2049 2002 and fixed, except in cyclonic areas, in accordance with AS 2050 2018; or
- cellulose cement corrugated sheeting complying with AS/NZS 2908.1 2000 and installed in accordance with AS/NZS 1562.2 1999; or
- metal sheet roofing complying with AS 1562.1 2018; or



- plastic sheet roofing designed and installed in accordance with AS/NZS 4256 Parts 1, 2, 3 1994 and 5 1996 and AS/NZS 1562.3 1996; or
- terracotta, fibre-cement and timber slates and shingles designed and installed in accordance with AS 4597 1999, except in cyclonic areas.

### Waterproofing of wet areas

Building elements in bathroom or shower room, a sink compartment, a laundry or sanitary compartment must—

(i) be water resistant or waterproof in accordance with BCA Table F1.7; and

(ii) comply with AS 3740 2010.

Where a wall hung urinal is installed—

(i) the wall must be surfaced with impervious material extending from the floor to not less than 50 mm above the top of the urinal and not less than 225 mm on each side of the urinal.

(ii) the floor must be surfaced with impervious material and graded to a floor waste

In a room with timber or steel framed walls and containing a urinal-

(i) the wall must be surfaced with an impervious material extending from the floor to not less than 100 mm above the floor surface; and

(ii) the junction of the floor surface and the wall surface must be impervious.

### Damp-proofing

Moisture from the ground must be prevented from reaching-

(i) the lowest floor timbers and the walls above the lowest floor joists; and

(ii) the walls above the damp-proof course; and

(iii) the underside of a suspended floor constructed of a material other than timber, and the supporting beams or girders.

Where a damp-proof course is provided, it must consist of-

(i) a material that complies with AS/NZS 2904 1995; or

(ii) impervious sheet material in accordance with AS 3660.1 2000 or 2014.

### Damp-proofing of floors on the ground

If a floor of a room is laid on the ground or on fill, moisture from the ground must be prevented from reaching the upper surface of the floor and adjacent walls by the insertion of a vapour barrier in accordance with AS 2870 2011, except damp-proofing need not be provided if—

(a) weatherproofing is not required; or

(b) the floor is the base of a stair, lift or similar shaft which is adequately drained by gravitation or mechanical means.

### Subfloor ventilation

Subfloor spaces must be provided with openings in *external walls* and internal subfloor walls in accordance with BCA Table F1.12 for the climatic zones given in BCA Figure F1.12 and have clearance between the ground surface and the underside of the lowest horizontal member in the subfloor in accordance with BCA Table F1.12.

#### Glazed assemblies

The following glazed assemblies in an external wall, must comply with AS 2047 2014 requirements for resistance to water penetration:

- Windows.
- Sliding and swinging glazed doors with a frame, including french and bi-fold doors with a frame.
- Adjustable louvres.
- Window walls with one piece framing



### <u>Toilets</u>

Please provide details of the proposed population so that a review can be carried out on the number of toilets provided.

Note that separate toilets must be provided for male and female. This requires the staff and student toilets to be labelled either male or female, they cannot be labelled unisex unless a performance solution is provided.

#### Showers

The BCA states that Class 9b theatres and sporting venues must be provided with one shower for each 10 participants or part thereof.

#### Construction of sanitary compartments

Sanitary compartments must have doors and partitions that separate adjacent compartments and extend to a height of not less than 1.5m above the floor if primary school children are the principal users.

The door to a fully enclosed sanitary compartment must open outwards or slide or be readily removable from the outside of the sanitary compartment.

#### Room Sizes

The BCA states that the ceiling height in a theatre, public hall or other assembly building or part that accommodates more than 100 persons must be not less than 2.7m.

The BCA states that all classrooms, offices and the kitchen are required to have a minimum ceiling height of 2.4m.

The BCA states that the storerooms and sanitary compartments are required to have a minimum ceiling height of 2.1m.

The ceiling height of the sports store under the stairs from the library in the Homebase Building is required to be a minimum height of 2.1m which means that the underside of the stair must be partitioned off from the rest of the room. Provide revised drawings showing the restriction of the sports store to areas where a ceiling height of 2.1m is achieved.



#### Natural lighting

The BCA states that natural light complying with BCA clause F4.2 is required to be provided to all generalpurpose classrooms in primary schools.

Required natural light must be provided by windows that have an aggregate light transmitting area measured exclusive of framing members, glazing bars or other obstructions of not less than 10% of the floor area of the room and are open to the sky or face a court or other space open to the sky or an open verandah, carport or the like.



The windows to homebase 3 in C3 on the lower ground floor do not open to the sky or face an open verandah as the window opens to the toilets.



The windows to homebase 3 in C1 on the upper ground floor do not open to the sky or face an open verandah as the window opens to homebase 2 and the practical activities area.



The windows to homebase 2 in C2 on the upper ground floor do not open to the sky or face an open veranda as the window opens to homebase 3 and the circulation area.





The windows to homebase 3 in C3 on the upper ground floor do not open to the sky or face an open verandah as the window opens to the toilets.





### Light and Ventilation

Artificial lighting must be provided to all rooms that are frequently occupied, all spaces required to be accessible, all corridors, lobbies, other circulation spaces and paths of egress. The artificial lighting system must comply with AS/NZS 1680.0 2009.

All areas of the buildings, except the store rooms, must be provided with natural ventilation complying with BCA Clause F4.6 or mechanical ventilation complying with AS 1668.2 2012.

Natural ventilation requires an opening of size no less than 5% of the floor area of the room.

The mechanical services designer is required to confirm that the canteen office is provided with compliant supply air borrowed from the adjacent canteen via the D1 (600 x 200) door grille. The floor area of the office is 46m2 and the door has an approx. area of 1.8m2 ie less than 10% of the area of the office. The confirmation is required to include details of the size of the openings in the adjacent room ie the canteen.



The mechanical services designer is required to confirm that the location of the toilet exhaust in C1 on the Lower Ground Level complies with the requirements of AS1668.2 2012, including the requirement of clause 3.10.2 which requires the discharge to be to the outside considering that the space outside the toilet is not external as it is entirely covered by the upper ground floor slab. In addition the designer is to confirm that the intake and exhaust locations comply with AS1668.2 2012.







#### Kitchen Exhaust

Any kitchens must be provided with a kitchen exhaust hood complying with AS/NZS 1668.1 2015 and AS 1668.2 2012 where:

(a) any cooking apparatus has—

(i) a total maximum electrical power input exceeding 8 kW; or

(ii) a total gas power input exceeding 29 MJ/h; or

(b) the total maximum power input to more than one apparatus exceeds-

(i) 0.5 kW electrical power; or

(ii) 1.8 MJ gas, per m2 of floor area of the room or enclosure.

Note that any kitchen exhaust ducts are required to be provided with access panels so that the duct's can be cleaned.

If the canteen is provided with cooking apparatus or a total maximum power input as stated above a kitchen exhaust system complying with AS/NZS 1668.1 2015 and AS 1668.2 2012 is required to be provided.

#### **Boilers**

Any boilers provided in the buildings must comply with BCA Clause G2.2 and Specification G2.2. The definition of a boiler is as follows.

**Boiler** means a vessel or an arrangement of vessels and interconnecting parts, wherein steam or other vapour is generated, or water or other liquid is heated at a pressure above that of the atmosphere, by the application of fire, the products of combustion, electrical power, or similar high temperature means, and—

(a) includes superheaters, reheaters, economisers, *boiler* piping, supports, mountings, valves, gauges, fittings, controls, the *boiler* settings and directly associated equipment; but

(b) excludes a fully flooded or pressurised system where water or other liquid is heated to a temperature lower than the normal atmospheric boiling temperature of the liquid.

### 8.0 Class 9b Buildings

The BCA states that the requirements of Part H1 of the BCA apply to every enclosed Class 9b building or part of a building which—

- is a school assembly, church or community hall with a stage and any backstage area with a total floor area of more than 300 m2; or
- otherwise, has a stage and any backstage area with a total floor area of more than 200m2; or
- has a stage with an associated rigging loft.



In addition to the above requirements, the BCA states that the following requirements of BCA clause H1.4 and H1.7 applies to every open or enclosed Class 9b building.

#### Seating Area

In a seating area the gradient of the floor surface must not be steeper than 1 in 8, or the floor must be stepped so that —

- a line joining the nosings of consecutive steps does not exceed an angle of 30° to the horizontal; and
- the height of each step in the stepped floor is not more than 600mm; and
- the height of any opening in such a step is not more than 125mm; and

#### Aisle Lights

In every enclosed Class 9b building, where in any part of the auditorium, the general lighting is dimmed or extinguished during public occupation and the floor is stepped or is inclined at a slope steeper than 1 in 12, aisle lights must be provided to illuminate the full length of the aisle and tread of each step.

The tiered seating area in the library has been removed from the scope and the above requirements no longer apply to the project.

### 9.0 Energy Efficiency

As the tender date was December 2019 the Section J requirements from BCA 2016 Amendment 1 can be applied.

#### Building Fabric

The BCA 2016 Amendment 1 Section J Building Fabric requirements apply to building elements forming the envelope of a Class 9b building.

Envelope means the parts of a building's fabric that separate a conditioned space or habitable room from:

- the exterior of the building; or
- a non-conditioned space including-
  - > the floor of a rooftop plant room, lift-machine room or the like; and
  - > the floor above a carpark or warehouse; and
  - > the common wall with a carpark, warehouse or the like

Conditioned space means a space within a building, including a ceiling or under-floor supply air plenum or return air plenum, where the environment is likely, by the intended use of the space, to have its temperature controlled by air-conditioning, but does not include—

(b) a space in a Class 6, 7, 8 or 9b building where the input energy to an airconditioning system is not more than 15 W/m2 or 15 J/s.m2 (54 KJ/hour.m2); or

Air-conditioning means a service that actively cools or heats the air within a space, but does not include a service that directly

(a) cools or heats cold or hot rooms; or

(b) maintains specialised conditions for equipment or processes, where this is the main purpose of the service.

The proposed building is required to comply with the building fabric requirements of Part J1 of the Building Code of Australia 2016 Amendment 1.

#### Glazing

The BCA 2016 Amendment 1 Section J Glazing requirements apply to elements forming the envelope of a Class 9b building.

The proposed building is required to comply with the glazing requirements of Part J1 of the Building Code of Australia 2016 Amendment 1.



### **Building Sealing**

The BCA 2016 Amendment 1 Section J Building Sealing requirements apply to building elements forming the envelope of a Class 9b building other than:

- a building in climate zones 1, 2, 3 and 5 where the only means of air-conditioning is by using an evaporative cooler; or
- a permanent building opening, in a space where a gas appliance is located, that is necessary for the safe operation of a gas appliance; or
- a building or space where the mechanical ventilation required by Part F4 provides sufficient pressurisation to prevent infiltration.

Envelope means the parts of a building's fabric that separate a conditioned space or habitable room from:

- the exterior of the building; or
- a non-conditioned space including—
  - > the floor of a rooftop plant room, lift-machine room or the like; and
  - > the floor above a carpark or warehouse; and
  - > the common wall with a carpark, warehouse or the like

Conditioned space means a space within a building, including a ceiling or under-floor supply air plenum or return air plenum, where the environment is likely, by the intended use of the space, to have its temperature controlled by air-conditioning, but does not include—

(b) a space in a Class 6, 7, 8 or 9b building where the input energy to an airconditioning system is not more than 15 W/m2 or 15 J/s.m2 (54 KJ/hour.m2); or

Air-conditioning means a service that actively cools or heats the air within a space, but does not include a service that directly

(a) cools or heats cold or hot rooms; or

(b) maintains specialised conditions for equipment or processes, where this is the main purpose of the service.

The proposed building is required to comply with the building sealing requirements of Part J3 of the Building Code of Australia 2016 Amendment 1.

The bi-fold doors and possible manual sliding doors in the envelope of the homebase building that are not self closing do not comply with the BCA building sealing requirements and are required to be addressed in a performance solution.







If the doors in the envelope of the admin building highlighted below are not self closing they do not comply with the BCA building sealing requirements and are required to be addressed in a performance solution.



If the hall and canteen are a conditioned space and the doors and roller shutters highlighted below are not self closing they are required to be addressed in a performance solution.





If the doors in the envelope of the special program building highlighted below are not self closing they do not comply with the BCA building sealing requirements and are required to be addressed in a performance solution.



<u>Ventilation Systems, Artificial Lighting, Hot Water Supply</u> The design stage services consultants are required to incorporate the BCA 2016 Amendment 1 Section J requirements into the design documents.

### 10 0 Conclusion

The design documentation provided to date has been assessed in respect to the deemed to satisfy provisions of the Building Code of Australia 2019 excluding Section B structure, Part G5 bushfire, NSW Part H101 entertainment venues and Section J energy efficiency.

The design is at a point where the design can be finalised, further reviews are required to be carried out prior to the completion of the design.

### **APPENDIX A – DRAWINGS REVIEWED**

# Architectural drawings prepared by NBRS Architecture

| 20018 - Door Hardware Schedule         20018 ARRS-DR.4.2 (1002) [6] C2 TEACHING BUILDING           20018 - NBRS-DR.4.2 (1001 [6] C3 TEACHING BUILDING         LOWER GROUND PLAN           20018 - NBRS-DR.4.2 (1001 [6] C3 TEACHING BUILDING         LOWER GROUND PLAN           20018 - NBRS-DR.4.2 (1001 [6] C3 TEACHING BUILDING         EUCHER GROUND PLAN           20018 - NBRS-DR.4.2 (1001 [6] C3 TEACHING BUILDING         EUCHER GROUND PLAN           20018 - NBRS-DR.4.2 (1012 [6] C4 TEACHING BUILDING         EUCHER GROUND PLAN           20018 - NBRS-DR.4.2 (1021 [6] C4 TEACHING BUILDING         EUCHER GROUND PLAN           20018 - NBRS-DR.4.2 (1021 [6] C4 TEACHING BUILDING         EUCHER GROUND PLAN           20018 - NBRS-DR.4.2 (1021 [6] C4 TEACHING GROUND         EUCHER GROUND PLAN           20018 - NBRS-DR.4.2 (1021 [6] C4 TEACHING GROUND         EUCHER GROUND PLAN           20018 - NBRS-DR.4.2 (1021 [6] C4 TEACHING GROUND         EUCHER GROUND PLAN           20018 - NBRS-DR.4.2 (1021 [6] C4 TEACHING GROUND         EUCHER GROUND PLAN           20018 - NBRS-DR.4.2 (1021 [6] C4 TEACHING GROUND         EUCHER GROUND PLAN           20018 - NBRS-DR.4.2 (1021 [6] C4 TEACHING GROUND         EUCHER GROUND PLAN           20018 - NBRS-DR.4.2 (1021 [6] C4 TEACHING GROUND         EUCHING C4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Drawing number, name and revision               | Drawing number, name and revision                |  |  |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|--------------------------------------------------|--|--|--|--|
| LOWER GROUND PLAN         LOWER GROUND PLAN           20018-NBRS-DR-A0000 [5] COVER SHEET         20018-NBRS-AA-C1004 [6] GI TEACHING BUILDING           20018-NBRS-DR-A0010 [4] ACCOMMODATION         20018-NBRS-DR-AC1006 [6] OVERALL TEACHING           20018-NBRS-DR-A0010 [4] ACCOMMODATION         20018-NBRS-DR-AC1006 [6] OVERALL TEACHING           20018-NBRS-DR-A0010 [4] ACCOMMODATION         20018-NBRS-DR-AC1006 [5] CI TEACHING BUILDING           20018-NBRS-DR-A0010 [4] ACCOMMODATION         20018-NBRS-DR-AC1006 [5] CI TEACHING BUILDING           20018-NBRS-DR-A0100 [5] DEMOLITION PLAN         20018-NBRS-DR-AC1006 [5] CI TEACHING BUILDING           20018-NBRS-DR-A0200 [3] BUILDING SETOUT PLAN         20018-NBRS-DR-AC1001 [6] OVERALL TEACHING           20018-NBRS-DR-A0300 [7] OVERALL LOWER GROUND         20018-NBRS-DR-AC1001 [6] OVERALL TEACHING           20018-NBRS-DR-A-0300 [7] OVERALL DWER GROUND         20018-NBRS-DR-AC1004 [6] OVERALL TEACHING           20018-NBRS-DR-A-0300 [7] OVERALL DWER GROUND         20018-NBRS-DR-AC1004 [6] OVERALL TEACHING           20018-NBRS-DR-A-0300 [7] OVERALL DWER GROUND         20018-NBRS-DR-AC1004 [6] OVERALL TEACHING           20018-NBRS-DR-A-0300 [7] OVERALL DWER GROUND         20018-NBRS-DR-AC1004 [6] OVERALL TEACHING           20018-NBRS-DR-A-0300 [7] OVERALL DWER GROUND         20018-NBRS-DR-AC1004 [6] OVERALL TEACHING           20018-NBRS-DR-A-5101 [2] TYPICAL CONSTRUCTION         20018-NBRS-DR-AC1004 [6] OVERALL TEACHING                                                                                                                                                                                                                                                                                                                                                    | 20018 - Door Hardware Schedule                  | 20018-NBRS-DR-A-C1003 [5] C2 TEACHING BUILDING   |  |  |  |  |
| 20018-NBRS-DR-A-0000 [5] COVER SHEET         20018-NBRS-DR-A-C1006 [6] C3 TEACHING BUILDING           20018-NBRS-DR-A-0000 [5] COVER SHEET         20018-NBRS-DR-A-C1006 [6] C3 TEACHING BUILDING           20018-NBRS-DR-A-0101 [4] ACCOMMODATION         20018-NBRS-DR-A-C1006 [6] C1 TEACHING BUILDING           20018-NBRS-DR-A-0101 [4] ACCOMMODATION         20018-NBRS-DR-A-0100 [5] C2 TEACHING BUILDING           20018-NBRS-DR-A-0101 [5] DEMOLITION PLAN         20018-NBRS-DR-A-0100 [5] C2 TEACHING BUILDING           20018-NBRS-DR-A-0100 [5] DEMOLITION PLAN         20018-NBRS-DR-A-0100 [5] C2 TEACHING BUILDING           20018-NBRS-DR-A-0100 [5] DEMOLITION PLAN         20018-NBRS-DR-A-0100 [5] C2 TEACHING BUILDING           20018-NBRS-DR-A-0100 [5] DEMOLITION PLAN         20018-NBRS-DR-A-0100 [5] C2 TEACHING BUILDING           20018-NBRS-DR-A-0300 [7] OVERALL LOWER GROUND         20018-NBRS-DR-A-0100 [5] OVERALL TEACHING           20018-NBRS-DR-A-0300 [7] OVERALL LOWER GROUND         20018-NBRS-DR-A-0100 [5] OVERALL TEACHING BUILDING           20018-NBRS-DR-A-0300 [7] OVERALL LOWER GROUND         20018-NBRS-DR-A-0100 [1] OVERALL DEVEROND           20018-NBRS-DR-A-0301 [2] TYPICAL CONSTRUCTION         20018-NBRS-DR-A-0100 [1] OVERALL TEACHING BUILDING           20018-NBRS-DR-A-3001 [3] DOOR SCHEDULE - VISUAL         20018-NBRS-DR-A-01001 [2] CTEACHING BUILDING           20018-NBRS-DR-A-3001 [3] DOOR SCHEDULE - VISUAL         20018-NBRS-DR-A-01001 [2] CTEACHING BUILDING                   20018-NBRS-DR-A-3001 [3] DOOR SCHE                                                                                                                                                                                                                                                                                                  |                                                 | LOWER GROUND PLAN                                |  |  |  |  |
| LOWER GROUND PLAN           20018-NBRS-DR-A-0010 [4] ACCOMMODATION         20018-NBRS-DR-A-C1005 [6] OVERALL TEACHING           20018-NBRS-DR-A-0010 [4] ACCOMMODATION         20018-NBRS-DR-A-C1005 [6] OVERALL TEACHING BUILDING           20018-NBRS-DR-A-0120 [4] ACCOMMODATION         20018-NBRS-DR-A-C1007 [6] C TEACHING BUILDING           20018-NBRS-DR-A-0120 [5] DEMOLITION PLAN         20018-NBRS-DR-A-C1007 [6] C TEACHING BUILDING           20018-NBRS-DR-A-0200 [3] BUILDING SETOUT PLAN         20018-NBRS-DR-A-C1017 [6] OVERALL TEACHING           20018-NBRS-DR-A-0200 [3] BUILDING SETOUT PLAN         20018-NBRS-DR-A-C1017 [6] OVERALL TEACHING           20018-NBRS-DR-A-0200 [3] BUILDING SETOUT PLAN         20018-NBRS-DR-A-C1017 [6] OVERALL TEACHING           20018-NBRS-DR-A-0200 [3] DUIDING SETOUT PLAN         20018-NBRS-DR-A-C1017 [6] OVERALL TEACHING           20018-NBRS-DR-A-0300 [7] OVERALL LOWER GROUND         20018-NBRS-DR-A-C1050 [6] OVERALL TEACHING           20018-NBRS-DR-A-0300 [7] OVERALL LOWER GROUND         20018-NBRS-DR-A-C1050 [6] OVERALL TEACHING           20018-NBRS-DR-A-6300 [1] OVERALL LOWER GROUND         20018-NBRS-DR-A-C1050 [2] OVERALL TEACHING           20018-NBRS-DR-A-500 [3] DOOR SCHEDULE - VISUAL         20018-NBRS-DR-A-61050 [2] OVERALL TEACHING           20018-NBRS-DR-A-6100 [3] WINDOW SCHEDULE - 20018-NBRS-DR-A-C1050 [2] OVERALL TEACHING         20018-NBRS-DR-A-61050 [2] OVERALL TEACHING BUILDING           20018-NBRS-DR-A-4300 [3] DOOR SCHEDULE - 20018-NBRS-DR-A-C10507 [2] C TEACHING BUILDI                                                                                                                                                                                                                                                                                             | 20018-NBRS-DR-A-0000 [5] COVER SHEET            | 20018-NBRS-DR-A-C1004 [5] C3 TEACHING BUILDING   |  |  |  |  |
| 20018-NBRS-DR-A-0101 [4] ACCOMMODATION         20018-NBRS-DR-A-0100 [5] OVERALL TEACHING           20018-NBRS-DR-A-0101 [4] ACCOMMODATION         20018-NBRS-DR-A-0100 [5] C1 TEACHING BUILDING           20018-NBRS-DR-A-0101 [4] ACCOMMODATION         20018-NBRS-DR-A-0101 [5] C2 TEACHING BUILDING           20018-NBRS-DR-A-0101 [4] ACCOMMODATION         20018-NBRS-DR-A-0100 [5] C2 TEACHING BUILDING           20018-NBRS-DR-A-0200 [3] BUILDING SETOUT PLAN         20018-NBRS-DR-A-0100 [5] C3 TEACHING BUILDING           20018-NBRS-DR-A-0300 [7] OVERALL LOWER GROUND         20018-NBRS-DR-A-0301 [4] OVERALL LOWER GROUND           20018-NBRS-DR-A-0301 [4] OVERALL LOWER GROUND         20018-NBRS-DR-A-0301 [4] OVERALL UPPER GROUND           20018-NBRS-DR-A-0301 [4] OVERALL UPPER GROUND         20018-NBRS-DR-A-0301 [4] OVERALL UPPER GROUND           20018-NBRS-DR-A-0301 [4] OVERALL CONSTRUCTION         20018-NBRS-DR-A-0301 [4] OVERALL TACHING BUILDING CONS EFTOUT PLAN LOWER GROUND           20018-NBRS-DR-A-0301 [4] OVERALL CONSTRUCTION         20018-NBRS-DR-A-0301 [4] OVERALL TACHING BUILDING CONS EFTOUT PLAN LOWER GROUND           20018-NBRS-DR-A-0301 [4] OVERALL CONSTRUCTION         20018-NBRS-DR-A-0301 [4] CVERALL TACHING BUILDING CONS EFTOUT PLAN LOWER GROUND           20018-NBRS-DR-A-0301 [4] OVERALL TACHING BUILDING CONS EFTOUT PLAN LOWER GROUND         20018-NBRS-DR-A-0301 [6] CTEACHING BUILDING CONS EFTOUT PLAN LOWER GROUND           20018-NBRS-DR-A-6301 [3] MODOW SCHEDULE -         20018-NBRS-DR-A-0301 [6] CTEACHING BUILDING CONS EFTOUT PLAN LOWER GROUND                                                                                                                                                                                                                                                            |                                                 | I OWER GROUND PLAN                               |  |  |  |  |
| SCHEDULE SHEET 1         BUILDING UPPER GROUND PLAN           20018-NBRS-DR-A-0101 [4] ACCOMMODATION         20018-NBRS-DR-A-0102 [5] CT TEACHING BUILDING           20018-NBRS-DR-A-0102 [4] ACCOMMODATION         20018-NBRS-DR-A-0102 [5] CT TEACHING BUILDING           20018-NBRS-DR-A-0100 [5] DEMOLITION PLAN         20018-NBRS-DR-A-0100 [5] CT TEACHING BUILDING           20018-NBRS-DR-A-0200 [3] BUILDING SETOUT PLAN         20018-NBRS-DR-A-0200 [5] CT TEACHING BUILDING           20018-NBRS-DR-A-0200 [3] BUILDING SETOUT PLAN         20018-NBRS-DR-A-0300 [7] OVERALL LOWER GROUND           20018-NBRS-DR-A-0300 [7] OVERALL LOWER GROUND         20018-NBRS-DR-A-0301 [5] OVERALL TEACHING           20018-NBRS-DR-A-0301 [4] OVERALL UPPER GROUND         20018-NBRS-DR-A-0301 [4] OVERALL UPPER GROUND           20018-NBRS-DR-A-0301 [4] OVERALL UPPER GROUND         20018-NBRS-DR-A-0501 [2] TYPICAL CONSTRUCTION           20018-NBRS-DR-A-5101 [2] TYPICAL CONSTRUCTION         20018-NBRS-DR-A-5101 [2] TYPICAL CONSTRUCTION           20018-NBRS-DR-A-5100 [3] DOOR SCHEDULE - VISUAL         20018-NBRS-DR-A-5100 [3] OVER SCHEDULE - VISUAL           20018-NBRS-DR-A-6100 [3] DOOR SCHEDULE - VISUAL         20018-NBRS-DR-A-6100 [2] CT TEACHING BUILDING           20018-NBRS-DR-A-8100 [3] WINDOW SCHEDULE - 20018-NBRS-DR-A-C300 [3] CT TEACHING BUILDING         20018-NBRS-DR-A-6100 [2] CT TEACHING BUILDING           20018-NBRS-DR-A-81001 [3] WINDOW SCHEDULE - 20018-NBRS-DR-A-C3002 [6] CT TEACHING BUILDING           20018-NBRS-DR-A-81001 [3] WINDOW                                                                                                                                                                                                                                                                                              | 20018-NBRS-DR-A-0010 [4] ACCOMMODATION          | 20018-NBRS-DR-A-C1005 [9] OVERALL TEACHING       |  |  |  |  |
| 20018-NBRS-DR-A-0101 [4] ACCOMMODATION         20018-NBRS-DR-A-0100 [5] C1 TEACHING BUILDING           20018-NBRS-DR-A-0100 [5] DEMOLITION PLAN         20018-NBRS-DR-A-0100 [5] C3 TEACHING BUILDING           20018-NBRS-DR-A-0100 [5] DEMOLITION PLAN         20018-NBRS-DR-A-0100 [5] C3 TEACHING BUILDING           20018-NBRS-DR-A-0200 [3] BUILDING SETCUT PLAN         20018-NBRS-DR-A-0200 [3] DEMOLITION PLAN           20018-NBRS-DR-A-0200 [3] BUILDING SETCUT PLAN         20018-NBRS-DR-A-0200 [3] OVERALL LOWER GROUND           20018-NBRS-DR-A-0200 [3] OVERALL LOWER GROUND         20018-NBRS-DR-A-0200 [3] OVERALL LOWER GROUND           20018-NBRS-DR-A-0301 [4] OVERALL UPPER GROUND         20018-NBRS-DR-A-0301 [4] OVERALL UPPER GROUND           20018-NBRS-DR-A-0301 [4] OVERALL UPPER GROUND         20018-NBRS-DR-A-0301 [4] OVERALL UPPER GROUND           20018-NBRS-DR-A-5101 [2] TYPICAL CONSTRUCTION         20018-NBRS-DR-A-5101 [2] TYPICAL CONSTRUCTION           20018-NBRS-DR-A-5100 [3] DOOR SCHEDULE - VISUAL         20018-NBRS-DR-A-5100 [3] OVERSCHEDULE - VISUAL           20018-NBRS-DR-A-5100 [3] MINDOW SCHEDULE - VISUAL         20018-NBRS-DR-A-5100 [3] CON SCHEDULE - VISUAL           20018-NBRS-DR-A-6100 [3] MINDOW SCHEDULE - VISUAL         20018-NBRS-DR-A-100 [3] CON SCHEDULE - VISUAL           20018-NBRS-DR-A-6100 [3] MINDOW SCHEDULE - CONC SETCUT PLAN UPPER GROUND         20018-NBRS-DR-A-100 [3] CON SCHEDULE - VISUAL           20018-NBRS-DR-A-6100 [3] MINDOW SCHEDULE - CONC SETCUT PLAN UPPER GROUND         20018-NBRS-DR-A-100 [3] CON SCH                                                                                                                                                                                                                                                                            | SCHEDULE SHEET 1                                | BUILDING UPPER GROUND PLAN                       |  |  |  |  |
| SCHEDULE SHEET 2         UPPER GROUND PLAN           20018.NBRS-DR-A0120 [4] ACCOMMODATION         20018.NBRS-DR-AC1007 [5] C2 TEACHING BUILDING           20018.NBRS-DR-A0100 [5] DEMOLITION PLAN         20018.NBRS-DR-AC1007 [5] C2 TEACHING BUILDING           20018.NBRS-DR-A-0200 [3] BUILDING SETOUT PLAN         20018.NBRS-DR-AC1001 [6] OVERALL TEACHING           20018.NBRS-DR-A-0200 [3] BUILDING SETOUT PLAN         20018.NBRS-DR-AC101 [6] OVERALL TEACHING           20018.NBRS-DR-A-0301 [7] OVERALL LOWER GROUND         20018.NBRS-DR-AC101 [6] OVERALL TEACHING           20018.NBRS-DR-A-0301 [7] OVERALL LOWER GROUND         20018.NBRS-DR-AC1501 [6] OVERALL TEACHING           20018.NBRS-DR-A-0301 [4] OVERALL UPPER GROUND         20018.NBRS-DR-AC1501 [2] CTEACHING BUILDING           20018.NBRS-DR-A-5101 [2] TYPICAL CONSTRUCTION         20018.NBRS-DR-AC1500 [2] CTEACHING BUILDING           20018.NBRS-DR-A-5101 [2] TYPICAL CONSTRUCTION         20018.NBRS-DR-AC1500 [2] OVERALL TEACHING           20018.NBRS-DR-A-5101 [3] WINDOW SCHEDULE - VISUAL         20018.NBRS-DR-AC1500 [2] OVERALL TEACHING BUILDING           20018.NBRS-DR-A-6100 [3] WINDOW SCHEDULE - VISUAL         20018.NBRS-DR-AC1500 [2] CT EACHING BUILDING           20018.NBRS-DR-A-6100 [3] WINDOW SCHEDULE - CONSTRUCTION PLAN UPPER GROUND         20018.NBRS-DR-AC1500 [2] CT EACHING BUILDING           20018.NBRS-DR-A-6100 [3] WINDOW SCHEDULE - CONSTRUCTION PLAN UPPER GROUND         20018.NBRS-DR-AC300 [6] TEACHING BUILDING           20018.NBRS-DR-A-6100 [3] WI                                                                                                                                                                                                                                                                                                      | 20018-NBRS-DR-A-0011 [4] ACCOMMODATION          | 20018-NBRS-DR-A-C1006 [5] C1 TEACHING BUILDING   |  |  |  |  |
| 20018-NBRS-DR-A-0100 [5] CACCOMMODATION         20018-NBRS-DR-A-0100 [5] CATEACHING BUILDING           20018-NBRS-DR-A-0100 [5] DEMOLITION PLAN         20018-NBRS-DR-A-0100 [5] CATEACHING BUILDING           20018-NBRS-DR-A-0200 [3] BUILDING SETCUT PLAN         20018-NBRS-DR-A-0200 [3] CATEACHING BUILDING           20018-NBRS-DR-A-0200 [3] BUILDING SETCUT PLAN         20018-NBRS-DR-A-0200 [3] CVERALL LOWER GROUND           20018-NBRS-DR-A-0200 [3] CVERALL LOWER GROUND         20018-NBRS-DR-A-0200 [3] CVERALL LOWER GROUND           20018-NBRS-DR-A-0301 [4] OVERALL LOWER GROUND         20018-NBRS-DR-A-0301 [4] OVERALL UPPER GROUND           20018-NBRS-DR-A-0301 [4] OVERALL UPPER GROUND         20018-NBRS-DR-A-0301 [4] OVERALL UPPER GROUND           20018-NBRS-DR-A-5101 [2] TYPICAL CONSTRUCTION         20018-NBRS-DR-A-5101 [2] TYPICAL CONSTRUCTION           20018-NBRS-DR-A-5100 [3] DOOR SCHEDULE - VISUAL         20018-NBRS-DR-A-5100 [3] COOR SCHEDULE - VISUAL           20018-NBRS-DR-A-8100 [3] DOOR SCHEDULE - VISUAL         20018-NBRS-DR-A-5100 [3] COOR SCHEDULE - VISUAL           20018-NBRS-DR-A-8100 [3] NINDOW SCHEDULE - CONS STOUT PLAN UPPER GROUND         20018-NBRS-DR-A-100 [3] WINDOW SCHEDULE - CONS STOUT PLAN UPPER GROUND           20018-NBRS-DR-A-8100 [3] WINDOW SCHEDULE - CONS STOUT PLAN UPPER GROUND         20018-NBRS-DR-A-6100 [3] COR SCHEDULE - CONS STOUT PLAN UPPER GROUND           20018-NBRS-DR-A-100 [3] WINDOW SCHEDULE - CONS STOUT PLAN UPPER GROUND         20018-NBRS-DR-A-6100 [3] COR SCHEDULE - CONS STOUT PLAN UPPER GROUND                                                                                                                                                                                                                                                                          | SCHEDULE SHEET 2                                | UPPER GROUND PLAN                                |  |  |  |  |
| SCHEDULE SHEET 3         UPPER GROUND PLAN         UPPER GROUND PLAN           20018-NBRS-DR-A-0100 [6] DEMOLITION PLAN         20018-NBRS-DR-A-0100 [6] C3 TEACHING BUILDING           20018-NBRS-DR-A-0200 [3] BUILDING SETOUT PLAN         20018-NBRS-DR-A-0101 [6] OVERALL TEACHING           20018-NBRS-DR-A-0300 [7] OVERALL LOWER GROUND         20018-NBRS-DR-A-0101 [6] OVERALL TEACHING           20018-NBRS-DR-A-0300 [7] OVERALL LOWER GROUND         20018-NBRS-DR-A-0101 [3] OVERALL TEACHING           20018-NBRS-DR-A-0301 [4] OVERALL LOWER GROUND         20018-NBRS-DR-A-0101 [3] C3 TEACHING BUILDING           20018-NBRS-DR-A-0301 [4] OVERALL LOWER GROUND         20018-NBRS-DR-A-0101 [3] C3 TEACHING BUILDING           20018-NBRS-DR-A-5101 [2] TYPICAL CONSTRUCTION         20018-NBRS-DR-A-6100 [3] C3 TEACHING BUILDING           20018-NBRS-DR-A-5100 [3] WINDOW SCHEDULE - VISUAL         20018-NBRS-DR-A-6100 [2] C4 TEACHING BUILDING           20018-NBRS-DR-A-8100 [3] WINDOW SCHEDULE -         20018-NBRS-DR-A-6100 [2] C4 TEACHING BUILDING           20018-NBRS-DR-A-8100 [3] WINDOW SCHEDULE -         20018-NBRS-DR-A-C300 [2] C4 TEACHING BUILDING           20018-NBRS-DR-A-8100 [3] WINDOW SCHEDULE -         20018-NBRS-DR-A-C300 [2] C4 TEACHING BUILDING           20018-NBRS-DR-A-8100 [3] WINDOW SCHEDULE -         20018-NBRS-DR-A-C300 [2] TEACHING BUILDING           20018-NBRS-DR-A-8100 [3] WINDOW SCHEDULE -         20018-NBRS-DR-A-C300 [6] TEACHING BUILDING           20018-NBRS-DR-A-B100 [3] WALL TYPE SCHEDULE - <td>20018-NBRS-DR-A-0012 [4] ACCOMMODATION</td> <td>20018-NBRS-DR-A-C1007 [5] C2 TEACHING BUILDING</td>                                                                                                                                                                                                           | 20018-NBRS-DR-A-0012 [4] ACCOMMODATION          | 20018-NBRS-DR-A-C1007 [5] C2 TEACHING BUILDING   |  |  |  |  |
| 20018-NBRS-DR-A-0100 [5] DEMOLITION PLAN         20018-NBRS-DR-A-0200 [3] BUILDING SETOUT PLAN           20018-NBRS-DR-A-0200 [3] BUILDING SETOUT PLAN         20018-NBRS-DR-A-0200 [3] BUILDING SETOUT PLAN           20018-NBRS-DR-A-0300 [7] OVERALL LOWER GROUND         20018-NBRS-DR-A-0101 [6] OVERALL TEACHING           20018-NBRS-DR-A-0300 [7] OVERALL LOWER GROUND         20018-NBRS-DR-A-0101 [3] OVERALL TEACHING           20018-NBRS-DR-A-0300 [7] OVERALL UPPER GROUND         20018-NBRS-DR-A-0101 [3] OVERALL TEACHING BUILDING           20018-NBRS-DR-A-0301 [4] OVERALL UPPER GROUND         20018-NBRS-DR-A-0101 [3] CTEACHING BUILDING           20018-NBRS-DR-A-5101 [2] TYPICAL CONSTRUCTION         20018-NBRS-DR-A-0102 [3] CTEACHING BUILDING           20018-NBRS-DR-A-5500 [1] WASTE BIN AREA DETAILS         20018-NBRS-DR-A-0102 [2] CTEACHING BUILDING           20018-NBRS-DR-A-5500 [1] WASTE BIN AREA DETAILS         20018-NBRS-DR-A-0102 [2] CTEACHING BUILDING           20018-NBRS-DR-A-6100 [3] DOOR SCHEDULE - VISUAL         20018-NBRS-DR-A-0100 [2] CONC SETOUT PLAN UPPER GROUND           20018-NBRS-DR-A-6100 [3] WINDOW SCHEDULE -         20018-NBRS-DR-A-0100 [2] CTEACHING BUILDING           20018-NBRS-DR-A-8101 [3] WINDOW SCHEDULE -         20018-NBRS-DR-A-0100 [2] CTEACHING BUILDING           20018-NBRS-DR-A-6100 [5] WALL TYPE SCHEDULE -         20018-NBRS-DR-A-0100 [3] TEACHING BUILDING           20018-NBRS-DR-A-8101 [3] WINDOW SCHEDULE -         20018-NBRS-DR-A-0100 [6] TEACHING BUILDING                                                                                                                                                                                                                                                                                                                              | SCHEDULE SHEET 3                                | UPPER GROUND PLAN                                |  |  |  |  |
| UPPER GROUND PLAN           20018-NBRS-DR-A-0101 [6] OVERALL TEACHING           20018-NBRS-DR-A-0300 [7] OVERALL LOWER GROUND           20018-NBRS-DR-A-0300 [7] OVERALL LOWER GROUND           20018-NBRS-DR-A-0301 [4] OVERALL UPPER GROUND           20018-NBRS-DR-A-5101 [2] TYPICAL CONSTRUCTION           20018-NBRS-DR-A-6101 [2] WINDOW SCHEDULE -           20018-NBRS-DR-A-6100 [3] WINDOW SCHEDULE -           20018-NBRS-DR-A-6101 [3] WINDOW SCHEDULE -           20018-NBRS-DR-A-6301 [6] WALL TYPE SCHEDULE -           20018-NBRS-DR-A-6301 [6] WALL TYPE SCHEDULE -           20018-NBRS-DR-A-6301 [6] TACHING BUILDING           20018-NBRS-DR-A-6301 [6] WALL TYPE SCHEDULE -           20018-NBRS-DR-A-6301 [6] WALL TYPE SCHEDULE -           20018-NBRS-DR-A-63                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 20018-NBRS-DR-A-0100 [5] DEMOLITION PLAN        | 20018-NBRS-DR-A-C1008 [5] C3 TEACHING BUILDING   |  |  |  |  |
| 20018-NBRS-DR-A-0200 [3] BUILDING SETOUT PLAN         20018-NBRS-DR-A-0200 [3] OVERALL LOWER GROUND           20018-NBRS-DR-A-0300 [7] OVERALL LOWER GROUND         20018-NBRS-DR-A-0300 [7] OVERALL LOWER GROUND           20018-NBRS-DR-A-0300 [7] OVERALL UPPER GROUND         20018-NBRS-DR-A-01502 [3] C1 TEACHING BUILDING           20018-NBRS-DR-A-0301 [4] OVERALL UPPER GROUND         20018-NBRS-DR-A-01502 [3] C1 TEACHING BUILDING           20018-NBRS-DR-A-0301 [4] OVERALL UPPER GROUND         20018-NBRS-DR-A-01502 [3] C1 TEACHING BUILDING           20018-NBRS-DR-A-5101 [2] TYPICAL CONSTRUCTION         20018-NBRS-DR-A-01502 [2] C1 TEACHING BUILDING           20018-NBRS-DR-A-5500 [1] WASTE BIN AREA DETAILS         20018-NBRS-DR-A-01502 [2] C1 TEACHING BUILDING           20018-NBRS-DR-A-5500 [1] WINDOW SCHEDULE - VISUAL         20018-NBRS-DR-A-01502 [2] C1 TEACHING BUILDING           20018-NBRS-DR-A-8100 [3] WINDOW SCHEDULE -         20018-NBRS-DR-A-01502 [2] C1 TEACHING BUILDING           20018-NBRS-DR-A-8101 [3] WINDOW SCHEDULE -         20018-NBRS-DR-A-0100 [3] C1 TEACHING BUILDING           20018-NBRS-DR-A-8101 [3] WINDOW SCHEDULE -         20018-NBRS-DR-A-0100 [3] TEACHING BUILDING           20018-NBRS-DR-A-0100 [5] WALL TYPE SCHEDULE -         20018-NBRS-DR-A-0100 [3] TEACHING BUILDING           20018-NBRS-DR-A-0100 [5] WALL TYPE SCHEDULE -         20018-NBRS-DR-A-0100 [6] TEACHING BUILDING           20018-NBRS-DR-A-0100 [6] WALL TYPE SCHEDULE -         20018-NBRS-DR-A-0100 [6] TEACHING BUILDING           2                                                                                                                                                                                                                                                                                                      |                                                 | UPPER GROUND PLAN                                |  |  |  |  |
| BUILDING ROOF PLAN         BUILDING ROOF PLAN           20018-MBRS-DR-A-0300 [7] OVERALL LOWER GROUND         20018-MBRS-DR-A-0501 [4] OVERALL UPPER GROUND           20018-MBRS-DR-A-0301 [4] OVERALL UPPER GROUND         20018-MBRS-DR-A-0502 [4] C1 TEACHING BUILDING           20018-MBRS-DR-A-0501 [4] OVERALL UPPER GROUND         20018-MBRS-DR-A-0503 [4] C2 TEACHING BUILDING           20018-MBRS-DR-A-5101 [2] TYPICAL CONSTRUCTION         20018-MBRS-DR-A-0505 [4] C2 TEACHING BUILDING           20018-MBRS-DR-A-5500 [1] WASTE BIN AREA DETAILS         20018-MBRS-DR-A-0505 [2] OVERALL TEACHING           20018-MBRS-DR-A-5500 [1] WASTE BIN AREA DETAILS         20018-MBRS-DR-A-0505 [2] OVERALL TEACHING           20018-MBRS-DR-A-5000 [3] DOOR SCHEDULE - VISUAL         20018-MBRS-DR-A-0506 [2] CT EACHING BUILDING           20018-MBRS-DR-A-3101 [3] WINDOW SCHEDULE -         20018-MBRS-DR-A-0508 [2] CT EACHING BUILDING           20018-MBRS-DR-A-3101 [3] WINDOW SCHEDULE -         20018-MBRS-DR-A-0508 [2] CT EACHING BUILDING           20018-MBRS-DR-A-3301 [5] WALL TYPE SCHEDULE -         20018-MBRS-DR-A-0508 [2] CT EACHING BUILDING           20018-MBRS-DR-A-3301 [5] WALL TYPE SCHEDULE -         20018-MBRS-DR-A-0508 [2] CT EACHING BUILDING           20018-MBRS-DR-A-3301 [5] WALL TYPE SCHEDULE -         20018-MBRS-DR-A-0508 [2] CT EACHING BUILDING           20018-MBRS-DR-A-3301 [5] WALL TYPE SCHEDULE -         20018-MBRS-DR-A-0500 [6] CT EACHING BUILDING           20018-MBRS-DR-A-34001 [6] MALL TYPE SCHEDULE - <t< td=""><td>20018-NBRS-DR-A-0200 [3] BUILDING SETOUT PLAN</td><td>20018-NBRS-DR-A-C1011 [6] OVERALL TEACHING</td></t<>                                                                                                                                                                                             | 20018-NBRS-DR-A-0200 [3] BUILDING SETOUT PLAN   | 20018-NBRS-DR-A-C1011 [6] OVERALL TEACHING       |  |  |  |  |
| 20018-NBRS-DR-A-0300 [7] OVERALL LOWER GROUND         20018-NBRS-DR-A-C501 [5] OVERALL TEACHING           20018-NBRS-DR-A-0301 [4] OVERALL UPPER GROUND         20018-NBRS-DR-A-C502 [4] C1 FACHING BUILDING           20018-NBRS-DR-A-C502 [4] C1 FACHING BUILDING         CONC SETOUT PLAN LOWER GROUND           20018-NBRS-DR-A-C103 [4] OVERALL UPPER GROUND         20018-NBRS-DR-A-C502 [4] C1 FACHING BUILDING           20018-NBRS-DR-A-500 [1] WASTE BIN AREA DETALS         20018-NBRS-DR-A-C506 [2] C1 FACHING BUILDING           20018-NBRS-DR-A-500 [3] DOOR SCHEDULE - VISUAL         20018-NBRS-DR-A-506 [2] C1 FACHING BUILDING           20018-NBRS-DR-A-500 [3] WINDOW SCHEDULE - VISUAL         20018-NBRS-DR-A-506 [2] C1 FACHING BUILDING           20018-NBRS-DR-A-3100 [3] WINDOW SCHEDULE - VISUAL         20018-NBRS-DR-A-5100 [2] C1 FACHING BUILDING           20018-NBRS-DR-A-3101 [3] WINDOW SCHEDULE - VISUAL         20018-NBRS-DR-A-6101 [2] TEACHING BUILDING           20018-NBRS-DR-A-3101 [3] WINDOW SCHEDULE - VISUAL         20018-NBRS-DR-A-3001 [6] TEACHING BUILDING           20018-NBRS-DR-A-3101 [3] WINDOW SCHEDULE - VISUAL         20018-NBRS-DR-A-2001 [6] TEACHING BUILDING           20018-NBRS-DR-A-3001 [6] MALL TYPE SCHEDULE - VISUAL         20018-NBRS-DR-A-2002 [6] TEACHING BUILDING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                 | BUILDING ROOF PLAN                               |  |  |  |  |
| PLAN (SITE PLAN)         BUILDING CONC SETOUT PLAN LOWER GROUND           20018-NBRS-DR-A-0301 [4] OVERALL UPPER GROUND         20018-NBRS-DR-A-0502 [4] C1 TEACHING BUILDING           20018-NBRS-DR-A-0502 [4] C1 TEACHING BUILDING         20018-NBRS-DR-A-0502 [4] C1 TEACHING BUILDING           20018-NBRS-DR-A-5101 [2] TYPICAL CONSTRUCTION         20018-NBRS-DR-A-0502 [4] C2 TEACHING BUILDING           20018-NBRS-DR-A-5500 [1] WASTE BIN AREA DETAILS         20018-NBRS-DR-A-0502 [4] C1 TEACHING BUILDING           20018-NBRS-DR-A-5500 [1] WASTE BIN AREA DETAILS         20018-NBRS-DR-A-0502 [2] C1 TEACHING BUILDING           20018-NBRS-DR-A-5500 [3] DOR SCHEDULE - VISUAL         20018-NBRS-DR-A-0502 [2] C1 TEACHING BUILDING           20018-NBRS-DR-A-3100 [3] WINDOW SCHEDULE -         20018-NBRS-DR-A-0502 [2] C3 TEACHING BUILDING           20018-NBRS-DR-A-3101 [3] WINDOW SCHEDULE -         20018-NBRS-DR-A-0502 [2] C3 TEACHING BUILDING           20018-NBRS-DR-A-3301 [5] WALL TYPE SCHEDULE -         20018-NBRS-DR-A-05002 [6] TEACHING BUILDING           20018-NBRS-DR-A-3302 [2] WALL TYPE SCHEDULE -         20018-NBRS-DR-A-03003 [6] C1 TEACHING BUILDING           20018-NBRS-DR-A-3302 [2] WALL TYPE SCHEDULE -         20018-NBRS-DR-A-03003 [6] C1 TEACHING BUILDING           20018-NBRS-DR-A-3302 [2] WALL TYPE SCHEDULE -         20018-NBRS-DR-A-03003 [6] C1 TEACHING BUILDING           20018-NBRS-DR-A-3302 [2] WALL TYPE SCHEDULE -         20018-NBRS-DR-A-03003 [6] C1 TEACHING BUILDING                                                                                                                                                                                                                                                                                                                                             | 20018-NBRS-DR-A-0300 [7] OVERALL LOWER GROUND   | 20018-NBRS-DR-A-C1501 [5] OVERALL TEACHING       |  |  |  |  |
| 20018-NBRS-DR-A-0301 [4] OVERALL UPPER GROUND         20018-NBRS-DR-A-C1502 [4] CT EACHING BUILDING<br>CONC SETOUT PLAN LOWER GROUND           20018-NBRS-DR-A-5101 [2] TYPICAL CONSTRUCTION         20018-NBRS-DR-A-C1503 [4] CZ TEACHING BUILDING<br>CONC SETOUT PLAN LOWER GROUND           20018-NBRS-DR-A-5000 [3] DOOR SCHEDULE - VISUAL         20018-NBRS-DR-A-5106 [2] CT TEACHING BUILDING<br>CONC SETOUT PLAN LOWER GROUND           20018-NBRS-DR-A-5000 [3] DOOR SCHEDULE - VISUAL         20018-NBRS-DR-A-5106 [2] CT TEACHING BUILDING<br>CONC SETOUT PLAN UPPER GROUND           20018-NBRS-DR-A-5100 [3] WINDOW SCHEDULE - VISUAL         20018-NBRS-DR-A-5100 [2] CT TEACHING BUILDING<br>CONC SETOUT PLAN UPPER GROUND           20018-NBRS-DR-A-3100 [3] WINDOW SCHEDULE -<br>VISUAL         20018-NBRS-DR-A-5108 [2] C3 TEACHING BUILDING<br>CONC SETOUT PLAN UPPER GROUND           20018-NBRS-DR-A-3101 [3] WINDOW SCHEDULE -<br>VISUAL         20018-NBRS-DR-A-3301 [6] TEACHING BUILDING<br>CONC SETOUT PLAN UPPER GROUND           20018-NBRS-DR-A-3301 [5] WALL TYPE SCHEDULE -<br>EXTERNAL         20018-NBRS-DR-A-3002 [6] TEACHING BUILDING<br>ELEVATIONS 2           20018-NBRS-DR-A-43001 [6] ADMIN ROOF PLAN         20018-NBRS-DR-A-3003 [6] CT TEACHING BUILDING<br>ELEVATIONS 2           20018-NBRS-DR-A-43001 [6] ADMIN CONC SETOUT         20018-NBRS-DR-A-2003 [6] CT TEACHING BUILDING<br>ELEVATIONS 2           20018-NBRS-DR-A-43001 [6] ADMIN ROOF PLAN         20018-NBRS-DR-A-C3002 [6] CTEACHING BUILDING<br>ELEVATIONS 2           20018-NBRS-DR-A-43001 [6] ADMIN ROOF PLAN         20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING<br>SECTIONS 2                     2                                                                                                                                                                               | PLAN (SITE PLAN)                                | BUILDING CONC SETOUT PLAN LOWER GROUND           |  |  |  |  |
| PLAN         CONC SETOUT PLAN LOWER GROUND           20018-NBRS-DR-A-5101 [2] TYPICAL CONSTRUCTION         20018-NBRS-DR-A-C1503 [4] C2 TEACHING BUILDING           20018-NBRS-DR-A-5101 [2] TYPICAL CONSTRUCTION         20018-NBRS-DR-A-C1504 [5] C3 TEACHING BUILDING           20018-NBRS-DR-A-5300 [1] WASTE BIN AREA DETAILS         20018-NBRS-DR-A-C1505 [2] OVERALL TEACHING BUILDING           20018-NBRS-DR-A-6300 [3] DOOR SCHEDULE - VISUAL         20018-NBRS-DR-A-C1505 [2] TEACHING BUILDING           20018-NBRS-DR-A-8100 [3] WINDOW SCHEDULE -         20018-NBRS-DR-A-C1507 [2] TEACHING BUILDING           20018-NBRS-DR-A-8101 [3] WINDOW SCHEDULE -         20018-NBRS-DR-A-C1507 [2] TEACHING BUILDING           20018-NBRS-DR-A-8101 [5] WALL TYPE SCHEDULE -         20018-NBRS-DR-A-C3001 [6] TEACHING BUILDING           20018-NBRS-DR-A-8302 [2] WALL TYPE SCHEDULE -         20018-NBRS-DR-A-C3001 [6] TEACHING BUILDING           20018-NBRS-DR-A-8302 [2] WALL TYPE SCHEDULE -         20018-NBRS-DR-A-C3001 [6] TEACHING BUILDING           20018-NBRS-DR-A-43001 [1] ADMIN LOWER GROUND         20018-NBRS-DR-A-C3002 [6] TEACHING BUILDING           20018-NBRS-DR-A-A3001 [6] ADMIN NOOF PLAN         20018-NBRS-DR-A-C3003 [6] C1 TEACHING BUILDING           20018-NBRS-DR-A-A4001 [6] ADMIN NOOF PLAN         20018-NBRS-DR-A-C3004 [6] C2 TEACHING BUILDING           20018-NBRS-DR-A-A4001 [6] ADMIN NOOF PLAN         20018-NBRS-DR-A-C3005 [6] C3 TEACHING BUILDING           20018-NBRS-DR-A-A4001 [6] ADMIN SECTOOT         20018-NBRS-                                                                                                                                                                                                                                                                                                               | 20018-NBRS-DR-Á-0301 [4] OVERALL UPPER GROUND   | 20018-NBRS-DR-A-C1502 [4] C1 TEACHING BUILDING   |  |  |  |  |
| 20018-NBRS-DR-A-C1503 [4] 2 TEACHING BUILDING<br>CONC SETOUT PLAN LOWER GROUND           20018-NBRS-DR-A-5101 [2] TYPICAL CONSTRUCTION         20018-NBRS-DR-A-C1504 [5] C3 TEACHING BUILDING<br>CONC SETOUT PLAN LOWER GROUND           20018-NBRS-DR-A-5000 [1] WASTE BIN AREA DETAILS         20018-NBRS-DR-A-C1504 [5] C3 TEACHING BUILDING<br>CONC SETOUT PLAN UPPER GROUND           20018-NBRS-DR-A-5000 [3] DOOR SCHEDULE - VISUAL         20018-NBRS-C1506 [2] C1 TEACHING BUILDING<br>CONC SETOUT PLAN UPPER GROUND           20018-NBRS-DR-A-8100 [3] WINDOW SCHEDULE -<br>VISUAL         20018-NBRS-DR-A-C1507 [2] C2 TEACHING BUILDING<br>CONC SETOUT PLAN UPPER GROUND           20018-NBRS-DR-A-8101 [3] WINDOW SCHEDULE -<br>VISUAL         20018-NBRS-DR-A-C1506 [2] C3 TEACHING BUILDING<br>CONC SETOUT PLAN UPPER GROUND           20018-NBRS-DR-A-8101 [5] WALL TYPE SCHEDULE -<br>EXTERNAL         20018-NBRS-DR-A-C3002 [6] TEACHING BUILDING<br>ELEVATIONS 1           20018-NBRS-DR-A-8302 [2] WALL TYPE SCHEDULE -<br>ELEVATIONS         20018-NBRS-DR-A-C3003 [6] C1 TEACHING BUILDING<br>ELEVATIONS           20018-NBRS-DR-A-43001 [11] ADMIN LOWER GROUND         20018-NBRS-DR-A-C3003 [6] C1 TEACHING BUILDING<br>ELEVATIONS           20018-NBRS-DR-A-A1001 [5] ADMIN ROOF PLAN         20018-NBRS-DR-A-C3004 [6] C2 TEACHING BUILDING<br>ELEVATIONS           20018-NBRS-DR-A-A1001 [6] ADMIN ELEVATIONS         20018-NBRS-DR-A-C4001 [6] TEACHING BUILDING<br>ELEVATIONS           20018-NBRS-DR-A-A5101 [5] ADMIN CONC SETOUT         20018-NBRS-DR-A-C4001 [6] TEACHING BUILDING<br>SECTIONS 1           20018-NBRS-DR-A-A51001 [6] ADMIN SECTIONS         20018-NBRS-DR-A-C40                                                                                                                                                                                | PLAN                                            | CONC SETOUT PLAN LOWER GROUND                    |  |  |  |  |
| CONG SETOUT PLAN LOWER GROUND20018-NBRS-DR.A-5101 [2] TYPICAL CONSTRUCTION20018-NBRS-DR.A-C1504 [3] C3 TEACHING BUILDING<br>CONC SETOUT PLAN LOWER GROUND20018-NBRS-DR.A-6300 [3] DOOR SCHEDULE - VISUAL20018-NBRS-DR.A-C1505 [2] C1 TEACHING BUILDING<br>CONC SETOUT PLAN UPPER GROUND20018-NBRS-DR.A-6100 [3] WINDOW SCHEDULE -<br>VISUAL20018-NBRS-DR.A-C1507 [2] TEACHING BUILDING<br>CONC SETOUT PLAN UPPER GROUND20018-NBRS-DR.A-8100 [3] WINDOW SCHEDULE -<br>VISUAL20018-NBRS-DR.A-C1507 [2] C2 TEACHING BUILDING<br>CONC SETOUT PLAN UPPER GROUND20018-NBRS-DR.A-8101 [3] WINDOW SCHEDULE -<br>20018-NBRS-DR.A-8101 [5] WINDOW SCHEDULE -<br>20018-NBRS-DR.A-61300 [2] C3 TEACHING BUILDING<br>CONC SETOUT PLAN UPPER GROUND20018-NBRS-DR.A-8101 [5] WALL TYPE SCHEDULE -<br>20018-NBRS-DR.A-C3001 [6] TEACHING BUILDING<br>EXTERNAL20018-NBRS-DR.A-8302 [2] WALL TYPE SCHEDULE -<br>20018-NBRS-DR.A-C3001 [6] TEACHING BUILDING<br>ELEVATIONS 1<br>20018-NBRS-DR.A-C3001 [6] TEACHING BUILDING<br>ELEVATIONS 2<br>20018-NBRS-DR.A-C3001 [6] TEACHING BUILDING<br>ELEVATIONS 2<br>20018-NBRS-DR.A-C3001 [6] C1 TEACHING BUILDING<br>ELEVATIONS 2<br>20018-NBRS-DR.A-C3001 [6] C2 TEACHING BUILDING<br>ELEVATIONS 2<br>20018-NBRS-DR.A-C3001 [6] C2 TEACHING BUILDING<br>ELEVATIONS 2<br>20018-NBRS-DR.A-C4001 [6] C2 TEACHING BUILDING<br>SECTIONS 2<br>20018-NBRS-DR.A-C4001 [6] CACHING BUILDING<br>SECTIONS 2<br>20018-NBRS-DR.A-C4001 [6] TEACHING BUILDING<br>SECTIONS 2<br>20018-NBRS-DR.A-C4001 [6] TEACHING BUILDING<br>SECTIONS 2<br>20018-NBRS-DR.A-C4001 [6] TEACHING BUILDING<br>SECTIONS 2<br>20018-NBRS-DR.A-C4001 [6] TEACHING BUILDING<br>SECTIONS 2<br>20018-NBRS- |                                                 | 20018-NBRS-DR-A-C1503 [4] C2 TEACHING BUILDING   |  |  |  |  |
| 20018-NBRS-DR-A-S101 [2] TYPICAL CONSTRUCTION       20018-NBRS-DR-A-S106 [5] C3 TEACHING BUILDING         DETAILS - SHEET 1       CONC SETOUT PLAN LOWER GROUND         20018-NBRS-DR-A-5500 [1] WASTE BIN AREA DETAILS       20018-NBRS-DR-A-C1506 [2] OVERALL TEACHING BUILDING         20018-NBRS-DR-A-8000 [3] DOOR SCHEDULE - VISUAL       20018-NBRS-DR-A-C1506 [2] OVERALL TEACHING BUILDING         20018-NBRS-DR-A-8100 [3] WINDOW SCHEDULE -       20018-NBRS-DR-A-C1506 [2] CT TEACHING BUILDING         20018-NBRS-DR-A-8100 [3] WINDOW SCHEDULE -       20018-NBRS-DR-A-C1508 [2] C3 TEACHING BUILDING         20018-NBRS-DR-A-8101 [3] WINDOW SCHEDULE -       20018-NBRS-DR-A-C1508 [2] C3 TEACHING BUILDING         20018-NBRS-DR-A-8301 [5] WALL TYPE SCHEDULE -       20018-NBRS-DR-A-C1508 [2] C3 TEACHING BUILDING         20018-NBRS-DR-A-8302 [2] WALL TYPE SCHEDULE -       20018-NBRS-DR-A-C3002 [6] TEACHING BUILDING         20018-NBRS-DR-A-8302 [2] WALL TYPE SCHEDULE -       20018-NBRS-DR-A-C3003 [6] C1 TEACHING BUILDING         20018-NBRS-DR-A-A1001 [1] ADMIN LOWER GROUND       20018-NBRS-DR-A-C3004 [6] C2 TEACHING BUILDING         20018-NBRS-DR-A-A1001 [1] ADMIN CONC SETOUT       20018-NBRS-DR-A-C3003 [6] C1 TEACHING BUILDING         20018-NBRS-DR-A-A1001 [5] ADMIN CONC SETOUT       20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING         20018-NBRS-DR-A-A1001 [6] ADMIN CONC SETOUT       20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING         20018-NBRS-DR-A-A1001 [6] ADMIN SECTIONS       20018-NBRS-DR-A-C4002 [6] TE                                                                                                                                                                                                                                                                                                                       |                                                 | CONC SETOUT PLAN LOWER GROUND                    |  |  |  |  |
| DETAILS - SHEET 1         CONC SETOUT PLAN LOWÊR GROUND           20018-NBRS-DR-A-5500 [1] WASTE BIN AREA DETAILS         20018-NBRS-DR-A-C1506 [2] CVERALL TEACHING<br>BUILDING CONC SETOUT PLAN UPPER GROUND           20018-NBRS-DR-A-8100 [3] WINDOW SCHEDULE - VISUAL         20018-NBRS-DR-A-C1507 [2] CZ TEACHING BUILDING<br>CONC SETOUT PLAN UPPER GROUND           20018-NBRS-DR-A-8101 [3] WINDOW SCHEDULE -<br>VISUAL         20018-NBRS-DR-A-C1507 [2] CZ TEACHING BUILDING<br>CONC SETOUT PLAN UPPER GROUND           20018-NBRS-DR-A-8101 [3] WINDOW SCHEDULE -<br>VISUAL         20018-NBRS-DR-A-C1508 [2] C3 TEACHING BUILDING<br>CONC SETOUT PLAN UPPER GROUND           20018-NBRS-DR-A-8301 [5] WALL TYPE SCHEDULE -<br>EXTERNAL         20018-NBRS-DR-A-C3002 [6] TEACHING BUILDING<br>ELEVATIONS 1           20018-NBRS-DR-A-8302 [2] WALL TYPE SCHEDULE -<br>EXTERNAL         20018-NBRS-DR-A-C3003 [6] C1 TEACHING BUILDING<br>ELEVATIONS 1           20018-NBRS-DR-A-A-1001 [11] ADMIN LOWER GROUND         20018-NBRS-DR-A-C3003 [6] C1 TEACHING BUILDING<br>ELEVATIONS 2           20018-NBRS-DR-A-A-1001 [11] ADMIN ROOF PLAN         20018-NBRS-DR-A-C3005 [6] C3 TEACHING BUILDING<br>ELEVATIONS 2           20018-NBRS-DR-A-A-1001 [6] ADMIN CONC SETOUT         20018-NBRS-DR-A-C4001 [6] TEACHING BUILDING<br>ELEVATIONS 2           20018-NBRS-DR-A-A-1001 [6] ADMIN SECTIONS 2         20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING<br>SECTIONS 1           20018-NBRS-DR-A-A-1001 [6] ADMIN SECTIONS 2         20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING<br>SECTIONS 1           20018-NBRS-DR-A-B1001 [6] ADMIN SECTIONS 2         20018-NBRS-DR-A-C4002 [6] TEAC                                                                                                                                                                                            | 20018-NBRS-DR-A-5101 [2] TYPICAL CONSTRUCTION   | 20018-NBRS-DR-A-C1504 [5] C3 TEACHING BUILDING   |  |  |  |  |
| 20018-NBRS-DR-A-C500 [1] WASTE BIN AREA DETAILS       20018-NBRS-DR-A-C1506 [2] OVERALL TEACHING         20018-NBRS-DR-A-8000 [3] DOOR SCHEDULE - VISUAL       20018-NBRS-DR-A-C1506 [2] C1 TEACHING BUILDING         20018-NBRS-DR-A-8100 [3] WINDOW SCHEDULE -       20018-NBRS-DR-A-C1507 [2] C2 TEACHING BUILDING         20018-NBRS-DR-A-8100 [3] WINDOW SCHEDULE -       20018-NBRS-DR-A-C1508 [2] C3 TEACHING BUILDING         20018-NBRS-DR-A-8101 [3] WINDOW SCHEDULE -       20018-NBRS-DR-A-C1508 [2] C3 TEACHING BUILDING         20018-NBRS-DR-A-8301 [5] WALL TYPE SCHEDULE -       20018-NBRS-DR-A-C1508 [2] C3 TEACHING BUILDING         2018-NBRS-DR-A-8302 [2] WALL TYPE SCHEDULE -       20018-NBRS-DR-A-C3002 [6] TEACHING BUILDING         2018-NBRS-DR-A-8302 [2] WALL TYPE SCHEDULE -       20018-NBRS-DR-A-C3002 [6] TEACHING BUILDING         2018-NBRS-DR-A-8302 [2] WALL TYPE SCHEDULE -       20018-NBRS-DR-A-C3002 [6] TEACHING BUILDING         2018-NBRS-DR-A-8302 [2] WALL TYPE SCHEDULE -       20018-NBRS-DR-A-C3002 [6] TEACHING BUILDING         20018-NBRS-DR-A-8300 [2] ADMIN ROOF PLAN       20018-NBRS-DR-A-C3003 [6] C1 TEACHING BUILDING         20018-NBRS-DR-A-A1011 [5] ADMIN ROOF PLAN       20018-NBRS-DR-A-C3005 [6] C3 TEACHING BUILDING         20018-NBRS-DR-A-A3001 [6] ADMIN SECTIONS       20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING         20018-NBRS-DR-A-A1011 [5] ADMIN SECTIONS       20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING         20018-NBRS-DR-A-B1001 [9] HALL LOWER GROUND       20018-NBRS-DR-A-C4                                                                                                                                                                                                                                                                                                                       | DETAILS - SHEET 1                               | CONC SETOUT PLAN LOWER GROUND                    |  |  |  |  |
| BulleDing CONC SETOUT PLAN UPPER GROUND           20018-NBRS-DR-A-6100 [3] DOOR SCHEDULE - VISUAL         20018-NBRS-DR-A-6100 [2] C1 TEACHING BUILDING           20018-NBRS-DR-A-6100 [3] WINDOW SCHEDULE -         20018-NBRS-DR-A-6107 [2] C2 TEACHING BUILDING           20018-NBRS-DR-A-6101 [3] WINDOW SCHEDULE -         20018-NBRS-DR-A-6108 [2] C3 TEACHING BUILDING           20018-NBRS-DR-A-6301 [5] WALL TYPE SCHEDULE -         20018-NBRS-DR-A-6300 [6] TEACHING BUILDING           20018-NBRS-DR-A-6302 [2] WALL TYPE SCHEDULE -         20018-NBRS-DR-A-6300 [6] TEACHING BUILDING           20018-NBRS-DR-A-6302 [2] WALL TYPE SCHEDULE -         20018-NBRS-DR-A-6300 [6] TEACHING BUILDING           20018-NBRS-DR-A-6302 [2] WALL TYPE SCHEDULE -         20018-NBRS-DR-A-6300 [6] C1 TEACHING BUILDING           20018-NBRS-DR-A-6300 [6] C1 TEACHING BUILDING         ELEVATIONS 2           20018-NBRS-DR-A-1011 [5] ADMIN CONC SETOUT         20018-NBRS-DR-A-6300 [6] C2 TEACHING BUILDING           20018-NBRS-DR-A-43001 [6] ADMIN CONC SETOUT         20018-NBRS-DR-A-6400 [6] C3 TEACHING BUILDING           20018-NBRS-DR-A-43001 [6] ADMIN SECTIONS         20018-NBRS-DR-A-6400 [6] C4 TEACHING BUILDING           20018-NBRS-DR-A-500 [6] ADMIN SECTIONS         20018-NBRS-DR-A-6400 [6] TEACHING BUILDING           20018-NBRS-DR-A-6400 [6] ADMIN SECTIONS         20018-NBRS-DR-A-6200 [6] TEACHING BUILDING           20018-NBRS-DR-A-6400 [6] ADMIN SECTIONS         20018-NBRS-DR-A-6200 [6] TEACHING BUILDING           2                                                                                                                                                                                                                                                                                                                                | 20018-NBRS-DR-A-5500 [1] WASTE BIN AREA DETAILS | 20018-NBRS-DR-A-C1505 [2] OVERALL TEACHING       |  |  |  |  |
| 20018-NBRS-DR-A-8000 [3] DOOR SCHEDULE - VISUAL       20018-NBRS-DR-A-6106 [2] C1 TEACHING BUILDING         20018-NBRS-DR-A-8100 [3] WINDOW SCHEDULE -       20018-NBRS-DR-A-61507 [2] C2 TEACHING BUILDING         20018-NBRS-DR-A-8101 [3] WINDOW SCHEDULE -       20018-NBRS-DR-A-61507 [2] C3 TEACHING BUILDING         20018-NBRS-DR-A-8301 [5] WINDOW SCHEDULE -       20018-NBRS-DR-A-61508 [2] C3 TEACHING BUILDING         20018-NBRS-DR-A-8301 [5] WALL TYPE SCHEDULE -       20018-NBRS-DR-A-63002 [6] TEACHING BUILDING         20018-NBRS-DR-A-8302 [2] WALL TYPE SCHEDULE -       20018-NBRS-DR-A-63002 [6] TEACHING BUILDING         20018-NBRS-DR-A-43001 [11] ADMIN LOWER GROUND       20018-NBRS-DR-A-63003 [6] C1 TEACHING BUILDING         20018-NBRS-DR-A-A1001 [11] ADMIN LOWER GROUND       20018-NBRS-DR-A-63004 [6] C2 TEACHING BUILDING         20018-NBRS-DR-A-A1011 [5] ADMIN CONC SETOUT       20018-NBRS-DR-A-63004 [6] C2 TEACHING BUILDING         20018-NBRS-DR-A-A1001 [6] ADMIN CONC SETOUT       20018-NBRS-DR-A-64001 [6] TEACHING BUILDING         20018-NBRS-DR-A-A1001 [6] ADMIN SECTIONS       20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING         20018-NBRS-DR-A-A4001 [6] ADMIN SECTIONS       20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING         20018-NBRS-DR-A-B1001 [9] HALL LOWER GROUND       20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING WALL         20018-NBRS-DR-A-B101 [9] HALL LOWER GROUND       20018-NBRS-DR-A-C6001 [3] TEACHING BUILDING WALL         20018-NBRS-DR-A-B1001 [6] HALL LOWER GROUND       20018-                                                                                                                                                                                                                                                                                                                       |                                                 | BUILDING CONC SETOUT PLAN UPPER GROUND           |  |  |  |  |
| CONC SETOUT PLAN UPPER GROUND20018-NBRS-DR-A-6100 [3] WINDOW SCHEDULE -<br>VISUAL20018-NBRS-DR-A-C1507 [2] C2 TEACHING BUILDING<br>CONC SETOUT PLAN UPPER GROUND20018-NBRS-DR-A-8101 [3] WINDOW SCHEDULE -<br>VISUAL20018-NBRS-DR-A-C3001 [6] TEACHING BUILDING<br>ELEVATIONS 120018-NBRS-DR-A-8301 [5] WALL TYPE SCHEDULE -<br>EXTERNAL20018-NBRS-DR-A-C3002 [6] TEACHING BUILDING<br>ELEVATIONS 220018-NBRS-DR-A-8302 [2] WALL TYPE SCHEDULE -<br>EXTERNAL20018-NBRS-DR-A-C3002 [6] TEACHING BUILDING<br>ELEVATIONS 220018-NBRS-DR-A-4302 [2] WALL TYPE SCHEDULE -<br>EXTERNAL20018-NBRS-DR-A-C3003 [6] C1 TEACHING BUILDING<br>ELEVATIONS 220018-NBRS-DR-A-41001 [11] ADMIN LOWER GROUND<br>PLAN20018-NBRS-DR-A-C3004 [6] C2 TEACHING BUILDING<br>ELEVATIONS20018-NBRS-DR-A-A1011 [5] ADMIN ROOF PLAN20018-NBRS-DR-A-C3005 [6] C3 TEACHING BUILDING<br>ELEVATIONS20018-NBRS-DR-A-A1011 [5] ADMIN CONC SETOUT<br>EUWER GROUND20018-NBRS-DR-A-C4001 [6] TEACHING BUILDING<br>ELEVATIONS20018-NBRS-DR-A-A1001 [9] ADMIN SECTIONS20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING<br>SECTIONS 120018-NBRS-DR-A-B1001 [9] HALL LOWER GROUND<br>PLAN20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING WALL<br>SECTIONS 120018-NBRS-DR-A-B1011 [3] HALL LOWER GROUND<br>PLAN20018-NBRS-DR-A-C6001 [3] TEACHING BUILDING<br>STAIRS - STAIR 420018-NBRS-DR-A-B1001 [9] HALL LOWER GROUND<br>PLAN20018-NBRS-DR-A-C6001 [3] TEACHING BUILDING<br>STAIRS - STAIR 520018-NBRS-DR-A-B1011 [3] HALL CONC SETOUT PLAN<br>DO18-NBRS-DR-A-C6003 [3] TEACHING BUILDING<br>STAIRS - STAIR 420018-NBRS-DR-A-B3001 [6] HALL ELEVATIONS 220018-NBRS-DR-A-C6003 [3] TEACHING BUILDING<br>STAIRS - STAIR 520018-NBR                                                                                                                                                                                                                 | 20018-NBRS-DR-A-8000 [3] DOOR SCHEDULE - VISUAL | 20018-NBRS-DR-A-C1506 [2] C1 TEACHING BUILDING   |  |  |  |  |
| 20018-NBRS-DR-A-8100 [3] WINDOW SCHEDULE -       20018-NBRS-DR-A-6100 [2] C2 TEACHING BUILDING         20018-NBRS-DR-A-8101 [3] WINDOW SCHEDULE -       20018-NBRS-DR-A-C1508 [2] C3 TEACHING BUILDING         20018-NBRS-DR-A-8301 [5] WALL TYPE SCHEDULE -       20018-NBRS-DR-A-C3001 [6] TEACHING BUILDING         EXTERNAL       ELEVATIONS 1       20018-NBRS-DR-A-C3002 [6] TEACHING BUILDING         EXTERNAL       ELEVATIONS 1       20018-NBRS-DR-A-C3002 [6] TEACHING BUILDING         EXTERNAL       ELEVATIONS 2       20018-NBRS-DR-A-C3003 [6] C1 TEACHING BUILDING         20018-NBRS-DR-A-A1001 [11] ADMIN LOWER GROUND       20018-NBRS-DR-A-C3003 [6] C1 TEACHING BUILDING         20018-NBRS-DR-A-A1001 [11] ADMIN CONC FLAN       20018-NBRS-DR-A-C3004 [6] C2 TEACHING BUILDING         20018-NBRS-DR-A-A1001 [5] ADMIN CONC SETOUT       20018-NBRS-DR-A-C3005 [6] C3 TEACHING BUILDING         20018-NBRS-DR-A-A3001 [6] ADMIN ELEVATIONS       20018-NBRS-DR-A-C4001 [6] TEACHING BUILDING         20018-NBRS-DR-A-A3001 [6] ADMIN SECTIONS       20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING         20018-NBRS-DR-A-B1001 [9] HALL LOWER GROUND       20018-NBRS-DR-A-C5001 [6] TEACHING BUILDING         20018-NBRS-DR-A-B1001 [9] HALL LOWER ROOF PLAN       20018-NBRS-DR-A-C5001 [3] TEACHING BUILDING         20018-NBRS-DR-A-B1001 [9] HALL LOWER ROOF PLAN       20018-NBRS-DR-A-C5001 [3] TEACHING BUILDING         20018-NBRS-DR-A-B1001 [6] HALL LOWER ROOF PLAN       20018-NBRS-DR-A-C6002 [3] TEACHING B                                                                                                                                                                                                                                                                                                                                                  |                                                 | CONC SETOUT PLAN UPPER GROUND                    |  |  |  |  |
| VISUAL       CONC SETOUT PLAN UPPER GROUND         20018.NBRS-DR.A-8101 [3] WINDOW SCHEDULE -       20018.NBRS-DR.A-C1508 [2] C3 TEACHING BUILDING         20018.NBRS-DR.A-8301 [5] WALL TYPE SCHEDULE -       20018.NBRS-DR.A-C3001 [6] TEACHING BUILDING         20018.NBRS-DR.A-8302 [2] WALL TYPE SCHEDULE -       20018.NBRS-DR.A-C3002 [6] TEACHING BUILDING         20018.NBRS-DR.A-43001 [11] ADMIN LOWER GROUND       20018.NBRS-DR.A-C3003 [6] C1 TEACHING BUILDING         PLAN       ELEVATIONS 1         20018.NBRS-DR.A-A1001 [11] ADMIN COVER GROUND       20018.NBRS-DR.A-C3003 [6] C1 TEACHING BUILDING         PLAN       ELEVATIONS         20018.NBRS-DR.A-A1001 [5] ADMIN COOF PLAN       20018.NBRS-DR.A-C3004 [6] C2 TEACHING BUILDING         20018.NBRS-DR.A-A1001 [5] ADMIN COOF STOUT       20018.NBRS-DR.A-C3005 [6] C3 TEACHING BUILDING         20018.NBRS-DR.A-A1001 [6] ADMIN ELEVATIONS       20018.NBRS-DR.A-C4001 [6] TEACHING BUILDING         20018.NBRS-DR.A-A4001 [6] ADMIN SECTIONS       20018.NBRS-DR.A-C4002 [6] TEACHING BUILDING         20018.NBRS-DR.A-B1001 [9] HALL LOWER GROUND       20018.NBRS-DR.A-C6001 [1] TEACHING BUILDING WALL         20018.NBRS-DR.A-B1001 [9] HALL LOWER GROUND       20018.NBRS-DR.A-C6001 [3] TEACHING BUILDING WALL         20018.NBRS-DR.A-B1001 [9] HALL LOWER GROUND       20018.NBRS-DR.A-C6001 [3] TEACHING BUILDING WALL         20018.NBRS-DR.A-B1001 [9] HALL LOWER GROUND       20018.NBRS-DR.A-C6001 [3] TEACHING BUILDING STAIRS - STAIR 3 <td>20018-NBRS-DR-A-8100 [3] WINDOW SCHEDULE -</td> <td>20018-NBRS-DR-A-C1507 [2] C2 TEACHING BUILDING</td>                                                                                                                                                                                                                                                  | 20018-NBRS-DR-A-8100 [3] WINDOW SCHEDULE -      | 20018-NBRS-DR-A-C1507 [2] C2 TEACHING BUILDING   |  |  |  |  |
| 20018-NBRS-DR-A-8101 [3] WINDOW SCHEDULE -       20018-NBRS-DR-A-6101 [2] C3 TEACHING BUILDING         20018-NBRS-DR-A-8301 [5] WALL TYPE SCHEDULE -       20018-NBRS-DR-A-C3001 [6] TEACHING BUILDING         EXTERNAL       20018-NBRS-DR-A-6302 [2] WALL TYPE SCHEDULE -       20018-NBRS-DR-A-C3002 [6] TEACHING BUILDING         ELEVATIONS 1       20018-NBRS-DR-A-63001 [11] ADMIN LOWER GROUND       20018-NBRS-DR-A-C3002 [6] TEACHING BUILDING         20018-NBRS-DR-A-A1001 [11] ADMIN LOWER GROUND       20018-NBRS-DR-A-C3003 [6] C1 TEACHING BUILDING         20018-NBRS-DR-A-A1001 [11] ADMIN NOOF PLAN       20018-NBRS-DR-A-C3004 [6] C2 TEACHING BUILDING         20018-NBRS-DR-A-A1001 [5] ADMIN ROOF PLAN       20018-NBRS-DR-A-C3005 [6] C3 TEACHING BUILDING         20018-NBRS-DR-A-A1001 [6] ADMIN ELEVATIONS       20018-NBRS-DR-A-C3005 [6] C3 TEACHING BUILDING         20018-NBRS-DR-A-A1001 [6] ADMIN ELEVATIONS       20018-NBRS-DR-A-C4001 [6] TEACHING BUILDING         20018-NBRS-DR-A-A4001 [6] ADMIN SECTIONS       20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING         20018-NBRS-DR-A-B1001 [9] HALL LOWER GROUND       20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING WALL         20018-NBRS-DR-A-B1011 [3] HALL LOWER GROUND       20018-NBRS-DR-A-C4002 [1] TEACHING BUILDING WALL         20018-NBRS-DR-A-B1011 [3] HALL LOWER GROUND       20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING STAIRS - STAIR 3         20018-NBRS-DR-A-B1012 [1] HALL UPPER ROOF PLAN       20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING STAIRS - STAIR 4                                                                                                                                                                                                                                                                                                                          | VISUAL                                          | CONC SETOUT PLAN UPPER GROUND                    |  |  |  |  |
| VISUAL       CONC SETOUT PLAN UPPER GROUND         20018-NBRS-DR-A-8301 [5] WALL TYPE SCHEDULE -       20018-NBRS-DR-A-C3002 [6] TEACHING BUILDING         2018-NBRS-DR-A-8302 [2] WALL TYPE SCHEDULE -       20018-NBRS-DR-A-C3002 [6] TEACHING BUILDING         2018-NBRS-DR-A-A1001 [11] ADMIN LOWER GROUND       20018-NBRS-DR-A-C3003 [6] C1 TEACHING BUILDING         PLAN       ELEVATIONS 2         20018-NBRS-DR-A-A1001 [5] ADMIN ROOF PLAN       20018-NBRS-DR-A-C3004 [6] C2 TEACHING BUILDING         20018-NBRS-DR-A-A1011 [5] ADMIN CONC SETOUT       20018-NBRS-DR-A-C3005 [6] C3 TEACHING BUILDING         20018-NBRS-DR-A-A3001 [6] ADMIN CONC SETOUT       20018-NBRS-DR-A-C3005 [6] C3 TEACHING BUILDING         20018-NBRS-DR-A-A3001 [6] ADMIN ELEVATIONS       20018-NBRS-DR-A-C4001 [6] TEACHING BUILDING         20018-NBRS-DR-A-A4001 [6] ADMIN SECTIONS       20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING         20018-NBRS-DR-A-B1011 [9] HALL LOWER GROUND       20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING WALL         20018-NBRS-DR-A-B1011 [9] HALL LOWER ROOF PLAN       20018-NBRS-DR-A-C5001 [1] TEACHING BUILDING WALL         20018-NBRS-DR-A-B1011 [3] HALL LOWER GROUND       20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING WALL         20018-NBRS-DR-A-B1012 [1] HALL UPPER ROOF PLAN       20018-NBRS-DR-A-C6001 [3] TEACHING BUILDING WALL         20018-NBRS-DR-A-B1012 [5] HALL CONC SETOUT PLAN       20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING STAIRS - STAIR 4         20018-NBRS-DR-A-B3001 [6                                                                                                                                                                                                                                                                                                                                                 | 20018-NBRS-DR-A-8101 [3] WINDOW SCHEDULE -      | 20018-NBRS-DR-A-C1508 [2] C3 TEACHING BUILDING   |  |  |  |  |
| 20018-NBRS-DR-A-8301 [5] WALL TYPE SCHEDULE -       20018-NBRS-A-A-A-A-C3001 [6] TEACHING BUILDING         EXTERNAL       20018-NBRS-DR-A-C3002 [6] TEACHING BUILDING         20018-NBRS-DR-A-8302 [2] WALL TYPE SCHEDULE -       20018-NBRS-DR-A-C3002 [6] TEACHING BUILDING         20018-NBRS-DR-A-A1001 [11] ADMIN LOWER GROUND       20018-NBRS-DR-A-C3003 [6] C1 TEACHING BUILDING         PLAN       20018-NBRS-DR-A-C3004 [6] C2 TEACHING BUILDING         20018-NBRS-DR-A-A1011 [5] ADMIN ROOF PLAN       20018-NBRS-DR-A-C3004 [6] C2 TEACHING BUILDING         20018-NBRS-DR-A-A1501 [5] ADMIN CONC SETOUT       20018-NBRS-DR-A-C3005 [6] C3 TEACHING BUILDING         20018-NBRS-DR-A-A1501 [5] ADMIN ELEVATIONS       20018-NBRS-DR-A-C4001 [6] TEACHING BUILDING         20018-NBRS-DR-A-A3001 [6] ADMIN ELEVATIONS       20018-NBRS-DR-A-C4001 [6] TEACHING BUILDING         20018-NBRS-DR-A-B1001 [9] HALL LOWER GROUND       20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING         20018-NBRS-DR-A-B1001 [9] HALL LOWER GROUND       20018-NBRS-DR-A-C5402 [1] TEACHING BUILDING WALL         20018-NBRS-DR-A-B1011 [3] HALL LOWER GROOF PLAN       20018-NBRS-DR-A-C5402 [3] TEACHING BUILDING         20018-NBRS-DR-A-B1011 [3] HALL LOWER GROOF PLAN       20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING         20018-NBRS-DR-A-B1011 [5] HALL CONC SETOUT PLAN       20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING         20018-NBRS-DR-A-B1011 [5] HALL CONC SETOUT PLAN       20018-NBRS-DR-A-C6003 [3] TEACHING BUILDING                                                                                                                                                                                                                                                                                                                                                      | VISUAL                                          | CONC SETOUT PLAN UPPER GROUND                    |  |  |  |  |
| EXTERNALELEVATIONS 120018-NBRS-DR-A-8302 [2] WALL TYPE SCHEDULE -<br>INTERNAL20018-NBRS-DR-A-C3002 [6] TEACHING BUILDING<br>ELEVATIONS 220018-NBRS-DR-A-A1001 [11] ADMIN LOWER GROUND20018-NBRS-DR-A-C3003 [6] C1 TEACHING BUILDING<br>ELEVATIONS20018-NBRS-DR-A-A1011 [5] ADMIN ROOF PLAN20018-NBRS-DR-A-C3004 [6] C2 TEACHING BUILDING<br>ELEVATIONS20018-NBRS-DR-A-A1011 [5] ADMIN CONC SETOUT<br>20018-NBRS-DR-A-C3005 [6] C3 TEACHING BUILDING<br>ELEVATIONS20018-NBRS-DR-A-C3005 [6] C3 TEACHING BUILDING<br>ELEVATIONS20018-NBRS-DR-A-A3001 [6] ADMIN ELEVATIONS20018-NBRS-DR-A-C4001 [6] TEACHING BUILDING<br>SECTIONS 120018-NBRS-DR-A-A4001 [6] ADMIN SECTIONS20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING<br>SECTIONS 220018-NBRS-DR-A-B1001 [9] HALL LOWER GROUND<br>PLAN20018-NBRS-DR-A-C5401 [1] TEACHING BUILDING WALL<br>SECTIONS - 120018-NBRS-DR-A-B1011 [3] HALL LOWER GROUND<br>PLAN20018-NBRS-DR-A-C6001 [3] TEACHING BUILDING WALL<br>SECTIONS - 120018-NBRS-DR-A-B1011 [2] HALL LOWER GROUND<br>PLAN20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING WALL<br>SECTIONS - 220018-NBRS-DR-A-B1011 [2] HALL CONC SETOUT PLAN<br>20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING<br>STAIRS - STAIR 320018-NBRS-DR-A-B1011 [6] HALL ELEVATIONS 1<br>20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING<br>STAIRS - STAIR 420018-NBRS-DR-A-B3002 [6] HALL ELEVATIONS 220018-NBRS-DR-A-B3002 [6] HALL ELEVATIONS 220018-NBRS-DR-A-B4001 [6] HALL SECTIONS 220018-NBRS-DR-                                                                                                                                                                                                                                                        | 20018-NBRS-DR-A-8301 [5] WALL TYPE SCHEDULE -   | 20018-NBRS-DR-A-C3001 [6] TEACHING BUILDING      |  |  |  |  |
| 20018-NBRS-DR-A-8302 [2] WALL TYPE SCHEDULE -       20018-NBRS-DR-A-C3002 [6] TEACHING BUILDING         INTERNAL       ELEVATIONS 2         20018-NBRS-DR-A-A1001 [11] ADMIN LOWER GROUND       20018-NBRS-DR-A-C3003 [6] C1 TEACHING BUILDING         PLAN       20018-NBRS-DR-A-C3004 [6] C2 TEACHING BUILDING         20018-NBRS-DR-A-A1501 [5] ADMIN CONC SETOUT       20018-NBRS-DR-A-C3005 [6] C3 TEACHING BUILDING         20018-NBRS-DR-A-A1501 [5] ADMIN CONC SETOUT       20018-NBRS-DR-A-C3005 [6] C3 TEACHING BUILDING         20018-NBRS-DR-A-A1501 [6] ADMIN ELEVATIONS       20018-NBRS-DR-A-C4001 [6] TEACHING BUILDING         20018-NBRS-DR-A-A4001 [6] ADMIN SECTIONS       20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING         20018-NBRS-DR-A-B1001 [9] HALL LOWER GROUND       20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING WALL         20018-NBRS-DR-A-B1011 [9] HALL LOWER GROUND       20018-NBRS-DR-A-C6001 [1] TEACHING BUILDING WALL         20018-NBRS-DR-A-B1012 [1] HALL UPPER ROOF PLAN       20018-NBRS-DR-A-C6001 [3] TEACHING BUILDING WALL         20018-NBRS-DR-A-B1012 [1] HALL UPPER ROOF PLAN       20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING         20018-NBRS-DR-A-B1012 [1] HALL UPPER ROOF PLAN       20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING         20018-NBRS-DR-A-B1012 [1] HALL CONC SETOUT PLAN       20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING         20018-NBRS-DR-A-B3002 [6] HALL ELEVATIONS 1       20018-NBRS-DR-A-C6003 [3] TEACHING BUILDING         20018-NBRS-DR-A-B3002 [6]                                                                                                                                                                                                                                                                                                                                                 | EXTERNAL                                        | ELEVATIONS 1                                     |  |  |  |  |
| INTERNALELEVATIONS 220018-NBRS-DR-A-A1001 [11] ADMIN LOWER GROUND20018-NBRS-DR-A-C3003 [6] C1 TEACHING BUILDING20018-NBRS-DR-A-A1011 [5] ADMIN ROOF PLAN20018-NBRS-DR-A-C3004 [6] C2 TEACHING BUILDING20018-NBRS-DR-A-A1011 [5] ADMIN CONC SETOUT20018-NBRS-DR-A-C3005 [6] C3 TEACHING BUILDING20018-NBRS-DR-A-A1001 [6] ADMIN ELEVATIONS20018-NBRS-DR-A-C3005 [6] C3 TEACHING BUILDING20018-NBRS-DR-A-A3001 [6] ADMIN ELEVATIONS20018-NBRS-DR-A-C4001 [6] TEACHING BUILDING20018-NBRS-DR-A-A4001 [6] ADMIN SECTIONS20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING20018-NBRS-DR-A-B1001 [9] HALL LOWER GROUND20018-NBRS-DR-A-C5402 [1] TEACHING BUILDING WALL20018-NBRS-DR-A-B1011 [3] HALL LOWER GROUND20018-NBRS-DR-A-C5402 [1] TEACHING BUILDING WALL20018-NBRS-DR-A-B1011 [3] HALL LOWER ROOF PLAN20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING WALL20018-NBRS-DR-A-B1011 [1] HALL UPPER ROOF PLAN20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING20018-NBRS-DR-A-B1011 [5] HALL CONC SETOUT PLAN20018-NBRS-DR-A-C6003 [3] TEACHING BUILDING20018-NBRS-DR-A-B1011 [5] HALL CONC SETOUT PLAN20018-NBRS-DR-A-C6003 [3] TEACHING BUILDING20018-NBRS-DR-A-B1011 [5] HALL ELEVATIONS 120018-NBRS-DR-A-C6003 [3] TEACHING BUILDING20018-NBRS-DR-A-B1011 [5] HALL ELEVATIONS 220018-NBRS-DR-A-D1001 [8] LIBRARY LOWER GROUND20018-NBRS-DR-A-B3001 [6] HALL ELEVATIONS 220018-NBRS-DR-A-D1002 [8] LIBRARY UPPER GROUND20018-NBRS-DR-A-B3001 [6] HALL ELEVATIONS 220018-NBRS-DR-A-D1002 [8] LIBRARY UPPER GROUND20018-NBRS-DR-A-B4001 [6] HALL SECTIONS -20018-NBRS-DR-A-D1002 [8] LIBRARY UPPER GROUND20018-NBRS-DR-A-                                                                                                                                                                                                                                                                                           | 20018-NBRS-DR-A-8302 [2] WALL TYPE SCHEDULE -   | 20018-NBRS-DR-A-C3002 [6] TEACHING BUILDING      |  |  |  |  |
| 20018-NBRS-DR-A-A1001 [11] ADMIN LOWER GROUND<br>PLAN20018-NBRS-DR-A-C3003 [6] C1 TEACHING BUILDING<br>ELEVATIONS20018-NBRS-DR-A-A1011 [5] ADMIN ROOF PLAN20018-NBRS-DR-A-C3004 [6] C2 TEACHING BUILDING<br>ELEVATIONS20018-NBRS-DR-A-A1501 [5] ADMIN CONC SETOUT<br>LOWER GROUND20018-NBRS-DR-A-C3005 [6] C3 TEACHING BUILDING<br>ELEVATIONS20018-NBRS-DR-A-A3001 [6] ADMIN ELEVATIONS20018-NBRS-DR-A-C4001 [6] TEACHING BUILDING<br>SECTIONS 120018-NBRS-DR-A-A4001 [6] ADMIN SECTIONS20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING<br>SECTIONS 220018-NBRS-DR-A-B1001 [9] HALL LOWER GROUND<br>PLAN20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING WALL<br>SECTIONS 220018-NBRS-DR-A-B1011 [3] HALL LOWER ROOF PLAN20018-NBRS-DR-A-C5402 [1] TEACHING BUILDING WALL<br>SECTIONS - 120018-NBRS-DR-A-B1012 [1] HALL LOWER ROOF PLAN20018-NBRS-DR-A-C6001 [3] TEACHING BUILDING WALL<br>SECTIONS - 220018-NBRS-DR-A-B1012 [1] HALL UPPER ROOF PLAN20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING<br>STAIRS - STAIR 320018-NBRS-DR-A-B1012 [1] HALL CONC SETOUT PLAN<br>LOWER GROUND20018-NBRS-DR-A-C6003 [3] TEACHING BUILDING<br>STAIRS - STAIR 420018-NBRS-DR-A-B3001 [6] HALL ELEVATIONS 120018-NBRS-DR-A-C6003 [3] TEACHING BUILDING<br>STAIRS - STAIR 420018-NBRS-DR-A-B4001 [6] HALL SECTIONS 220018-NBRS-DR-A-D1001 [8] LIBRARY LOWER GROUND<br>PLAN20018-NBRS-DR-A-B4001 [6] HALL SECTIONS -20018-NBRS-DR-A-D1002 [8] LIBRARY UPPER GROUND<br>PLAN20018-NBRS-DR-A-B5401 [1] HALL WALL SECTIONS -20018-NBRS-DR-A-D1001 [6] LIBRARY CONC SETOUT<br>PLAN LOWER GROUND20018-NBRS-DR-A-B5401 [1] HALL WALL SECTIONS -20018-NBRS-DR-A-D1001 [5] LIBRARY CONC SETOUT<br>PLAN LOWER GROUND </td <td>INTERNAL</td> <td>ELEVATIONS 2</td>                                                                                                                                                                     | INTERNAL                                        | ELEVATIONS 2                                     |  |  |  |  |
| PLAN         ELEVATIONS           20018-NBRS-DR-A-A1011 [5] ADMIN ROOF PLAN         20018-NBRS-DR-A-C3004 [6] C2 TEACHING BUILDING<br>ELEVATIONS           20018-NBRS-DR-A-A1501 [5] ADMIN CONC SETOUT         20018-NBRS-DR-A-C3005 [6] C3 TEACHING BUILDING<br>ELEVATIONS           20018-NBRS-DR-A-A3001 [6] ADMIN ELEVATIONS         20018-NBRS-DR-A-C4001 [6] TEACHING BUILDING<br>SECTIONS 1           20018-NBRS-DR-A-A4001 [6] ADMIN SECTIONS         20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING<br>SECTIONS 2           20018-NBRS-DR-A-B1001 [9] HALL LOWER GROUND         20018-NBRS-DR-A-C5401 [1] TEACHING BUILDING WALL<br>SECTIONS - 1           20018-NBRS-DR-A-B1001 [9] HALL LOWER GROUND         20018-NBRS-DR-A-C5402 [1] TEACHING BUILDING WALL<br>SECTIONS - 1           20018-NBRS-DR-A-B1011 [3] HALL LOWER ROOF PLAN         20018-NBRS-DR-A-C5002 [1] TEACHING BUILDING WALL<br>SECTIONS - 2           20018-NBRS-DR-A-B1012 [1] HALL UPPER ROOF PLAN         20018-NBRS-DR-A-C6001 [3] TEACHING BUILDING<br>STAIRS - STAIR 3           20018-NBRS-DR-A-B1011 [5] HALL CONC SETOUT PLAN         20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING<br>STAIRS - STAIR 5           20018-NBRS-DR-A-B3001 [6] HALL ELEVATIONS 1         20018-NBRS-DR-A-C6003 [3] TEACHING BUILDING<br>STAIRS - STAIR 5           20018-NBRS-DR-A-B3002 [6] HALL ELEVATIONS 2         20018-NBRS-DR-A-C1001 [8] LIBRARY LOWER GROUND<br>PLAN           20018-NBRS-DR-A-B4001 [6] HALL SECTIONS -<br>SHEET 1         20018-NBRS-DR-A-D1001 [8] LIBRARY UPPER GROUND<br>PLAN           20018-NBRS-DR-A-B5402 [1] HALL WALL SECTIONS -<br>SHEET 2         20018-NBR                                                                                                                                                                                                                                  | 20018-NBRS-DR-A-A1001 [11] ADMIN LOWER GROUND   | 20018-NBRS-DR-A-C3003 [6] C1 TEACHING BUILDING   |  |  |  |  |
| 20018-NBRS-DR-A-A1011 [5] ADMIN ROOF PLAN20018-NBRS-DR-A-C3004 [6] C2 TEACHING BUILDING<br>ELEVATIONS20018-NBRS-DR-A-A1501 [5] ADMIN CONC SETOUT<br>LOWER GROUND20018-NBRS-DR-A-C3005 [6] C3 TEACHING BUILDING<br>ELEVATIONS20018-NBRS-DR-A-A3001 [6] ADMIN ELEVATIONS20018-NBRS-DR-A-C4001 [6] TEACHING BUILDING<br>SECTIONS 120018-NBRS-DR-A-B1001 [9] HALL LOWER GROUND<br>PLAN20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING WALL<br>SECTIONS 220018-NBRS-DR-A-B1001 [9] HALL LOWER GROUND<br>PLAN20018-NBRS-DR-A-C5402 [1] TEACHING BUILDING WALL<br>SECTIONS - 120018-NBRS-DR-A-B1011 [3] HALL LOWER ROOF PLAN<br>SU018-NBRS-DR-A-B1012 [1] HALL UPPER ROOF PLAN<br>LOWER GROUND20018-NBRS-DR-A-C6001 [3] TEACHING BUILDING WALL<br>SECTIONS - 220018-NBRS-DR-A-B1012 [1] HALL UPPER ROOF PLAN<br>LOWER GROUND20018-NBRS-DR-A-C6001 [3] TEACHING BUILDING<br>STAIRS - STAIR 320018-NBRS-DR-A-B3001 [6] HALL ELEVATIONS 1<br>20018-NBRS-DR-A-B3002 [6] HALL ELEVATIONS 220018-NBRS-DR-A-C6003 [3] TEACHING BUILDING<br>STAIRS - STAIR 420018-NBRS-DR-A-B3002 [6] HALL ELEVATIONS 220018-NBRS-DR-A-D1001 [8] LIBRARY LOWER GROUND<br>PLAN20018-NBRS-DR-A-B4001 [6] HALL SECTIONS -<br>SHEET 120018-NBRS-DR-A-D1002 [8] LIBRARY UPPER GROUND<br>PLAN20018-NBRS-DR-A-B5401 [1] HALL WALL SECTIONS -<br>SHEET 120018-NBRS-DR-A-D1501 [5] LIBRARY CONC SETOUT<br>PLAN UPPER GROUND<br>PLAN20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING -<br>SHEET 220018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT<br>PLAN UPPER GROUND<br>PLAN UPPER GROUND<br>PLAN UPPER GROUND                                                                                                                                                                                                                                                                                                                                         | PLAN                                            | ELEVATIONS                                       |  |  |  |  |
| ELEVATIONS20018-NBRS-DR-A-A1501 [5] ADMIN CONC SETOUT<br>LOWER GROUND20018-NBRS-DR-A-C3005 [6] C3 TEACHING BUILDING<br>ELEVATIONS20018-NBRS-DR-A-A3001 [6] ADMIN ELEVATIONS20018-NBRS-DR-A-C4001 [6] TEACHING BUILDING<br>SECTIONS 120018-NBRS-DR-A-A4001 [6] ADMIN SECTIONS20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING<br>SECTIONS 220018-NBRS-DR-A-B1001 [9] HALL LOWER GROUND<br>PLAN20018-NBRS-DR-A-C5402 [6] TEACHING BUILDING WALL<br>SECTIONS - 120018-NBRS-DR-A-B1011 [3] HALL LOWER GROUND<br>PLAN20018-NBRS-DR-A-C5402 [1] TEACHING BUILDING WALL<br>SECTIONS - 120018-NBRS-DR-A-B1012 [1] HALL UPPER ROOF PLAN<br>20018-NBRS-DR-A-B1012 [5] HALL CONC SETOUT PLAN<br>20018-NBRS-DR-A-B1001 [5] HALL CONC SETOUT PLAN<br>20018-NBRS-DR-A-B1001 [6] HALL ELEVATIONS 1<br>20018-NBRS-DR-A-B1001 [6] HALL ELEVATIONS 1<br>20018-NBRS-DR-A-B3002 [6] HALL ELEVATIONS 2<br>20018-NBRS-DR-A-B3002 [6] HALL ELEVATIONS 2<br>20018-NBRS-DR-A-B5401 [1] HALL WALL SECTIONS -<br>20018-NBRS-DR-A-B5401 [1] HALL WALL SECTIONS -<br>20018-NBRS-DR-A-D1011 [5] LIBRARY CONC SETOUT<br>PLAN20018-NBRS-DR-A-B5401 [1] HALL WALL SECTIONS -<br>SHEET 120018-NBRS-DR-A-D1011 [5] LIBRARY CONC SETOUT<br>PLAN<br>20018-NBRS-DR-A-D1501 [5] LIBRARY CONC SETOUT<br>PLAN UPPER GROUND<br>PLAN UPPER GROUND20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING<br>20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT<br>PLAN UPPER GROUND                                                                                                                                                                      | 20018-NBRS-DR-A-A1011 [5] ADMIN ROOF PLAN       | 20018-NBRS-DR-A-C3004 [6] C2 TEACHING BUILDING   |  |  |  |  |
| 20018-NBRS-DR-A-A1501 [5] ADMIN CONC SETOUT<br>LOWER GROUND20018-NBRS-DR-A-C3005 [6] C3 TEACHING BUILDING<br>ELEVATIONS20018-NBRS-DR-A-A3001 [6] ADMIN ELEVATIONS20018-NBRS-DR-A-C4001 [6] TEACHING BUILDING<br>SECTIONS 120018-NBRS-DR-A-A4001 [6] ADMIN SECTIONS20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING<br>SECTIONS 220018-NBRS-DR-A-B1001 [9] HALL LOWER GROUND<br>PLAN20018-NBRS-DR-A-C5401 [1] TEACHING BUILDING WALL<br>SECTIONS - 120018-NBRS-DR-A-B1011 [3] HALL LOWER GROOF PLAN20018-NBRS-DR-A-C5402 [1] TEACHING BUILDING WALL<br>SECTIONS - 120018-NBRS-DR-A-B1012 [1] HALL UPPER ROOF PLAN20018-NBRS-DR-A-C6001 [3] TEACHING BUILDING<br>STAIRS - STAIR 320018-NBRS-DR-A-B1012 [1] HALL CONC SETOUT PLAN20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING<br>STAIRS - STAIR 320018-NBRS-DR-A-B1001 [6] HALL ELEVATIONS 120018-NBRS-DR-A-C6003 [3] TEACHING BUILDING<br>STAIRS - STAIR 420018-NBRS-DR-A-B3002 [6] HALL ELEVATIONS 220018-NBRS-DR-A-C6003 [3] TEACHING BUILDING<br>STAIRS - STAIR 420018-NBRS-DR-A-B3002 [6] HALL ELEVATIONS 220018-NBRS-DR-A-D1001 [8] LIBRARY LOWER GROUND<br>PLAN20018-NBRS-DR-A-B4001 [6] HALL SECTIONS -<br>SHEET 120018-NBRS-DR-A-D1011 [5] LIBRARY UPPER GROUND<br>PLAN20018-NBRS-DR-A-B5402 [1] HALL WALL SECTIONS -<br>SHEET 120018-NBRS-DR-A-D1011 [5] LIBRARY CONC SETOUT<br>PLAN LOWER GROUND20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING -<br>SHEET 220018-NBRS-DR-A-D1011 [5] LIBRARY CONC SETOUT<br>PLAN LOWER GROUND20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING<br>BUILDING LOWER GROUND PLAN20018-NBRS-DR-A-D1501 [5] LIBRARY CONC SETOUT<br>PLAN LOWER GROUND                                                                                                                                                                                                                                                                              |                                                 | ELEVATIONS                                       |  |  |  |  |
| LOWER GROUNDELEVATIONS20018-NBRS-DR-A-A3001 [6] ADMIN ELEVATIONS20018-NBRS-DR-A-C4001 [6] TEACHING BUILDING<br>SECTIONS 120018-NBRS-DR-A-A4001 [6] ADMIN SECTIONS20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING<br>SECTIONS 220018-NBRS-DR-A-B1001 [9] HALL LOWER GROUND<br>PLAN20018-NBRS-DR-A-C5401 [1] TEACHING BUILDING WALL<br>SECTIONS - 120018-NBRS-DR-A-B1012 [1] HALL LOWER ROOF PLAN20018-NBRS-DR-A-C5402 [1] TEACHING BUILDING WALL<br>SECTIONS - 220018-NBRS-DR-A-B1012 [1] HALL UPPER ROOF PLAN20018-NBRS-DR-A-C6001 [3] TEACHING BUILDING WALL<br>SECTIONS - 220018-NBRS-DR-A-B1012 [1] HALL CONC SETOUT PLAN20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING<br>STAIRS - STAIR 320018-NBRS-DR-A-B1501 [5] HALL CONC SETOUT PLAN20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING<br>STAIRS - STAIR 320018-NBRS-DR-A-B3001 [6] HALL ELEVATIONS 120018-NBRS-DR-A-C6003 [3] TEACHING BUILDING<br>STAIRS - STAIR 520018-NBRS-DR-A-B3002 [6] HALL ELEVATIONS 220018-NBRS-DR-A-D1001 [8] LIBRARY LOWER GROUND<br>PLAN20018-NBRS-DR-A-B3002 [6] HALL SECTIONS -<br>SHEET 120018-NBRS-DR-A-D1001 [8] LIBRARY UPPER GROUND<br>PLAN20018-NBRS-DR-A-B5401 [1] HALL WALL SECTIONS -<br>SHEET 120018-NBRS-DR-A-D1011 [5] LIBRARY ROOF PLAN20018-NBRS-DR-A-B5401 [1] HALL WALL SECTIONS -<br>SHEET 220018-NBRS-DR-A-D1501 [5] LIBRARY CONC SETOUT<br>PLAN LOWER GROUND20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING<br>BUILDING LOWER GROUND PLAN20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT<br>PLAN LOWER GROUND20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING<br>BUILDING LOWER GROUND PLAN20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT<br>PLAN LOWER GROUND                                                                                                                                                                                                                                                      | 20018-NBRS-DR-A-A1501 [5] ADMIN CONC SETOUT     | 20018-NBRS-DR-A-C3005 [6] C3 TEACHING BUILDING   |  |  |  |  |
| 20018-NBRS-DR-A-A3001 [6] ADMIN ELEVATIONS20018-NBRS-DR-A-C4001 [6] TEACHING BUILDING<br>SECTIONS 120018-NBRS-DR-A-A4001 [6] ADMIN SECTIONS20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING<br>SECTIONS 220018-NBRS-DR-A-B1001 [9] HALL LOWER GROUND<br>PLAN20018-NBRS-DR-A-C5401 [1] TEACHING BUILDING WALL<br>SECTIONS - 120018-NBRS-DR-A-B1011 [3] HALL LOWER GROUP<br>PLAN20018-NBRS-DR-A-C5402 [1] TEACHING BUILDING WALL<br>SECTIONS - 120018-NBRS-DR-A-B1012 [1] HALL UPPER ROOF PLAN20018-NBRS-DR-A-C6001 [3] TEACHING BUILDING<br>STAIRS - STAIR 320018-NBRS-DR-A-B1012 [1] HALL CONC SETOUT PLAN<br>LOWER GROUND20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING<br>STAIRS - STAIR 420018-NBRS-DR-A-B3001 [6] HALL ELEVATIONS 1<br>20018-NBRS-DR-A-C6003 [3] TEACHING BUILDING<br>STAIRS - STAIR 420018-NBRS-DR-A-C6003 [3] TEACHING BUILDING<br>STAIRS - STAIR 420018-NBRS-DR-A-B3002 [6] HALL ELEVATIONS 2<br>20018-NBRS-DR-A-C6003 [3] TEACHING BUILDING<br>STAIRS - STAIR 520018-NBRS-DR-A-D1001 [8] LIBRARY LOWER GROUND<br>PLAN20018-NBRS-DR-A-B4001 [6] HALL SECTIONS -<br>SHEET 120018-NBRS-DR-A-D1002 [8] LIBRARY UPPER GROUND<br>PLAN20018-NBRS-DR-A-B5401 [1] HALL WALL SECTIONS -<br>SHEET 220018-NBRS-DR-A-D1001 [5] LIBRARY CONC SETOUT<br>PLAN LOWER GROUND20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING<br>BUILDING LOWER GROUND PLAN20018-NBRS-DR-A-D1501 [5] LIBRARY CONC SETOUT<br>PLAN LOWER GROUND20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING<br>BUILDING LOWER GROUND PLAN20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT<br>PLAN LOWER GROUND                                                                                                                                                                                                                                                                                                                                     | LOWER GROUND                                    | ELEVATIONS                                       |  |  |  |  |
| SEC HONS 120018-NBRS-DR-A-A4001 [6] ADMIN SECTIONS20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING<br>SECTIONS 220018-NBRS-DR-A-B1001 [9] HALL LOWER GROUND<br>PLAN20018-NBRS-DR-A-C5401 [1] TEACHING BUILDING WALL<br>SECTIONS - 120018-NBRS-DR-A-B1011 [3] HALL LOWER ROOF PLAN20018-NBRS-DR-A-C5402 [1] TEACHING BUILDING WALL<br>SECTIONS - 220018-NBRS-DR-A-B1012 [1] HALL UPPER ROOF PLAN20018-NBRS-DR-A-C6001 [3] TEACHING BUILDING<br>STAIRS - STAIR 320018-NBRS-DR-A-B1501 [5] HALL CONC SETOUT PLAN<br>LOWER GROUND20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING<br>STAIRS - STAIR 420018-NBRS-DR-A-B3001 [6] HALL ELEVATIONS 120018-NBRS-DR-A-C6003 [3] TEACHING BUILDING<br>STAIRS - STAIR 520018-NBRS-DR-A-B3002 [6] HALL ELEVATIONS 220018-NBRS-DR-A-D1001 [8] LIBRARY LOWER GROUND<br>PLAN20018-NBRS-DR-A-B4001 [6] HALL SECTIONS -<br>SHEET 120018-NBRS-DR-A-D1002 [8] LIBRARY UPPER GROUND<br>PLAN20018-NBRS-DR-A-B5401 [1] HALL WALL SECTIONS -<br>SHEET 220018-NBRS-DR-A-D1001 [5] LIBRARY CONC SETOUT<br>PLAN LOWER GROUND<br>PLAN LOWER GROUND20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING -<br>SU1DING LOWER GROUND PLAN20018-NBRS-DR-A-D1001 [5] LIBRARY CONC SETOUT<br>PLAN LOWER GROUND<br>PLAN LOWER GROUND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 20018-NBRS-DR-A-A3001 [6] ADMIN ELEVATIONS      | 20018-NBRS-DR-A-C4001 [6] TEACHING BUILDING      |  |  |  |  |
| 20018-NBRS-DR-A-A4001 [6] ADMIN SECTIONS20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING<br>SECTIONS 220018-NBRS-DR-A-B1011 [9] HALL LOWER GROUND<br>PLAN20018-NBRS-DR-A-C5401 [1] TEACHING BUILDING WALL<br>SECTIONS - 120018-NBRS-DR-A-B1011 [3] HALL LOWER ROOF PLAN20018-NBRS-DR-A-C5402 [1] TEACHING BUILDING WALL<br>SECTIONS - 220018-NBRS-DR-A-B1012 [1] HALL UPPER ROOF PLAN20018-NBRS-DR-A-C6001 [3] TEACHING BUILDING<br>STAIRS - STAIR 320018-NBRS-DR-A-B1011 [5] HALL CONC SETOUT PLAN20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING<br>STAIRS - STAIR 420018-NBRS-DR-A-B3001 [6] HALL ELEVATIONS 120018-NBRS-DR-A-C6002 [3] TEACHING BUILDING<br>STAIRS - STAIR 420018-NBRS-DR-A-B3002 [6] HALL ELEVATIONS 220018-NBRS-DR-A-C6003 [3] TEACHING BUILDING<br>STAIRS - STAIR 520018-NBRS-DR-A-B4001 [6] HALL SECTIONS 220018-NBRS-DR-A-D1001 [8] LIBRARY LOWER GROUND<br>PLAN20018-NBRS-DR-A-B5401 [1] HALL WALL SECTIONS -<br>SHEET 120018-NBRS-DR-A-D1011 [5] LIBRARY UPPER GROUND<br>PLAN20018-NBRS-DR-A-B5402 [1] HALL WALL SECTIONS -<br>SHEET 220018-NBRS-DR-A-D1001 [6] UBRARY CONC SETOUT<br>PLAN LOWER GROUND<br>20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING -<br>20018-NBRS-DR-A-D1501 [5] LIBRARY CONC SETOUT<br>PLAN LOWER GROUND<br>20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING<br>20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT<br>PLAN UPPER GROUND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                 | SECTIONS 1                                       |  |  |  |  |
| SECTIONS 220018-NBRS-DR-A-B1001 [9] HALL LOWER GROUND<br>PLAN20018-NBRS-DR-A-C5401 [1] TEACHING BUILDING WALL<br>SECTIONS - 120018-NBRS-DR-A-B1011 [3] HALL LOWER ROOF PLAN20018-NBRS-DR-A-C5402 [1] TEACHING BUILDING WALL<br>SECTIONS - 220018-NBRS-DR-A-B1012 [1] HALL UPPER ROOF PLAN20018-NBRS-DR-A-C6001 [3] TEACHING BUILDING<br>STAIRS - STAIR 320018-NBRS-DR-A-B1012 [1] HALL CONC SETOUT PLAN20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING<br>STAIRS - STAIR 420018-NBRS-DR-A-B3001 [6] HALL ELEVATIONS 120018-NBRS-DR-A-C6003 [3] TEACHING BUILDING<br>STAIRS - STAIR 420018-NBRS-DR-A-B3002 [6] HALL ELEVATIONS 220018-NBRS-DR-A-C6003 [3] TEACHING BUILDING<br>STAIRS - STAIR 520018-NBRS-DR-A-B4001 [6] HALL SECTIONS 220018-NBRS-DR-A-D1001 [8] LIBRARY LOWER GROUND<br>PLAN20018-NBRS-DR-A-B5401 [1] HALL WALL SECTIONS -<br>SHEET 120018-NBRS-DR-A-D1002 [8] LIBRARY UPPER GROUND<br>PLAN20018-NBRS-DR-A-B5402 [1] HALL WALL SECTIONS -<br>SHEET 220018-NBRS-DR-A-D1501 [5] LIBRARY CONC SETOUT<br>PLAN LOWER GROUND20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING<br>BUILDING LOWER GROUND PLAN20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT<br>PLAN UPPER GROUND20018-NBRS-DR-A-C1010 [6] OVERALL TEACHING<br>BUILDING LOWER GROUND PLAN20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT<br>PLAN UPPER GROUND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 20018-NBRS-DR-A-A4001 [6] ADMIN SECTIONS        | 20018-NBRS-DR-A-C4002 [6] LEACHING BUILDING      |  |  |  |  |
| 20018-NBRS-DR-A-B1001 [9] HALL LOWER GROUND<br>PLAN20018-NBRS-DR-A-C5401 [1] TEACHING BUILDING WALL<br>SECTIONS - 120018-NBRS-DR-A-B1011 [3] HALL LOWER ROOF PLAN<br>20018-NBRS-DR-A-B1012 [1] HALL UPPER ROOF PLAN<br>20018-NBRS-DR-A-B1012 [1] HALL UPPER ROOF PLAN<br>20018-NBRS-DR-A-B1012 [1] HALL ONC SETOUT PLAN<br>LOWER GROUND20018-NBRS-DR-A-C6001 [3] TEACHING BUILDING<br>STAIRS - STAIR 320018-NBRS-DR-A-B1501 [5] HALL CONC SETOUT PLAN<br>LOWER GROUND20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING<br>STAIRS - STAIR 420018-NBRS-DR-A-B3001 [6] HALL ELEVATIONS 1<br>20018-NBRS-DR-A-B3002 [6] HALL ELEVATIONS 2<br>20018-NBRS-DR-A-B3002 [6] HALL ELEVATIONS 2<br>20018-NBRS-DR-A-B4001 [6] HALL SECTIONS<br>20018-NBRS-DR-A-B4001 [6] HALL SECTIONS -<br>SHEET 1<br>20018-NBRS-DR-A-B5402 [1] HALL WALL SECTIONS -<br>20018-NBRS-DR-A-D1001 [5] LIBRARY UPPER GROUND<br>PLAN20018-NBRS-DR-A-B5402 [1] HALL WALL SECTIONS -<br>SHEET 220018-NBRS-DR-A-D1001 [5] LIBRARY ROOF PLAN<br>20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING<br>20018-NBRS-DR-A-D1501 [5] LIBRARY CONC SETOUT<br>PLAN LOWER GROUND20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING<br>BUILDING LOWER GROUND PLAN20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT<br>PLAN UPPER GROUND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                 | SECTIONS 2                                       |  |  |  |  |
| PLANSEC TIONS - 120018-NBRS-DR-A-B1011 [3] HALL LOWER ROOF PLAN20018-NBRS-DR-A-C5402 [1] TEACHING BUILDING WALL<br>SECTIONS - 220018-NBRS-DR-A-B1012 [1] HALL UPPER ROOF PLAN20018-NBRS-DR-A-C6001 [3] TEACHING BUILDING<br>STAIRS - STAIR 320018-NBRS-DR-A-B1501 [5] HALL CONC SETOUT PLAN<br>LOWER GROUND20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING<br>STAIRS - STAIR 420018-NBRS-DR-A-B3001 [6] HALL ELEVATIONS 120018-NBRS-DR-A-C6003 [3] TEACHING BUILDING<br>STAIRS - STAIR 520018-NBRS-DR-A-B3002 [6] HALL ELEVATIONS 220018-NBRS-DR-A-D1001 [8] LIBRARY LOWER GROUND<br>PLAN20018-NBRS-DR-A-B4001 [6] HALL SECTIONS20018-NBRS-DR-A-D1002 [8] LIBRARY UPPER GROUND<br>PLAN20018-NBRS-DR-A-B5401 [1] HALL WALL SECTIONS -<br>SHEET 120018-NBRS-DR-A-D1011 [5] LIBRARY ROOF PLAN20018-NBRS-DR-A-B5402 [1] HALL WALL SECTIONS -<br>SHEET 220018-NBRS-DR-A-D1001 [6] UIBRARY CONC SETOUT<br>PLAN LOWER GROUND20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING<br>BUILDING LOWER GROUND PLAN20018-NBRS-DR-A-D1501 [5] LIBRARY CONC SETOUT<br>PLAN LOWER GROUND20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING<br>BUILDING LOWER GROUND PLAN20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT<br>PLAN LOWER GROUND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 20018-NBRS-DR-A-B1001 [9] HALL LOWER GROUND     | 20018-NBRS-DR-A-C5401 [1] TEACHING BUILDING WALL |  |  |  |  |
| 20018-NBRS-DR-A-B1011 [3] HALL LOWER ROOF PLAN20018-NBRS-DR-A-C5402 [1] TEACHING BUILDING WALL<br>SECTIONS - 220018-NBRS-DR-A-B1012 [1] HALL UPPER ROOF PLAN20018-NBRS-DR-A-C6001 [3] TEACHING BUILDING<br>STAIRS - STAIR 320018-NBRS-DR-A-B1501 [5] HALL CONC SETOUT PLAN<br>LOWER GROUND20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING<br>STAIRS - STAIR 420018-NBRS-DR-A-B3001 [6] HALL ELEVATIONS 120018-NBRS-DR-A-C6003 [3] TEACHING BUILDING<br>STAIRS - STAIR 420018-NBRS-DR-A-B3002 [6] HALL ELEVATIONS 220018-NBRS-DR-A-C6003 [3] TEACHING BUILDING<br>STAIRS - STAIR 520018-NBRS-DR-A-B4001 [6] HALL SECTIONS 220018-NBRS-DR-A-D1001 [8] LIBRARY LOWER GROUND<br>PLAN20018-NBRS-DR-A-B5401 [1] HALL WALL SECTIONS -<br>SHEET 120018-NBRS-DR-A-D1011 [5] LIBRARY ROOF PLAN20018-NBRS-DR-A-B5402 [1] HALL WALL SECTIONS -<br>SHEET 220018-NBRS-DR-A-D1501 [5] LIBRARY CONC SETOUT<br>PLAN LOWER GROUND20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING<br>BUILDING LOWER GROUND PLAN20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT<br>PLAN UPPER GROUND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                 |                                                  |  |  |  |  |
| SEC HUNS - 220018-NBRS-DR-A-B1012 [1] HALL UPPER ROOF PLAN20018-NBRS-DR-A-C6001 [3] TEACHING BUILDING<br>STAIRS - STAIR 320018-NBRS-DR-A-B1501 [5] HALL CONC SETOUT PLAN<br>LOWER GROUND20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING<br>STAIRS - STAIR 420018-NBRS-DR-A-B3001 [6] HALL ELEVATIONS 120018-NBRS-DR-A-C6003 [3] TEACHING BUILDING<br>STAIRS - STAIR 520018-NBRS-DR-A-B3002 [6] HALL ELEVATIONS 220018-NBRS-DR-A-D1001 [8] LIBRARY LOWER GROUND<br>PLAN20018-NBRS-DR-A-B4001 [6] HALL SECTIONS20018-NBRS-DR-A-D1002 [8] LIBRARY UPPER GROUND<br>PLAN20018-NBRS-DR-A-B5401 [1] HALL WALL SECTIONS -<br>SHEET 120018-NBRS-DR-A-D1011 [5] LIBRARY ROOF PLAN20018-NBRS-DR-A-B5402 [1] HALL WALL SECTIONS -<br>SHEET 220018-NBRS-DR-A-D1501 [5] LIBRARY CONC SETOUT<br>PLAN20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING<br>BUILDING LOWER GROUND PLAN20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT<br>PLAN UPPER GROUND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 20018-NBRS-DR-A-B1011 [3] HALL LOWER ROOF PLAN  | 20018-NBRS-DR-A-C5402 [1] TEACHING BUILDING WALL |  |  |  |  |
| 20018-NBRS-DR-A-B1012 [1] HALL OPPER ROOF PLAN20018-NBRS-DR-A-C6001 [3] TEACHING BUILDING<br>STAIRS - STAIR 320018-NBRS-DR-A-B1501 [5] HALL CONC SETOUT PLAN<br>LOWER GROUND20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING<br>STAIRS - STAIR 420018-NBRS-DR-A-B3001 [6] HALL ELEVATIONS 120018-NBRS-DR-A-C6003 [3] TEACHING BUILDING<br>STAIRS - STAIR 520018-NBRS-DR-A-B3002 [6] HALL ELEVATIONS 220018-NBRS-DR-A-D1001 [8] LIBRARY LOWER GROUND<br>PLAN20018-NBRS-DR-A-B4001 [6] HALL SECTIONS20018-NBRS-DR-A-D1002 [8] LIBRARY UPPER GROUND<br>PLAN20018-NBRS-DR-A-B5401 [1] HALL WALL SECTIONS -<br>SHEET 120018-NBRS-DR-A-D1011 [5] LIBRARY ROOF PLAN20018-NBRS-DR-A-B5402 [1] HALL WALL SECTIONS -<br>SHEET 220018-NBRS-DR-A-D1501 [5] LIBRARY CONC SETOUT<br>PLAN LOWER GROUND20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING<br>BUILDING LOWER GROUND PLAN20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT<br>PLAN UPPER GROUND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                 |                                                  |  |  |  |  |
| STAIKS - STAIK 320018-NBRS-DR-A-B1501 [5] HALL CONC SETOUT PLAN<br>LOWER GROUND20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING<br>STAIRS - STAIR 420018-NBRS-DR-A-B3001 [6] HALL ELEVATIONS 120018-NBRS-DR-A-C6003 [3] TEACHING BUILDING<br>STAIRS - STAIR 520018-NBRS-DR-A-B3002 [6] HALL ELEVATIONS 220018-NBRS-DR-A-D1001 [8] LIBRARY LOWER GROUND<br>PLAN20018-NBRS-DR-A-B4001 [6] HALL SECTIONS 220018-NBRS-DR-A-D1002 [8] LIBRARY UPPER GROUND<br>PLAN20018-NBRS-DR-A-B4001 [6] HALL SECTIONS -<br>SHEET 120018-NBRS-DR-A-D1011 [5] LIBRARY UPPER GROUND<br>PLAN20018-NBRS-DR-A-B5402 [1] HALL WALL SECTIONS -<br>SHEET 220018-NBRS-DR-A-D1011 [5] LIBRARY CONC SETOUT<br>PLAN LOWER GROUND20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING<br>BUILDING LOWER GROUND PLAN20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT<br>PLAN UPPER GROUND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 20010-NDRS-DR-A-DIVIZ[I] HALL UPPER ROOF PLAN   |                                                  |  |  |  |  |
| 20018-NBRS-DR-A-B1501 [5] HALL CONC SETOUT PLAN<br>LOWER GROUND20018-NBRS-DR-A-C6002 [5] TEACHING BUILDING<br>STAIRS - STAIR 420018-NBRS-DR-A-B3001 [6] HALL ELEVATIONS 120018-NBRS-DR-A-C6003 [3] TEACHING BUILDING<br>STAIRS - STAIR 520018-NBRS-DR-A-B3002 [6] HALL ELEVATIONS 220018-NBRS-DR-A-D1001 [8] LIBRARY LOWER GROUND<br>PLAN20018-NBRS-DR-A-B4001 [6] HALL SECTIONS20018-NBRS-DR-A-D1002 [8] LIBRARY UPPER GROUND<br>PLAN20018-NBRS-DR-A-B5401 [1] HALL WALL SECTIONS -<br>SHEET 120018-NBRS-DR-A-D1011 [5] LIBRARY ROOF PLAN20018-NBRS-DR-A-B5402 [1] HALL WALL SECTIONS -<br>SHEET 220018-NBRS-DR-A-D1501 [5] LIBRARY CONC SETOUT<br>PLAN LOWER GROUND20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING<br>BUILDING LOWER GROUND PLAN20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT<br>PLAN UPPER GROUND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                 |                                                  |  |  |  |  |
| LOWER GROUNDSTAIRS - STAIR420018-NBRS-DR-A-B3001 [6] HALL ELEVATIONS 120018-NBRS-DR-A-C6003 [3] TEACHING BUILDING<br>STAIRS - STAIR 520018-NBRS-DR-A-B3002 [6] HALL ELEVATIONS 220018-NBRS-DR-A-D1001 [8] LIBRARY LOWER GROUND<br>PLAN20018-NBRS-DR-A-B4001 [6] HALL SECTIONS20018-NBRS-DR-A-D1002 [8] LIBRARY UPPER GROUND<br>PLAN20018-NBRS-DR-A-B5401 [1] HALL WALL SECTIONS -<br>SHEET 120018-NBRS-DR-A-D1011 [5] LIBRARY ROOF PLAN20018-NBRS-DR-A-B5402 [1] HALL WALL SECTIONS -<br>SHEET 220018-NBRS-DR-A-D1501 [5] LIBRARY CONC SETOUT<br>PLAN LOWER GROUND20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING<br>BUILDING LOWER GROUND PLAN20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT<br>PLAN UPPER GROUND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                 |                                                  |  |  |  |  |
| 20016-NBRS-DR-A-B3002 [6] HALL ELEVATIONS 1       20018-NBRS-DR-A-D1004 [6] LIBRARY LOWER GROUND         20018-NBRS-DR-A-B4001 [6] HALL SECTIONS       20018-NBRS-DR-A-D1002 [8] LIBRARY UPPER GROUND         20018-NBRS-DR-A-B4001 [6] HALL SECTIONS       20018-NBRS-DR-A-D1002 [8] LIBRARY UPPER GROUND         20018-NBRS-DR-A-B5401 [1] HALL WALL SECTIONS -       20018-NBRS-DR-A-D1011 [5] LIBRARY ROOF PLAN         20018-NBRS-DR-A-B5402 [1] HALL WALL SECTIONS -       20018-NBRS-DR-A-D1011 [5] LIBRARY CONC SETOUT         20018-NBRS-DR-A-B5402 [1] HALL WALL SECTIONS -       20018-NBRS-DR-A-D1501 [5] LIBRARY CONC SETOUT         20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING       20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT         PLAN       20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT         PLAN       20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                 |                                                  |  |  |  |  |
| 20018-NBRS-DR-A-B3002 [6] HALL ELEVATIONS 220018-NBRS-DR-A-D1001 [8] LIBRARY LOWER GROUND<br>PLAN20018-NBRS-DR-A-B4001 [6] HALL SECTIONS20018-NBRS-DR-A-D1002 [8] LIBRARY UPPER GROUND<br>PLAN20018-NBRS-DR-A-B5401 [1] HALL WALL SECTIONS -<br>SHEET 120018-NBRS-DR-A-D1011 [5] LIBRARY ROOF PLAN20018-NBRS-DR-A-B5402 [1] HALL WALL SECTIONS -<br>SHEET 220018-NBRS-DR-A-D1501 [5] LIBRARY CONC SETOUT<br>PLAN LOWER GROUND20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING<br>BUILDING LOWER GROUND PLAN20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT<br>PLAN UPPER GROUND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                 | STAIRS - STAIR 5                                 |  |  |  |  |
| 20018 NBRS-DR-A-B4001 [6] HALL SECTIONS       20018-NBRS-DR-A-D1002 [8] LIBRARY UPPER GROUND         20018-NBRS-DR-A-B5401 [1] HALL WALL SECTIONS -       20018-NBRS-DR-A-D1011 [5] LIBRARY ROOF PLAN         20018-NBRS-DR-A-B5402 [1] HALL WALL SECTIONS -       20018-NBRS-DR-A-D1011 [5] LIBRARY CONC SETOUT         20018-NBRS-DR-A-B5402 [1] HALL WALL SECTIONS -       20018-NBRS-DR-A-D1501 [5] LIBRARY CONC SETOUT         20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING       20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT         PLAN       20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 20018-NBRS-DR-A-B3002 [6] HALL FLEVATIONS 2     |                                                  |  |  |  |  |
| 20018-NBRS-DR-A-B4001 [6] HALL SECTIONS       20018-NBRS-DR-A-D1002 [8] LIBRARY UPPER GROUND         20018-NBRS-DR-A-B5401 [1] HALL WALL SECTIONS -       20018-NBRS-DR-A-D1011 [5] LIBRARY ROOF PLAN         20018-NBRS-DR-A-B5402 [1] HALL WALL SECTIONS -       20018-NBRS-DR-A-D1011 [5] LIBRARY CONC SETOUT         20018-NBRS-DR-A-B5402 [1] HALL WALL SECTIONS -       20018-NBRS-DR-A-D1501 [5] LIBRARY CONC SETOUT         20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING       20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT         PLAN       20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT         PLAN       PLAN LOWER GROUND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                 | PI AN                                            |  |  |  |  |
| 20018-NBRS-DR-A-B5401 [1] HALL WALL SECTIONS -<br>SHEET 1       20018-NBRS-DR-A-D1011 [5] LIBRARY ROOF PLAN         20018-NBRS-DR-A-B5402 [1] HALL WALL SECTIONS -<br>SHEET 2       20018-NBRS-DR-A-D1501 [5] LIBRARY CONC SETOUT<br>PLAN LOWER GROUND         20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING<br>BUILDING LOWER GROUND PLAN       20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT<br>PLAN UPPER GROUND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 20018-NBRS-DR-A-B4001 [6] HALL SECTIONS         | 20018-NBRS-DR-A-D1002 [8] LIBRARY LIPPER GROUND  |  |  |  |  |
| 20018-NBRS-DR-A-B5401 [1] HALL WALL SECTIONS -       20018-NBRS-DR-A-D1011 [5] LIBRARY ROOF PLAN         20018-NBRS-DR-A-B5402 [1] HALL WALL SECTIONS -       20018-NBRS-DR-A-D1501 [5] LIBRARY CONC SETOUT         20018-NBRS-DR-A-B5402 [1] HALL WALL SECTIONS -       20018-NBRS-DR-A-D1501 [5] LIBRARY CONC SETOUT         PLAN LOWER GROUND       20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT         PLAN LOWER GROUND       20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT         PLAN UPPER GROUND       PLAN UPPER GROUND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                 | PI AN                                            |  |  |  |  |
| SHEET 120018-NBRS-DR-A-B5402 [1] HALL WALL SECTIONS -<br>SHEET 220018-NBRS-DR-A-D1501 [5] LIBRARY CONC SETOUT<br>PLAN LOWER GROUND20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING<br>BUILDING LOWER GROUND PLAN20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT<br>PLAN UPPER GROUND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 20018-NBRS-DR-A-B5401 [1] HALL WALL SECTIONS -  | 20018-NBRS-DR-A-D1011 [5] LIBRARY ROOF PLAN      |  |  |  |  |
| 20018-NBRS-DR-A-B5402 [1] HALL WALL SECTIONS -<br>SHEET 220018-NBRS-DR-A-D1501 [5] LIBRARY CONC SETOUT<br>PLAN LOWER GROUND20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING<br>BUILDING LOWER GROUND PLAN20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | SHEET 1                                         |                                                  |  |  |  |  |
| SHEET 2       PLAN LOWER GROUND         20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING       20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT         BUILDING LOWER GROUND PLAN       PLAN UPPER GROUND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 20018-NBRS-DR-A-B5402 [1] HALL WALL SECTIONS -  | 20018-NBRS-DR-A-D1501 [5] LIBRARY CONC SETOUT    |  |  |  |  |
| 20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING       20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT         BUILDING LOWER GROUND PLAN       PLAN UPPER GROUND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | SHEET 2                                         | PLAN LOWER GROUND                                |  |  |  |  |
| BUILDING LOWER GROUND PLAN PLAN PLAN UPPER GROUND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING      | 20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT    |  |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | BUILDING LOWER GROUND PLAN                      | PLAN UPPER GROUND                                |  |  |  |  |

| Drawing number, name and revision              | Drawing number, name and revision              |
|------------------------------------------------|------------------------------------------------|
| 20018-NBRS-DR-A-C1002 [8] C1 TEACHING BUILDING | 20018-SCH007 DOOR SCHEDULE-Rev 2               |
| LOWER GROUND PLAN                              |                                                |
| 20018-NBRS-DR-A-D3001 [6] LIBRARY ELEVATIONS 1 | 20018-NBRS-DR-A-D3002 [6] LIBRARY ELEVATIONS 2 |
| 20018-NBRS-DR-A-D4001 [6] LIBRARY SECTIONS     | 20018-NBRS-DR-A-D6001 [3] LIBRARY STAIRS       |

Electrical drawings prepared by Stowe Australia

| Drawing number, name and revision | Drawing number, name and revision |  |  |  |  |
|-----------------------------------|-----------------------------------|--|--|--|--|
| WPS-STO-E000.00 1                 |                                   |  |  |  |  |
| WPS-STO-E000.01 1                 | WPS-STO-E300.01 1                 |  |  |  |  |
|                                   |                                   |  |  |  |  |
| WPS-STO-E200.01 1                 | WPS-STO-E310.01 1                 |  |  |  |  |
| WPS-STO-E210.01 1                 | WPS-STO-E320.01 1                 |  |  |  |  |
| WPS-STO-E220.01 1                 | WPS-STO-E320.02 1                 |  |  |  |  |
| WPS-STO-E220.02 1                 | WPS-STO-E330.01 1                 |  |  |  |  |
| WPS-STO-E230.01 1                 | WPS-STO-E600.01 1                 |  |  |  |  |
| WPS-STO-E300.01 1                 | WPS-STO-E600.02 1                 |  |  |  |  |

Security drawings prepared by Stowe Australia

| Drawing number, name and revision | Drawing number, name and revision |  |  |  |
|-----------------------------------|-----------------------------------|--|--|--|
| E100.02 1                         | E320.11.1                         |  |  |  |
| E300.11 1                         | E320.12 1                         |  |  |  |
| E310.11 1                         | E330.11 1                         |  |  |  |

Hydraulic drawings prepared by H.L. Mullane & Son Pty Ltd

| Drawing number, name and revision | Drawing number, name and revision |
|-----------------------------------|-----------------------------------|
| MARL-HY-DWG-H-000 2               | MARL-HY-DWG-H-203 2               |
| MARL-HY-DWG-H-001 2               | MARL-HY-DWG-H-300 2               |
| MARL-HY-DWG-H-002 2               | MARL-HY-DWG-H-301 2               |
| MARL-HY-DWG-H-100 3               | MARL-HY-DWG-H-302 2               |
| MARL-HY-DWG-H-101 2               | MARL-HY-DWG-H-303 2               |
| MARL-HY-DWG- H-200 2              | MARL-HY-DWG-H-304 2               |
| MARL-HY-DWG-H-202-2               | MARL-HY-DWG-H-400 1               |

Mechanical drawings prepared by Edwards & Vickerman Consulting Engineers Pty Ltd

| Drawing number, name and revision | Drawing number, name and revision |
|-----------------------------------|-----------------------------------|
| ME-100-01                         | ME-C2-300 01                      |
| ME-A-200 00                       | ME-C2-301 01                      |
| ME-A-300 01                       | ME -C3-200 00                     |
| ME-A-400 01                       | ME-C3-300 01                      |
| ME-B-200 00                       | ME-C3-301 01                      |
| ME-B-300 01                       | ME-C-300 00                       |
| ME-B-301 01                       | ME-C-301 00                       |
| ME-B-400 01                       | ME-C-400 01                       |
| ME-C1-200 00                      | ME-D-200 00                       |
| ME-C1-300 01                      | ME-D-300 01                       |
| ME-C1-301 01                      | ME-D-301 00                       |
| ME C2-200 00                      | ME-D-400 01                       |

Landscaping drawings prepared by NBRS Architecture

| Drawing number, name and revision | Drawing number, name and revision |
|-----------------------------------|-----------------------------------|
| 20018-NBRS-LWD-000 5              | 20018-NBRS-LWD-309 6              |
| 20018-NBRS-LWD-001 4              | 20018-NBRS-LWD-310 6              |
| 20018-NBRS-LWD-010 4              | 20018-NBRS-LWD-311 6              |
| 20018-NBRS-LWD-100 4              | 20018-NBRS-LWD-312 6              |
| 20018-NBRS-LWD-101 5              | 20018-NBRS-LWD-400 4              |
| 20018-NBRS-LWD-102 5              | 20018-NBRS-LWD-401 4              |
| 20018-NBRS-LWD-103 5              | 20018-NBRS-LWD-402 4              |
| 20018-NBRS-LWD-104 5              | 20018-NBRS-LWD-403 4              |
| 20018-NBRS-LWD-105 5              | 20018-NBRS-LWD-404 4              |
| 20018-NBRS-LWD-106 5              | 20018-NBRS-LWD-405 4              |
| 20018-NBRS-LWD-107 5              | 20018-NBRS-LWD-406 4              |

| Drawing number, name and revision | Drawing number, name and revision |
|-----------------------------------|-----------------------------------|
| 20018-NBRS-LWD-108 5              | 20018-NBRS-LWD-407 4              |
| 20018-NBRS-LWD-109 5              | 20018-NBRS-LWD-408 4              |
| 20018-NBRS-LWD-110 5              | 20018-NBRS-LWD-409 4              |
| 20018-NBRS-LWD-111 5              | 20018-NBRS-LWD-410 4              |
| 20018-NBRS-LWD-112 5              | 20018-NBRS-LWD-411 4              |
| 20018-NBRS-LWD-113 4              | 20018-NBRS-LWD-412 4              |
| 20018-NBRS-LWD-301 6              | 20018-NBRS-LWD-500 4              |
| 20018-NBRS-LWD-302 6              | 20018-NBRS-LWD-501 4              |
| 20018-NBRS-LWD-303 6              | 20018-NBRS-LWD-502 4              |
| 20018-NBRS-LWD-304 6              | 20018-NBRS-LWD-503 4              |
| 20018-NBRS-LWD-305 6              | 20018-NBRS-LWD-504 4              |
| 20018-NBRS-LWD-306 6              | 20018-NBRS-LWD-601 3              |
| 20018-NBRS-LWD-307 6              | 20018-NBRS-LWD-602                |
| 20018-NBRS-LWD-308 6              |                                   |

### **APPENDIX B – TYPE OF CONSTRUCTION REQUIREMENTS**

The following table lists the fire resistance levels required for the new Type C Construction buildings ie the Admin Building and also the Hall Building.

| Building Element                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Fire Resistance Level in minutes<br>Structural adequacy/Integrity/Insulation<br>Required for Class 5, 7b & 9b |  |  |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|--|--|--|
| External wall (including any column and other building element incorporated therein) or other external                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                               |  |  |  |
| building element, where the distance from any fire source feature to whether the distance from any fire source feature to whether the distance from any fire source feature to whether the distance from any fire source feature to whether the distance from any fire source feature to whether the distance from any fire source feature to whether the distance from any fire source feature to whether the distance from any fire source feature to whether the distance from any fire source feature to whether the distance from any fire source feature to whether the distance from any fire source feature to whether the distance from any fire source feature to whether the distance from any fire source feature to whether the distance from any fire source feature to whether the distance from any fire source feature to whether the distance from any fire source feature to whether the distance from any fire source feature to whether the distance from any fire source feature to whether the distance from any fire source feature to whether the distance from any fire source feature to whether the distance from any fire source feature to whether the distance from any fire source feature to whether the distance from any fire source feature to whether the distance from any fire source feature to whether the distance from any fire source feature to whether the distance from any fire source feature to whether the distance from any fire source feature to whether the distance feature to whether to wheth | nich it is exposed is -                                                                                       |  |  |  |
| Less than 1.5m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 90/90/90                                                                                                      |  |  |  |
| 1.5 to less than 3m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 60/60/60                                                                                                      |  |  |  |
| 3m or more                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -/-/-                                                                                                         |  |  |  |
| External column not incorporated in an external wall, where the distant                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | nce from any fire source feature to                                                                           |  |  |  |
| which it is exposed is -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                               |  |  |  |
| Less than 1.5m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 90/-/-                                                                                                        |  |  |  |
| 1.5 to less than 3m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 60/-/-                                                                                                        |  |  |  |
| 3m or more                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -/-/-                                                                                                         |  |  |  |
| Common wall and fire walls                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 90/90/90                                                                                                      |  |  |  |
| Internal walls bounding a stair if required to be rated                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 60/60/60                                                                                                      |  |  |  |
| Roofs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | -/-/-                                                                                                         |  |  |  |

The following table lists the fire resistance levels required for the new Type B Construction building ie the Homebase Building.

| Building Element                                                                                              | Fire Resistance Level in minutes<br>Structural adequacy/Integrity/Insulation |  |  |  |  |  |
|---------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|--|--|--|--|--|
| <b>External wall</b> (including any column and other building element incorporated therein) or other external |                                                                              |  |  |  |  |  |
| building element, where the distance from any fire source feature to which                                    | h it is exposed is -                                                         |  |  |  |  |  |
| For <i>loadbearing</i> parts                                                                                  |                                                                              |  |  |  |  |  |
| Less than 1.5m                                                                                                | 120/120/120                                                                  |  |  |  |  |  |
| 1.5 to less than 3m 120/90/60                                                                                 |                                                                              |  |  |  |  |  |
| 3 to less than 9m                                                                                             | 120/30/30                                                                    |  |  |  |  |  |
| 9 to less than 18m                                                                                            | 120/30/-                                                                     |  |  |  |  |  |
| 18m or more                                                                                                   | _/_/-                                                                        |  |  |  |  |  |
| For non-loadbearing parts                                                                                     |                                                                              |  |  |  |  |  |
| Less than 1.5m                                                                                                | -/120/120                                                                    |  |  |  |  |  |
| 1.5 to less than 3m                                                                                           | -/90/60                                                                      |  |  |  |  |  |
| 3m or more -/-/-                                                                                              |                                                                              |  |  |  |  |  |
| <b>External column</b> not incorporated in an external wall, where the distance                               | e from any fire source feature to                                            |  |  |  |  |  |
| which it is exposed is -                                                                                      | 1                                                                            |  |  |  |  |  |
| For loadbearing column - less than 18m                                                                        | 120/-/-                                                                      |  |  |  |  |  |
| For loadbearing columns - 18m or more                                                                         | -/-/-                                                                        |  |  |  |  |  |
| For non-loadbearing columns                                                                                   | _/_/_                                                                        |  |  |  |  |  |
| Common wall and fire walls                                                                                    | 120/120/120                                                                  |  |  |  |  |  |
| Internal walls                                                                                                |                                                                              |  |  |  |  |  |
| Fire resisting lift and stair shafts                                                                          |                                                                              |  |  |  |  |  |
| Loadbearing                                                                                                   | 120/120/120                                                                  |  |  |  |  |  |
| Fire resisting stair shafts                                                                                   |                                                                              |  |  |  |  |  |
| Non-loadbearing                                                                                               | -/120/120                                                                    |  |  |  |  |  |
| Bounding <i>public corridors</i> , public lobbies and the like                                                |                                                                              |  |  |  |  |  |
| Loadbearing                                                                                                   | 120/-/-                                                                      |  |  |  |  |  |
| Non-loadbearing                                                                                               | _/_/-                                                                        |  |  |  |  |  |
| Between or bounding sole-occupancy units                                                                      |                                                                              |  |  |  |  |  |
| Loadbearing                                                                                                   | 120/-/-                                                                      |  |  |  |  |  |
| Non-loadbearing                                                                                               | _/_/-                                                                        |  |  |  |  |  |
| Other loadbearing internal walls and columns 120/-/-                                                          |                                                                              |  |  |  |  |  |
| Roofs                                                                                                         | _/_/_                                                                        |  |  |  |  |  |

Aconex

1203 - Warnervale New Primary School 75 Warnervale Road Warnervale NSW 2259 Australia

MAIL TYPE General Correspondence MAIL NUMBER NBRS-GCOR-000382 REFERENCE NUMBER NBRS-GCOR-000360

NBRSARCHITECTURE.

# Re: re: WVPS - SSDA B4 External wall compliance table - MBC Comment 161120

| From   | James Kim - NBRSARCHITECTURE                                  |
|--------|---------------------------------------------------------------|
| То     | Mr Sean Moore - Metro Building Consultancy                    |
| Cc (4) | Katie Lawson-Craig - NBRSARCHITECTURE                         |
|        | Ms Stephanie Wong - NBRSARCHITECTURE                          |
|        | Mr Chris Hamilton - Richard Crookes Constructions Pty Limited |
|        | Mr Adrian Connell - Richard Crookes Constructions Pty Limited |
| Sent   | Tuesday, 17 November 2020                                     |

Sent

✓ MESSAGE

Hi Sean

as discussed, please find attached response to BCA report R05 (50%) for your information. also confirm we will implement additional notes in the Cerama PANEL report dated 10/11/2020

regards

James

From: J Kim Sent: 17/11/2020 2:06:16 PM AEDT (GMT +11:00) To: Sean Moore Cc: Katie Lawson-Craig, Stephanie Wong, Adrian Connell, Chris Hamilton Mail Number: NBRS-GCOR-000381 Subject: Re: re: WVPS - SSDA B4 External wall compliance table - MBC Comment 161120

Good afternoon Sean

Majority of detail screenshots in Cerama PANEL report is from NBRS wall details and slab edge details, except for Figure7, 9, 11 and 12.

Figure 7 is not proposed and Figure 5 will be used throughout.

Also we will implement detail figures 9, 11 an 12 in the report

| METRO                                                                                                                                                                                                                  | BC                                                                              |                                                                                   |                                                                                                          |                                                               |                                                                                       |                                  | Design Team Commetns | STATUS |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------|----------------------|--------|
| WEIRO BUILDING CONSULTANLY<br>WARNERVALE PRIMARY SCHOOL                                                                                                                                                                |                                                                                 |                                                                                   |                                                                                                          |                                                               |                                                                                       |                                  |                      |        |
| BUILDING CODE OF AUSTRALIA VOL 1 2019 50% DESIGN REVIEW                                                                                                                                                                |                                                                                 |                                                                                   |                                                                                                          |                                                               |                                                                                       |                                  |                      |        |
| OCTOBER 2020                                                                                                                                                                                                           |                                                                                 |                                                                                   |                                                                                                          |                                                               |                                                                                       |                                  |                      |        |
| Report prepared for Richard Crookes Constructions<br>Level 3, 4 Broadcast Way,<br>Artarmon, NSW 2064                                                                                                                   |                                                                                 |                                                                                   |                                                                                                          |                                                               |                                                                                       |                                  |                      |        |
| Report prepared by<br>Suite 102, 12 Mount Stree                                                                                                                                                                        | Metro Building (<br>et, North Sydney N                                          | Consultancy<br>SW 2059                                                            | Attention: Tim Hastings                                                                                  |                                                               |                                                                                       |                                  |                      |        |
| Dependent of forement                                                                                                                                                                                                  | 20242502                                                                        | (                                                                                 | Consultant: Sean Moore / Simon                                                                           | Bond                                                          |                                                                                       |                                  |                      |        |
| Job number                                                                                                                                                                                                             | 20213R02                                                                        |                                                                                   |                                                                                                          |                                                               |                                                                                       |                                  |                      |        |
| Date<br>metrobc.com.au                                                                                                                                                                                                 | 26 <sup>th</sup> July 2020                                                      |                                                                                   |                                                                                                          |                                                               |                                                                                       |                                  |                      |        |
| Address: Suite 102, 12 Mount Stre                                                                                                                                                                                      | eet, North Sydney N                                                             | ISW 2060   Email: admin@                                                          | metrobc.com.au   Phone: (02) 96                                                                          | 692 8477   Fax: (C                                            | 2) 8209 4955                                                                          | _                                |                      |        |
| CONTENTS<br>1.0                                                                                                                                                                                                        | Introduc                                                                        | tion and Documentation                                                            |                                                                                                          |                                                               |                                                                                       |                                  |                      |        |
| 2.0                                                                                                                                                                                                                    | Use and                                                                         | d Class of Building                                                               |                                                                                                          |                                                               |                                                                                       |                                  |                      |        |
| 3.0                                                                                                                                                                                                                    | Constru<br>Egress                                                               | iction and fire resistance                                                        | ratings                                                                                                  |                                                               |                                                                                       |                                  |                      |        |
| 5.0                                                                                                                                                                                                                    | Accessi                                                                         | ibility                                                                           |                                                                                                          |                                                               |                                                                                       |                                  |                      |        |
| 6.0                                                                                                                                                                                                                    | Service:<br>Health a                                                            | s & Equipment<br>and Amenity                                                      |                                                                                                          |                                                               |                                                                                       |                                  |                      |        |
| 8.0                                                                                                                                                                                                                    | Class 9                                                                         | b Buildings                                                                       |                                                                                                          |                                                               |                                                                                       |                                  |                      |        |
| 9.0                                                                                                                                                                                                                    | Energy                                                                          | Efficiency                                                                        |                                                                                                          |                                                               |                                                                                       |                                  |                      |        |
| Apper                                                                                                                                                                                                                  | ndix A Drawing                                                                  | js reviewed                                                                       |                                                                                                          |                                                               |                                                                                       |                                  |                      |        |
|                                                                                                                                                                                                                        | ndix B Type of                                                                  | Construction Requireme                                                            | nts                                                                                                      |                                                               |                                                                                       |                                  |                      |        |
| Company                                                                                                                                                                                                                | 10L                                                                             | Name                                                                              | Signed                                                                                                   |                                                               | Date                                                                                  |                                  |                      |        |
| Metro Building Consultancy                                                                                                                                                                                             |                                                                                 | Sean Moore                                                                        | ARE                                                                                                      |                                                               | 26/10/20                                                                              |                                  |                      |        |
| REVISION HISTORY                                                                                                                                                                                                       |                                                                                 |                                                                                   | 1. Î                                                                                                     |                                                               |                                                                                       |                                  |                      |        |
| Description                                                                                                                                                                                                            |                                                                                 | Prepared by                                                                       | Revision No.                                                                                             |                                                               | Date                                                                                  |                                  |                      |        |
| BCA Report Initial Tender<br>BCA Report 50% Design                                                                                                                                                                     |                                                                                 | Sean Moore<br>Sean Moore                                                          | R02                                                                                                      |                                                               | 26/10/20                                                                              |                                  |                      |        |
| 1.0 Introduction and                                                                                                                                                                                                   | I Documentation                                                                 |                                                                                   |                                                                                                          |                                                               |                                                                                       |                                  |                      |        |
| Introduction                                                                                                                                                                                                           |                                                                                 |                                                                                   | 4 2040 advice in colotion to the                                                                         | DCA samalianas                                                |                                                                                       | forthe                           |                      |        |
| The tender documents sta                                                                                                                                                                                               | of Warnervale Prin                                                              | nary School located at 7                                                          | 5 Warnervale Road, Warnervale                                                                            | NSW 2259.                                                     | or the design documents                                                               | s tor the                        |                      |        |
| 20 Teaching Spaces         Special program spaces         Library         Administrative spaces         Canten         Out of school hours care         Hall         Infrastructure works         Infrastructure works |                                                                                 |                                                                                   |                                                                                                          |                                                               |                                                                                       |                                  |                      |        |
| The information submitted<br>excluding Section B struct<br>of NBRS Architecture and<br>entire form.                                                                                                                    | to date has been<br>ture, Part G5 bushf<br>I cannot be used fo                  | reviewed for compliance<br>irre, NSW Part H101 enter<br>or any other purpose with | with the Deemed-to-Satisfy pro-<br>ertainment venues & Section J e<br>out the prior permission of Metro  | visions of the Bui<br>energy efficiency.<br>D Building Consul | Iding Code of Australia 20<br>This report is for the exclutancy. The report is only w | 019<br>usive use<br>valid in its |                      |        |
| Documentation available a<br>The drawings provided by<br>to the Building Code of Au<br>structural and civil drawing                                                                                                    | and assessed<br>NBRS Architecture<br>Istralia Volume 1 2<br>Is have not been ni | e to Metro Building Cons<br>019. The list of drawings                             | ultancy on 15 <sup>th</sup> , 19 <sup>th</sup> and 21 <sup>st</sup> of reviewed is as per the table in A | October 2020 ha                                               | ave been assessed for co<br>report. It is noted that the                              | ompliance<br>e                   |                      |        |
|                                                                                                                                                                                                                        | ,                                                                               |                                                                                   |                                                                                                          |                                                               |                                                                                       |                                  |                      |        |
| 2.0 Use and class of<br>The following table lists the                                                                                                                                                                  | f building<br>e uses and classifie                                              | cations of the new building                                                       | as.                                                                                                      |                                                               |                                                                                       |                                  |                      |        |
| Admin Building                                                                                                                                                                                                         |                                                                                 |                                                                                   |                                                                                                          |                                                               |                                                                                       |                                  |                      |        |
| Level                                                                                                                                                                                                                  | Üse                                                                             |                                                                                   |                                                                                                          | Class                                                         | Approx. floor area                                                                    |                                  |                      |        |
| Lower ground level                                                                                                                                                                                                     | Offices and amer                                                                | nities                                                                            |                                                                                                          | 5                                                             | 447m <sup>2</sup>                                                                     |                                  | NOTED                |        |
| The building has a rise of<br>The effective height of the                                                                                                                                                              | storey of 1.                                                                    | licable as it is single stor                                                      | ev                                                                                                       |                                                               |                                                                                       |                                  | NOTED                |        |
| Hall Building                                                                                                                                                                                                          | , эрр                                                                           | g-= 0.01                                                                          |                                                                                                          |                                                               |                                                                                       |                                  |                      |        |
| Level                                                                                                                                                                                                                  |                                                                                 |                                                                                   |                                                                                                          |                                                               |                                                                                       |                                  |                      |        |
| Lower ground level                                                                                                                                                                                                     | Storerooms, hall,                                                               | amenities and ancillary                                                           | canteen                                                                                                  | 7b & 9b                                                       | 755m <sup>2</sup>                                                                     |                                  | NOTED                |        |
| The building has a rise of<br>The effective height of the                                                                                                                                                              | storey of 1.                                                                    | licable as it is single stor                                                      | ev                                                                                                       |                                                               |                                                                                       |                                  | NOTED                |        |
| Homebase Building                                                                                                                                                                                                      | 0 11                                                                            | 5                                                                                 | ,                                                                                                        |                                                               |                                                                                       |                                  |                      |        |
| Level                                                                                                                                                                                                                  | Use                                                                             |                                                                                   |                                                                                                          | Class                                                         | Approx. floor area                                                                    |                                  |                      |        |
| Lower ground level                                                                                                                                                                                                     | Teaching spaces                                                                 | and amenities                                                                     |                                                                                                          | 9b                                                            | 2648m <sup>2</sup>                                                                    |                                  | NOTED                |        |
| Ground level Teaching spaces, library and amenities 9b 2647m <sup>2</sup>                                                                                                                                              |                                                                                 |                                                                                   | NOTED                                                                                                    |                                                               |                                                                                       |                                  |                      |        |
| The building has a rise of storey of 2.<br>The effective height of the building is 5m                                                                                                                                  |                                                                                 |                                                                                   |                                                                                                          | NOTED                                                         |                                                                                       |                                  |                      |        |
| The energine of the Duniding is 511.                                                                                                                                                                                   |                                                                                 |                                                                                   |                                                                                                          |                                                               |                                                                                       |                                  |                      |        |
| 3.0 Construction and<br>The class 5 Admin Buildin                                                                                                                                                                      | d fire resistance r                                                             | ratings<br>v of 1 is required to come                                             | by with the Building Code of Aug                                                                         | stralia Type C.Co                                             | nstruction requiremente                                                               | These are                        |                      |        |
| listed in Appendix B.                                                                                                                                                                                                  | ilding with size of                                                             | torey of 1 is required (                                                          | omply with the Puildin Ord                                                                               | Australia Tran                                                | Construction re-view                                                                  | nte Thee                         | NOTED                |        |
| are listed in Appendix B.                                                                                                                                                                                              | muning with rise of st                                                          | torey or it is required to d                                                      | omply with the Building Code of                                                                          | Australia Type C                                              | Construction requirement                                                              | INS. INese                       | NOTED                |        |
| The class 9b Homebase E<br>These are listed in Appen                                                                                                                                                                   | Building with rise of<br>dix B.                                                 | storey of 2 is required to                                                        | comply with the Building Code                                                                            | of Australia Type                                             | B Construction requirem                                                               | ients.                           | NOTED                |        |





| Stars shaft<br>If the stair shaft in the Homebase Building supports any floor or a structural part of it—<br>(i) the floor or part must have an FRL of 60/-/- or more; or<br>(ii) the junction of the stair shaft must be constructed so that the floor or part will be free to sag or fall in a fire without causing structural damage to the<br>shaft.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                           |           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-----------|
| Loadbearing internal walls<br>A loadbearing internal wall and a loadbearing fire wall (including those that are part of a loadbearing shaft) in the Homebase Building must be<br>constructed from concrete or masonry.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                           |           |
| Internal columns In the Class 9 Homebase Building, in the storey immediately below the roof, internal columns and internal walls other than fire walls and shaft walls, need not be provided with a fire resistance level. As stated previously this concession does not extend to the columns incorporated into the external wall as they are not deemed to be internal.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | NOTED                                                     |           |
| Homebase Building — Floor FRL<br>In the Class 9b Homebase Building, a floor separating storeys must—<br>(i) be constructed so that it is at least of the standard achieved by a floor/celling system incorporating a celling which has a resistance to the incipient<br>spread of fire to the space above itself of not less than 60 minutes; or<br>(ii) have an FRL of at least 30/30/30; or<br>(iii) have an FRL of the columns incorporated into the external walls that are within 18m of a fire source feature (eastern boundary and the hall) are required<br>to have an FRL of 120/4. If the columns on level 1 rely on the slab for support the slab is required to be provided with the same FRL and the FRL of the<br>slab is required to be stated on the final documents. | REFER TO<br>S-0-GE-02 (B), CONSTRUCTION NOTES             | COMPLETED |
| Roof<br>The roof of all the proposed buildings are not required to be fire rated.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | NOTED                                                     |           |
| Lightweight construction<br>Lightweight construction used to provide an FRL must comply with Clause C1.8, Clause C3.17 and Specification C1.8 of the Building Code of Australia.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | NOTED                                                     |           |
| Non-combustible building elements<br>The external walls of the proposed 2 storey Type B Construction Homebase Building are required to be non- combustible i.e. be constructed of a<br>material that is not deemed combustible by AS1530.11994 or has a CodeMark Certificate of Conformity confirming compliance to BCA CP2 and CP4.<br>Further details of the external walls (eg Codemark certificates) are required to be provided prior to design completion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | REFER TO REVISED COMPLIANCE TABLE<br>ISSUED ON 12/11/2020 | COMPLETED |
| Fire Hazard Properties<br>All new floor, wall and ceiling linings are required to comply with the requirements of Clause C1.10 and Specification C1.10 of Building Code of Australia<br>2019. Provide the laboratory test results for the fire hazard indices of the proposed timber flooring prior to the completion of the design.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | REFER TO T-SHEETS                                         | COMPLETED |
| Performance of external walls in fire<br>Concrete external walls that could collapse as complete panels (e.g. tilt-up and pre-cast concrete), in a building having a rise in storeys of not more than<br>2, must comply with BCA Specification C1.11.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | NOTED                                                     |           |
| Anciliary element (i.e. an element that is secondary to and not an integral part of another element to which it is attached) must not be fixed, installed or<br>attached to the internal parts or external face of an external wall that is required to be non-combustible unless it is also non-combustible or one of the<br>permitted elements listed under BCA clause C1.14.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | NOTED                                                     |           |
| Compartmentation – Admin Building<br>The Building Code of Australia 2019 requirement for a Type C Class 5 building is that the maximum floor area of each fire compartment must not exceed<br>3,000m <sup>2</sup> and the maximum volume must not exceed 18,000m <sup>3</sup> . The proposed size of the Admin Building is not proposed to exceed these limitations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | NOTED                                                     |           |
| Compartmentation – Hall Building<br>The Building Code of Australia 2019 requirement for a Type C Class 7b & 9b building is that the maximum floor area of each fire compartment must not<br>exceed 2,000m <sup>2</sup> and the maximum volume must not exceed 12,000m <sup>3</sup> . The Hall Building is not proposed to exceed these limitations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | NOTED                                                     |           |
| Compartmentation – Homebase Building<br>The Building Code of Australia 2019 requirement for a Type B Class 9b building is that the maximum floor area of each fire compartment must not<br>exceed 5,500m <sup>2</sup> and the maximum volume must not exceed 33,000m <sup>3</sup> . The Homebase Building is not proposed to exceed these limitations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | NOTED                                                     |           |
| Compartmentation – Design Development<br>The size of the buildings fire compartments will continue to be assessed as the design is developed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | NOTED                                                     |           |
| Lift Shaft<br>As the lift shaft does not connect more than 2 storeys it is not required to be fire rated.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | NOTED                                                     |           |
| Bollers<br>Any rooms that contain bollers must be fire separated from the remainder of the building by construction that achieves an FRL of at least 2 hours.<br>Boller means a vessel or an arrangement of vessels and interconnecting parts, wherein steam or other vapour is generated, or water or other liquid is<br>heated at a pressure above that of the atmosphere, by the application of fire, the products of combustion, electrical power, or similar high temperature<br>means, and—<br>(a) includes superheaters, reheaters, economisers, boiler piping, supports, mountings, valves, gauges, fittings, controls, the boiler settings and directly<br>associated equipment; but<br>(b) excludes a fully flooded or pressurised system where water or other liquid is heated to a temperature lower than the normal atmospheric boiling<br>temperature of the liquid.                                                                                            | NOTED                                                     |           |
| Battery Rooms<br>Any rooms that contain a battery or batteries that have a voltage exceeding 24 volts and a capacity exceeding 10 ampere hours (eg UPS) must be fire<br>senarciad from the remainder of the building by construction that achieves as CPL of at least 2 hours.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | NOTED                                                     |           |
| Electricity supply equipment<br>If the main switchboard sustains emergency equipment operating in the emergency mode it must be separated from the remainder of the building by<br>construction having an FRL of not less than 120/120/120 and have any door protected with a self obsing fire door having an FRL of not less than -<br>/1/20/30.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                           |           |
| It is noted that the MSB is located in the Hall Building and as it is not required to be provided with smoke detection or an FIP the BCA does not require it to be enclosed in fire rated construction. We note however that the design shows an FRL of 120/120/120 specified to the MSB room. Please provide details of the fire rated ceiling as the roof elements are not permitted to span across the fire rated walls.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                           | COMPLETED |
| The BCA only requires the walls separating the MSB room from the remainder of the building to be fire rated. If the ESFG requires all enclosing walls to<br>be fire rated (as documented) then the louvers shown on ME-B-300(01) are also required to be fire rated.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | REFER TO ME-B300 (02)                                     | COMPLETED |
| Openings in floors and ceilings for services – Homebase Building<br>Where a service passes through the fire rated floor of the 2 storey Type B Construction Homebase building the service must be protected by a shaft that<br>will not reduce the fire performance of the building elements it penetrates or in accordance with BCA Clause C3.15 and BCA Specification C3.15.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | NOTED                                                     |           |

| The kiln exhaust is required to be contained within a shaft that has an FRL of 30/30/30 from both sides that goes to the underside of the roofsheeting.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | SHOW ON<br>20018-NBRS-DR-A-B2001 &<br>MECHANICAL DOCS                                                       | COMPLETED |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-----------|
| The fire damper specified to the toilets exhaust penetration of the level 1 slab shown on drawing ME-D-300(01) is noted.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | NOTED                                                                                                       |           |
| Openings for Services Penetrations<br>Openings for services penetrations in any fire rated construction must be fire sealed in accordance with the requirements of BCA Clause C3.15 and<br>Specification C3.15.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | NOTED                                                                                                       |           |
| 4.0       Egress         Principles         The building's egress system should be designed to ensure compliance with the following principles:         A tleast one exits is required from the Admin Building and one from the Hall Building.         A tleast tow exits are required from each storey of the Homebase Building.         The maximum distance of travel to an exit will be 40 metres, and to a point of choice will be 20 metres, the distance between alternate exits is not to exceed 60 metres.         The distance between alternate exits is to be not less than 9 metres.         The distance between alternate exits is to be not less than 9 metres.         All paths of travel are to be a minimum of 1000mm in clear width.         Exit doors are required to be the passage from the side that a person is seeking egress.         The threshold of all doors must be flush or provided with a threshold or kerb ramp.         Handrails ion Class 9b buildings used as a primary school are required to have a minimum height of 865-1000mm.         Handrails and patisr and ramps are required to have a minimum height of 865-malong stair flights and 1 malong landings and walkways where the drop is greater than 125mm.         Balustrades protecting a drop of more than 1 m are not permitted to have an opening greater than 125mm to the stars sering the Homebase Building.         The balustrades protecting a drop of more than 4 m are not permitted to have any horizontal or near horizontal elements between 150mm and 760mm above the floor that facilitates circling a drop of all new retaining wallis that form part of or are directly associate | NOTED                                                                                                       |           |
| Number of exits<br>The Homebase Building is required to be provided with at least two exits per storey as they accommodate more than 50 persons per storey. The current<br>design shows multiple exits serving both storeys.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | NOTED                                                                                                       |           |
| Eress<br>Please provide the furniture layouts so that the travel distances can be assessed in C1 on the upper ground level.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | REFER TO ATTACHED FURNITURE PLAN. IN<br>ADDITION PASSAGE LOCK PROVIDED FROM<br>CIRCULATION INTO HOME BASE 1 | COMPLETED |
| It is noted that the swing door to the Library on the Ground Level (upper level) of the Homebase Building is provided with a fire trip so that it can act as an egress noute from the walkway side as it is required for egress.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | REFER TO DOOR SCHEDULE (2)                                                                                  |           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | INCLUDED AND NOTED IN DEPARTURE<br>SCHEDULE FOR REVIEW BY EFSG & SSU                                        |           |
| Dimensions of exits and paths of ravel<br>The BCA states that all paths of ravel are required to have a minimum clear width of 1m.<br>The clear width of the two stairs to the stage are required to be at least 1m after the installation of the two handrails. The dimensions should be provided<br>on the plans and currently there is little tolerance provided for.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | DIMS ARE ON FLOOR PLAN & STAIR DETAILS                                                                      |           |

| Discharge from exits<br>The path of travel from the discharge point of the proposed exits to the road must have an unobstructed width throughout of not less than 1m to a road<br>or open space.<br>If an exit discharges to open space that is at a different level than the public road to which it is connected a path of travel to the road must be a ramp not<br>steeper than 1:8 at any part or not steeper than 1:14 if required by required by part D3 of the BCA or a stairway complying with the deemed-to-satisfy<br>provisions of the BCA.<br>The treads of the stairs serving the library in the Homebase Building are required to be a constant dimension and not as shown below.                                                                                                                   | REFER TO STAIR DETAILS / NBRS landscape                                                  |           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-----------|
| Installations in exits and paths of travel<br>Electrical, comms or mechanical distribution boards installed along a path of travel to an exit are required to be enclosed by non-combustible<br>construction or a fire protective covering with doorways or openings suitably sealed against smoke spreading from the enclosure.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | SERVICES DOCS                                                                            |           |
| Enclosure of space under stairs and ramps<br>The space below a required stairs must not be enclosed to form a cupboard or other enclosed space unless the enclosing walls and ceilings have an<br>FRL of not less than 60/60/60 and any access doorway to the enclosed space is fitted with a self-closing –/60/30 fire door.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                          |           |
| The sports store under stair 8 is enclosed and is required to be provided with an FRL of 60/60/60. This FRL is required to be stated on the drawings.<br>(Refer to comments under ceiling heights about the underside of this stairs.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                          |           |
| Stars                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Refer to library stair<br>20018-NBRS-DR-A-D8001(5)                                       | COMPLETED |
| The proposed stairs are required to be provided with risers and goings that have a constant dimension throughout the flight and with a handrail with a<br>height of 865-1000mm.<br>- The BCA states that risers are not permitted to have any openings that would allow a 125mm sphere to pass through between the treads.<br>- The treads or nosing strips of the proposed external stairs must have a slip-resistance classification not less than P4 when tested in accordance with A5 4566 2013.<br>- The treads or nosing strips of the proposed internal stairs must have a slip-resistance classification not less than P4 when tested in accordance with A5 4566 2013.<br>- Stair 3 and 4 are required to be redesigned so that the treads have a constant dimension. Provide further details for review. |                                                                                          |           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Refer toStair 3 & 4 details<br>20018-NBRS-DR-A-C6001(4)<br>&<br>20018-NBRS-DR-A-C6002(4) | COMPLETED |
| Landings<br>Proposed landings are required to have a maximum gradient of 1:50 and must be not less than 750mm long, and where this involves a change in<br>direction, the length is measured 500mm from the inside edge of the landing.<br>The edge of any proposed landings or the nosing strips of the proposed new landings must have a slip-resistance classification not less than P4 when<br>wet and P3 when dry when tested in accordance with AS 4566 2013.<br>The compliance of all the strip landings be continuelly accessed as the desire is developed.                                                                                                                                                                                                                                               | NOTED                                                                                    |           |



| The BCA states that handrails are required to be located along each side if the total width of the stairway or ramp is 2m or more.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                        |           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|-----------|
| Statis 5 from landscaping drawing LWD-104(5) and the stair between the Admin and the Hall have a width of more than 2m and are required to be provided with a handrait to both sides of the stair. Please consider changing the numbers of the stars to avoid duplication as stair 5 is also the internal star's serving homebase cluster C2.<br>STAIR 5<br>STAIR 5 | REFER TO<br>LWD-104 (8)<br>LWD-102 (8)<br>LWD-601 (7)                  | COMPLETED |
| Handrails in Class 9b buildings used as a primary school are required to have a second handrail fixed at a height between 665 mm and 750 mm. The<br>recommended height for this handrail is 700mm.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                        |           |
| Please clarify why the handrail to the library stair is not located on the edge of the stair.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                        |           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Refer to library stair<br>20018-NBRS-DR-A-D8001(5)                     | COMPLETED |
| Handrails are required to be continuous between stair flight landings and have no obstruction on or above them that will tend to break a hand-hold.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                        |           |
| Fixed platforms, walkways, stairways and ladders<br>A fixed platform, walkways, stairway, ladder and any going and riser, landing, handrail or barrier attached thereto may comply with AS 1657 2018 in lieu of<br>BCA Clauses D2.13, D2.14, D2.16 and D2.17 if it only serves machinery rooms, boiler houses, lift-machine rooms, plant-rooms and the like.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | NOTED                                                                  |           |
| The line overgon overallers are required to include details of any AS toor ladders etc that are required to access to any plant room / space.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | NOTED                                                                  |           |
| Swinging Doors<br>A swinging door in a required exit or forming part of a required exit is required to swing in the direction of egress.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | NOTED                                                                  |           |
| Door hardware<br>The door hardware to all proposed swing doors must be readily openable without a key from the side that faces a person seeking egress by:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | NOTED                                                                  |           |
| <ul> <li>a single hand downward action on a single device which is located between 900 mm and 1.1 m from the floor and be such that the hand of a person who cannot grip will not slip from the handle during the operation of the latch and have a clearance between the handle and the back plate or door face at the centre grip section of the handle of not less than 35 mm and not more than 45mm or</li> <li>a single hand pushing action on a single latch operation device which is located between 900 mm and 1.2 m from the floor.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | NOTED                                                                  |           |
| Note that the sliding doors in the path of travel to an exit must be readily openable without a key from the side that faces a person seeking egress, by a<br>single hand downward action on a single dovice which is located between 900 mm and 1.1 m from the floor be such that the hand of a person who<br>cannot prip will not slip from the handle during the operation of the latch and have a clearance between the handle and the back plate or door face at the<br>centre grip section of the handle of not less than 35 mm and not more than 45 mm. This requires the sliding doors to be provided with a lever handle as<br>well as a 'D' pull handle.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | NOTED                                                                  |           |
| 5.0 Accessibility All works are required to comply with the requirements of Part D2 of Building Code of Australia 2010 and the relevant parts of AS1/29.1.2000 and                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                        |           |
| All works are required to comply with the requirements of Part DS of Building Code of Adstralia 2019 and the relevant parts of AS 1428.1 2009 and<br>AS1428.4.1 2009. For further details please refer to the separate DDA report.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                        |           |
| 6.0 Services and Equipment The following is a status of the services required to be provided to the buildings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                        |           |
| Fire Hydrants<br>Fire Hydrant coverage is required to be provided to the Hall Building and the Homebase Building in accordance with AS2419.1-2005 as they are greater<br>than 500m2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | NOTED                                                                  |           |
| The Admin Building has a floor area of less than 500m2 and is not required to be provided with fire hydrant coverage.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | NOTED                                                                  |           |
| The developed design drawing are required to show compliance with the fire hydrant booster location requirements including that if remote from the<br>building (served), the booster shall be—                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | REFER TO FC-100                                                        | COMPLETED |
| <ul> <li>(i) at the boundary of the site and be within sight of the main entrance of the building;</li> <li>(ii) adjacent to the principal vehicular access to the site; and</li> <li>(iii) located not less than 10 m from the external wall of any building served</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Booster location on drawings MARL-HY-DWG-<br>H-100 & MARL-HY-DWG-H-101 | COMPLETED |
| Currently the booster is not within sight of the entrance to the Homebase Building and due to landscaping may not be visible from the entrance to the Hall Building.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Booster location on drawings MARL-HY-DWG-<br>H-100 & MARL-HY-DWG-H-101 | COMPLETED |
| The tire hydrant to the west of Stair 4 is required to be located at least 10m from the stair as it is required for egress and considered part of the building.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Booster location on drawings MARL-HY-DWG-<br>H-100 & MARL-HY-DWG-H-101 | COMPLETED |
| า เอาของ เราออน เราแปน ออนสายอาสาย และพมายอากา เอาอน.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | REISSUED ON12/11/2020                                                  | COMPLETED |
| Provide confirmation that the fire hydrants are used as attack hydrants and not feed hydrants. If feed hydrants confirm that the brigade appliance can be located at least 10m from the building.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | All hydrants are attack hydrants                                       | COMPLETED |
| Provide confirmation that the fire hydrant line that goes through the homebase building is below ground. If above ground it is required to be provided with protection as the building is not sprinkler protected.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | The fire hydrant pipework is below ground.                             | COMPLETED |

| Traffication standard requests attack hybranis to be boated within a traditional attack states units a traditional or an advantation of the dentity marked traffication of the compliance of the western hydrant serving the homebase building.                                                                                                                                                                                                                                                                                                                                      | This fire hydrant has been relocated & it is<br>clearly marked on drawings that it is 50m from<br>hardstand, refer to drawings FC-100, FC-101 &<br>MARL-HY-DWG-H-100 & MARL-HY-DWG-H-101 | COMPLETED |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <u>Fire Hose-Reels</u><br>Fire Hose Reel coverage is not required to the Admin Building as it has a floor area of less than 500m2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | NOTED                                                                                                                                                                                    |           |
| Fire Hose Reel coverage is required to the Hall Building as it has a floor area of more than 500m2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | The Fire Hose Reel Coverage plan is on FC-103,<br>which covers the Hall                                                                                                                  | COMPLETED |
| The BCA does not require fire hose reel coverage to the classrooms and associated corridors in primary schools ie the classrooms and corridors in the<br>Homebase Building.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | NOTED                                                                                                                                                                                    |           |
| Fire Hose Reel coverage is required to the library as it is in a building with a floor area of more than 500m2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | The Fire Hose Reel Coverage plan is on FC-103,<br>which covers the Library Ground & Upper<br>Floor.                                                                                      | COMPLETED |
| The door from the library to the external walkway is not an exit door as it does not lead to a road or open space. The exit from the library is the top riser of the internal stairs to the lower ground and the FHR should be located within 4m of it.                                                                                                                                                                                                                                                                                                                                                                                                                                       | Fire Hose Reel has been relocated to be next to<br>stairs & a FHR being added to path of traveled<br>outside the lift                                                                    | COMPLETED |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                          |           |
| B1<br>B0LING ELECTRIC<br>UNDERBENCH 2/P UNIT<br>CANTERN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Fire Hose Reel has been relocated to be next<br>canteen                                                                                                                                  | COMPLETED |
| Portable Fire Extinguishers<br>Portable fire extinguishers must be provided in accordance with BCA Clause E1.6 and AS 2444 2001.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                          |           |
| Smoke hazard management<br>The NSW Variation of the BCA states that Class 9b assembly buildings (eg schools) are required to be provided with automatic shutdown of any air-<br>handling system (other than non-ducted individual room units with a capacity not more than 1000 l/s and miscellaneous exhaust air systems installed in<br>accordance with Sections 5 and 6 of AS 1668.1 2015) on the activation of smoke detectors installed complying with Clause 6 of BCA Specification<br>E2.2a and any other fire detection and alarm system.                                                                                                                                             | SHUTDOWN REQUIREMENTS ARE NOTED ON<br>200 SERIES DRAWINGS, A FIRE SHUT DOWN<br>SIGNAL IS TO BE PROVIDED BY THE<br>ELECTRICAL SUB-CONTRACTOR TO EVERY<br>MECHANICAL SERVICES SWITCHBOARD  |           |
| Clause 6 of BCA Specification E2.2a states that detectors must be spaced not more than 20m apart and not more than 10m from any wall, bulkhead or<br>smoke curtain and have a sensitivity in accordance with AS1670.1 2018.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | NOTED                                                                                                                                                                                    |           |
| Smoke hazard management - Stages<br>The NSW Variation of the BCA states that a building or part of a building used as an assembly building which has a stage—<br>(A) with a floor area of more than 50 m2 and not more than 150 m2 must, over the stage, be provided with (aa) an automatic smoke exhaust system<br>complying with Specification E2.2b (including Figure 2); or<br>(ab) nod mounted automatic smoke-and-heat vents comolylon with NSW H101.22 in a single storey building or the top storey of a multi storey building.                                                                                                                                                       |                                                                                                                                                                                          |           |
| ······································                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CURRENT STAGE IS LESS THAN 50M2                                                                                                                                                          | COMPLETED |
| NSW H101.22 Automatic smoke-and-heat vents for stages<br>An automatic smoke-and-heat vents system required by NSW Table E2.2b "Stages and backstage" must—<br>(a) be capable of automatic operation by the inclusion of a heat sensing device designed to activate the system at a temperature of not more<br>than 71°C; and<br>(b) be capable of being released manually from positions at each side of the stage and of being fully activated from either position; and<br>(c) have a notice, prominently displayed at each position referred to in (b), clearly indicating the method of activation; and<br>(d) have an openable area of not less than 1/10 of the total area of the stage | CURRENT STAGE IS LESS THAN 50M2                                                                                                                                                          | COMPLETED |





| If a floor of a room is laid on the ground or on fill, mosture from the ground must be prevented from reaching the upper surface of the floor and adjacent<br>walls by the insertion of a vagorub barrier in accordance with AS 2870 2011, except damp-proofing need not be provided if—<br>(a) weatherproofing is not required; or<br>(b) the floor is the base of a stair, lift or similar shaft which is adequately drained by gravitation or mechanical means. | NOTED                                                                                                                         |           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-----------|
| Subfloor ventilation:<br>Subfloor spaces must be provided with openings in external walls and internal subfloor walls in accordance with BCA Table F1.12 for the climatic zones<br>given in BCA Figure F1.12 and have clearance between the ground surface and the underside of the lowest horizontal member in the subfloor in<br>accordance with BCA Table F1.12.                                                                                                | NOTED                                                                                                                         |           |
| Glazed assemblies         In an external wall, must comply with AS 2047 2014 requirements for resistance to water penetration:           Windows.         Sliding and swingn glazed doors with a frame, including french and bi-fold doors with a frame.           Adjustable lowres.         Window walls with one piece framing                                                                                                                                  | NOTED                                                                                                                         |           |
| Toilets<br>Please provide details of the proposed population so that a review can be carried out on the number of toilets provided.                                                                                                                                                                                                                                                                                                                                | NBRS TOILET CALCULATION                                                                                                       |           |
| Note that separate toilets must be provided for male and female. This requires the staff and student toilets to be labelled either male or female, they<br>cannot be labelled unixex unless a performance solution is provided.                                                                                                                                                                                                                                    | NBRS                                                                                                                          |           |
| Showers<br>The BCA states that Class 9b theatres and sporting venues must be provided with one shower for each 10 participants or part thereof.                                                                                                                                                                                                                                                                                                                    | CONFIRM REQUIREMENT                                                                                                           |           |
| Construction of sanitary compartments<br>Sanitary compartments must have doors and partitions that separate adjacent compartments and extend to a height of not less than 1.5m above the<br>floor if primary school children are the principal users.                                                                                                                                                                                                              | NOTED                                                                                                                         |           |
| The door to a fully enclosed sanitary compartment must open outwards or slide or be readily removable from the outside of the sanitary compartment.                                                                                                                                                                                                                                                                                                                | NOTED                                                                                                                         |           |
| Room Sizes<br>The BCA states that the ceiling height in a theatre, public hall or other assembly building or part that accommodates more than 100 persons must be not<br>less than 2.7m.                                                                                                                                                                                                                                                                           | NOTED                                                                                                                         |           |
| The BCA states that all classrooms, offices and the kitchen are required to have a minimum ceiling height of 2.4m.                                                                                                                                                                                                                                                                                                                                                 | NOTED                                                                                                                         |           |
| The BCA states that the storerooms and sanitary compartments are required to have a minimum ceiling height of 2.1m.                                                                                                                                                                                                                                                                                                                                                | NOTED                                                                                                                         |           |
| SPORTS STORE                                                                                                                                                                                                                                                                                                                                                                                                                                                       | NOTED                                                                                                                         |           |
| Natural lighting<br>The BCA states that natural light complying with BCA clause F4.2 is required to be provided to all general- purpose classrooms in primary schools.                                                                                                                                                                                                                                                                                             | NBRS WILL PROVIDE COMPLIANCE TABLE                                                                                            |           |
| Required natural light must be provided by windows that have an aggregate light transmitting area measured exclusive of framing members, glazing bars<br>or other obstructions of not less than 10% of the floor area of the room and are open to the sky or face a court or other space open to the sky or an<br>open veranduk, carport or the like.                                                                                                              | NBRS WILL PROVIDE COMPLIANCE TABLE                                                                                            |           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                               |           |
| The windows to homebase 3 in C3 on the lower ground floor do not open to the sky or face an open verandah as the window opens to the toilets.                                                                                                                                                                                                                                                                                                                      | RCC/ NBRS FURTHER DISCUSSION                                                                                                  |           |
| The windows to homebase 3 in C3 on the lower ground floor do not open to the sky or face an open verandah as the window opens to the tolets.                                                                                                                                                                                                                                                                                                                       | RCC/ NBRS FURTHER DISCUSSION<br>DRAFTING ERROR. THERE ARE WINDOWS ON<br>EASTERN SIDE. REFER TO 20018-NBRS-DR-A-<br>C1005 (11) | COMPLETED |



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | EXHAUST POINT FOR C1 LOWER GROUND<br>FLOOR HAS BEEN RELOCATED -<br>REFER TO DRAWING C1-300                | COMPLETED |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|-----------|
| Kitchen Exhaust Any kitchens must be provided with a kitchen exhaust hood complying with AS/NZS 1668.1 2015 and AS 1668.2 2012 where: (a) any concine apparatus has—                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | NOTED                                                                                                     |           |
| (a) any county apparatus ras—<br>(i) a total maximum electrical power input exceeding 8 kW; or<br>(ii) a total gas power input exceeding 29 MJ/h; or                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | THERE IS NO APPLIANCE WITH INPUT<br>POWER EXCEEDING 8kW OR 26MJH OR 0.5kW<br>OR 1.8MJH PER M <sup>2</sup> | COMPLETED |
| <ul> <li>(b) the total maximum power input to more than one apparatus exceeds—         <ul> <li>(0) 0.5 KW detricial power; or</li> <li>(ii) 1.3 MJ gas, per m2 of <i>floor area</i> of the room or enclosure.</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | THERE IS NO APPLIANCE WITH INPUT<br>POWER EXCEEDING 8kW OR 26MJH OR 0.5kW<br>OR 1.8MJH PER M <sup>2</sup> | COMPLETED |
| Note that any kitchen exhaust ducts are required to be provided with access panels so that the duct's can be cleaned.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | NOTED                                                                                                     |           |
| If the canteen is provided with cooking apparatus or a total maximum power input as stated above a kitchen exhaust system complying with AS/NZS<br>1668.1 2015 and AS 1668.2 2012 is required to be provided.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | NOTED                                                                                                     |           |
| Boilers<br>Any boilers provided in the buildings must comply with BCA Clause G2.2 and Specification G2.2. The definition of a boiler is as follows.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | NOTED                                                                                                     |           |
| Boiler means a vessel or an arrangement of vessels and interconnecting parts, wherein steam or other vapour is generated, or water or other liquid<br>is heated at a pressure above that of the atmosphere, by the application of fire, the products of combustion, electrical power, or similar high<br>temperature means, and—<br>(a) includes superheaters, reheaters, economisers, <i>boiler</i> piping, supports, mountings, valves, gauges, fittings, controls, the <i>boiler</i> settings and<br>directly associated equipment, but<br>(b) excludes a fully flooded or pressurised system where water or other liquid is heated to a temperature lower than the normal atmospheric boiling<br>temperature of the liquid. | NOTED                                                                                                     |           |
| The BCA states that the requirements of Part H1 of the BCA apply to every enclosed Class 9b building or part of a building which—<br>is a school assembly, ounch or community hall with a tables and any backstage area any backstage area any backstage area of more than 200 m2; or<br>otherwise, has a stage and any backstage area with a total floor area of more than 200m2; or<br>has a stage with an associated rigging loft.                                                                                                                                                                                                                                                                                           |                                                                                                           |           |
| In addition to the above requirements, the BCA states that the following requirements of BCA clause H1.4 and H1.7 applies to every open or enclosed<br>Class 9b building.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                           |           |
| Seating Area<br>In a seating area the gradient of the floor surface must not be steeper than 1 in 8, or the floor must be stepped so that —<br>a line joining the nosings of consecutive steps does not exceed an angle of 30° to the horizontal; and<br>the height of each step in the stepped floor is not more than 800mm; and<br>the height of any opening in such a step is not more than 125mm; and                                                                                                                                                                                                                                                                                                                       |                                                                                                           |           |
| Aise Lights<br>In every enclosed Class 9b building, where in any part of the auditorium, the general lighting is dimmed or extinguished during public occupation and the<br>floor is stepped or is inclined at a slope steeper than 1 in 12, aisle lights must be provided to illuminate the full length of the aisle and tread of each step.                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                           |           |
| The tiered seating area in the library has been removed from the scope and the above requirements no longer apply to the project.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                           |           |
| 9.0 Energy Efficiency<br>Building Fabric                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                           |           |
| The BCA 2019 Section J Building Fabric requirements apply to building elements forming the envelope of a Class 9b building.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | SHOULD BE 2016 SECTION J                                                                                  |           |
| the exterior of the building; or     a non-conditioned space including—     the floor above a carpark or warehouse; and     the floor above a carpark or warehouse; and     the common wall with a carpark, warehouse or the like                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                           |           |
| Conditioned space means a space within a building, including a ceiling or under-floor supply air plenum or return air plenum, where the environment is likely, by the intended use of the space, to have its temperature controlled by air-conditioning.                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                           |           |
| Air-conditioning means a service that actively cools or heats the air within a space, but does not include a service that directly<br>(a) cools or heats cold or hot rooms; or<br>(b) maintains specialised conditions for equipment or processes, where this is the main purpose of the service.                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                           |           |
| The proposed building is required to comply with the building fabric requirements of Part J1 of the Building Code of Australia 2019.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                           |           |
| Building Sealing The BCA 2019 Section J Building Sealing requirements apply to building elements forming the envelope of a Class 9b building other than: a building in climate zones 1, 2, 3 and 5 where the only means of air-conditioning is by using an evaporative cooler; or a permanent building opening, in a space where a gas appliance is located, that is necessary for the safe operation of a gas appliance; or a building or space where the mechanical ventilation required by Part F4 provides sufficient pressurisation to prevent infitiration.                                                                                                                                                               | RCC / NBRS TO REVIEW                                                                                      |           |

| Envelope means the parts of a building's fabric that separate a conditioned space or habitable room from: the exterior of the building, or the exterior of the building, or the floor of a rooftop plant room, lift-machine room or the like; and the floor of a rooftop plant room, lift-machine room or the like; and the floor of a rooftop plant room, lift-machine room or the like; and the common wall with a carpark, warehouse or the like                  | RCC / NBRS TO REVIEW     |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--|
| Conditioned space means a space within a building, including a ceiling or under-floor supply air plenum or return air plenum, where the environment is likely, by the intended use of the space, to have its temperature controlled by air-conditioning but does not include—<br>(b) a space in a Class 6, 7, 8 or 9b building where the input energy to an airconditioning system is not more than 15 W/m2 or 15 J/s.m2 (54 KJ/hour.m2); or                         | RCC / NBRS TO REVIEW     |  |
| Air-conditioning means a service that actively cools or heats the air within a space, but does not include a service that directly<br>(a) cools or heats cold or hot rooms; or<br>(b) maintains specialised conditions for equipment or processes, where this is the main purpose of the service.                                                                                                                                                                    | RCC / NBRS TO REVIEW     |  |
| The proposed building is required to comply with the building sealing requirements of Part J3 of the Building Code of Australia 2019.                                                                                                                                                                                                                                                                                                                                | RCC / NBRS TO REVIEW     |  |
| The bi-fold doors and possible manual sliding doors in the envelope of the homebase building that are not self closing do not comply with the BCA<br>building sealing requirements and are required to be addressed in a performance solution.                                                                                                                                                                                                                       | RCC / NBRS TO REVIEW     |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | RCC / NBRS TO REVIEW     |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | RCC / NBRS TO REVIEW     |  |
| If the doors in the envelope of the admin building highlighted below are not self closing they do not comply with the BCA building sealing requirements<br>and are required to be addressed in a performance solution.                                                                                                                                                                                                                                               | RCC / NBRS TO REVIEW     |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | RCC / NBRS TO REVIEW     |  |
| If the hall and canteen are a conditioned space and the doors and roler shutters highlighted below are not self closing they are required to be addressed<br>in a performance solution.                                                                                                                                                                                                                                                                              | RCC / NBRS TO REVIEW     |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | RCC / NBRS TO REVIEW     |  |
| If the doors in the envelope of the special program building highlighted below are not self closing they do not comply with the BCA building sealing<br>requirements and are required to be addressed in a performance solution.                                                                                                                                                                                                                                     | RCC / NBRS TO REVIEW     |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | RCC / NBRS TO REVIEW     |  |
| Ventilation Systems, Artificial Lighting, Hot Water Supply<br>The design stage services consultants are required to incorporate the BCA 2019 Section J requirements into the design documents.                                                                                                                                                                                                                                                                       | SHOULD BE 2016 SECTION J |  |
| 10 0         Conclusion           The design documentation provided to date has been assessed in respect to the deemed to satisfy provisions of the Building Code of Australia 2019 excluding Section B structure, Part G5 bushfire, NSW Part H101 entertainment venues and Section J energy efficiency.           The design is at a point where the design can be finalised, further reviews are required to be carried out prior to the completion of the design. |                          |  |



### WARNERVALE PRIMARY SCHOOL

BUILDING CODE OF AUSTRALIA VOL 1 2019 – ACCESS & DDA 50% DESIGN REVIEW

**OCTOBER 2020** 

| Report prepared for            | NBRS Architecture<br>Level 3, 4 Glen Street,<br>Milsons Point NSW 2061<br>Attention: Macella Salzmann                     |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| Report prepared by             | Metro Building Consultancy<br>Suite 102, 12 Mount Street,<br>North Sydney NSW 2060<br>Consultant: Sean Moore / Simon Bond |
| Report reference<br>Job number | 20213-WPS-Access-R02<br>20213                                                                                             |
| Date                           | 27 <sup>th</sup> October 2020                                                                                             |


# CONTENTS

- 1.0 Introduction and Documentation
- 2.0 Use and Class of Building
- 3.0 Mandatory Requirements
- 4.0 DDA Optional Requirements
- 5.0 Conclusion
- Appendix A Drawings reviewed

# DOCUMENT ACCEPTANCE

| Company                    | Name       | Signed | Date     |
|----------------------------|------------|--------|----------|
| Metro Building Consultancy | Sean Moore | HARE   | 27/10/20 |

# **REVISION HISTORY**

| Description                           | Prepared by | Revision No. | Date     |
|---------------------------------------|-------------|--------------|----------|
| Access Report – Initial Tender Review | Sean Moore  | R01          | 17/07/20 |
| Access Report – 50% Design Review     | Simon Bond  | R02          | 27/10/20 |



# 1.0 Introduction and Documentation

#### Introduction

NBRS Architecture has requested Building Code of Australia 2019 & DDA disabled access advice in relation to the compliance of the tender design drawings for the proposed redevelopment of Warnervale Primary School located at 75 Warnervale Road, Warnervale NSW 2259.

The tender documents state that the scope of works are as follows:

| 20 Teaching Spaces     | Administrative spaces    | Hall                        |
|------------------------|--------------------------|-----------------------------|
| Special program spaces | Canteen                  | Infrastructure works        |
| Library                | Out of school hours care | Landscaping (hard and soft) |

The tender design drawings have been reviewed for compliance with the Deemed-to-Satisfy provisions of Part D3 and F2 of the Building Code of Australia 2019, the Disability Access to Premises Standards 2010, the Disability Discrimination Act (DDA) 1992 and the relevant parts of AS1428.1 2009 and AS1428.4.1 2009. This report is for the exclusive use of NBRS Architecture and cannot be used for any other purpose without the prior permission of Metro Building Consultancy. The report is only valid in its entire form.

#### Documentation available and assessed

The drawings provided by NBRS Architecture to Metro Building Consultancy on 15<sup>th</sup>, 21<sup>st</sup> and 22<sup>nd</sup> of October 2020 have been assessed for compliance to the Building Code of Australia Volume 1 2019. The list of drawings reviewed is as per the table in Appendix A of this report.

# 2.0 Use and class of building

The following table lists the uses and classifications of the new buildings.

# Admin Building

| Level              | Use                   | Class | Approx. floor area |
|--------------------|-----------------------|-------|--------------------|
| Lower ground level | Offices and amenities | 5     | 447m <sup>2</sup>  |

The building has a rise of storey of 1.

The effective height of the building is not applicable as it is single storey.

# Hall Building

| Level              | Use                                               | Class   | Approx. floor area |
|--------------------|---------------------------------------------------|---------|--------------------|
| Lower ground level | Storerooms, hall, amenities and ancillary canteen | 7b & 9b | 755m <sup>2</sup>  |

The building has a rise of storey of 1.

The effective height of the building is not applicable as it is single storey.

# Homebase Building

| Level              | Use                                    | Class | Approx. floor area |
|--------------------|----------------------------------------|-------|--------------------|
| Lower ground level | Teaching spaces and amenities          | 9b    | 2648m <sup>2</sup> |
| Ground level       | Teaching spaces, library and amenities | 9b    | 2647m <sup>2</sup> |

The building has a rise of storey of 2.

The effective height of the building is 5m.



# 3.0 Mandatory Requirements

# General building access requirements

Disabled access is required to be provided to and within all areas normally used by the occupants.

Disabled access is required to be provided to wheelchair seating spaces provided in accordance with D3.9.

Disabled access is required to be provided to and within all other areas normally used by the occupants, except that access need not be provided to tiers or platforms of seating areas that do not contain wheelchair seating spaces.

#### Access to buildings

Access is required to be provided to the proposed buildings from:

- the proposed main points of a pedestrian entry at the allotment boundary; and
- from another accessible building connected by a pedestrian link; and
- from any required accessible carparking space on the allotment.

# From the allotment boundary

The BCA states that disabled access must be provided to the proposed Hall Building from the main points of a pedestrian entry at the allotment boundary.





The BCA states that disabled access must be provided to the proposed Admin Building from the main points of a pedestrian entry at the allotment boundary. Further detail of the accessible path eg gate hardware etc are required in the developed design drawings.



The BCA states that disabled access must be provided to the proposed Homebase Building from the main points of a pedestrian entry at the allotment boundary and from the accessible carspaces. Further detail of the accessible path eg gate clearances and hardware etc are required in the developed design drawings.





Provide detail of the gate, their clearances, and their hardware for review prior to the completion of the design and prior to the issue of the Crown Works Certificate.



From another accessible building connected by a pedestrian link

The accessible path of travel between the buildings is required to comply with AS1428.1 2009.

# Accessible Carspaces

The BCA states that disabled access must be provided to the proposed buildings from the accessible car spaces.



# Pedestrian entry points

The BCA requires that the principal pedestrian entrances to the proposed buildings to be accessible and also that not less than 50% of all pedestrian entrances including the principal pedestrian entrance are accessible.

Due to the buildings having multiple points of entry that could be considered as accessible, the developed design drawings are required to provide details of which doorways are 'entrances', which of these are proposed to be used as accessible entry points and which doorways are only used as exits.



# Access within buildings

# Continuous accessible paths of travel

The minimum unobstructed height of a continuous accessible path of travel is required to be 2m or 1.98m at doorways and the minimum width is required to be 1m and 850mm at doorways.

Fixtures and fittings such as lights, awnings, operable parts of windows, telephones, skirtings, essential fixtures and fittings such as fire hose reels, fire extinguishers and switchboards are not permitted to intrude into the minimum unobstructed width.

1.8m wide x 2m long passing spaces are required to be provided within 20m intervals on those parts of an accessway where a direct line of sight is not available.

Turning spaces complying are required to be provided within 2m of the end of accessways where it is not possible to continue travelling along the accessway and at maximum 20m intervals along the accessway.

#### Floor or ground surfaces on continuous accessible paths of travel and circulation spaces

The access requirements include a requirement that the abutment of surfaces shall have a smooth transition. Design transition shall be 0 mm. Construction tolerances shall be 0  $\pm$ 3 mm for vertical changes in level and 0  $\pm$ 5 mm provided the edges have a bevelled or rounded edge to reduce the likelihood of tripping.



(a) Change in level

The pile height or pile thickness of carpet is required to not exceed 11mm and the carpet backing thickness shall not exceed 4 mm.

Grates provided along a continuous accessible path of travel and in circulation spaces are required to comply with the following:

- Circular openings shall be not greater than 13 mm in diameter.
- Slotted openings shall be not greater than 13 mm wide and be oriented so that the long dimension is transverse to the dominant direction of travel.

#### Slip Resistance

A continuous accessible path of travel and any circulation spaces shall have a slip-resistant surface. The texture of the surface shall be traversable by people who use a wheelchair and those with an ambulant or sensory disability. The following table lists the minimum slip resistance classifications for common locations.

| Location                                          | Wet pendulum test | Oil-wet inclining platform test |
|---------------------------------------------------|-------------------|---------------------------------|
| External ramps steeper than 1:14                  | P5                | R12                             |
| External ramps and walkways not steeper than 1:14 | P4                | R11                             |
| Wet areas e.g. toilets                            | P3                | R10                             |
| Transitional areas                                | P2                | R9                              |
| Dry areas                                         | P1                | R9                              |
| Stair tread or landing surface - Wet              | P4                | R11                             |
| Stair nosing or landing edge strip - Wet          | P4                | -                               |



Provide the slip resistance test results for the proposed finishes, including the external timber decking and timber flooring in the Hall Building, prior to the completion of the design.



Alternatively, the finishes schedule can state what slip resistance is to be achieved after the timber floors are sealed.

| A: STRUCTURE  | CTD01 | COMPOSITE TIMBER DECKING TYPE 01 | 0383 Sheet Flooring and Decking   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | _ | *  | aorilim                   |
|---------------|-------|----------------------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|----|---------------------------|
| 22: STRUCTURE | TDOV  | TIMBER DECKING TYPE OF           | 0383 Sheet Plooning and Decking   | Anierod Companya Threer Dael<br>Landeni, Tenere Dael<br>Landeni, Tenere Javie, stanta a Schon m Knitskep traunijsk.<br>Type TRC<br>Nagelan: Danta Na Skol (2005)<br>Maker a Schon Na Na Skol<br>Maker a Schon Na Na Skol<br>Anie Andrea Schon Na Skol<br>Anie Anie Schon Skol<br>Javie A Schon Na Skol<br>Maker a Schon Skol<br>Maker a Schon Skol<br>Maker a Schon Skol<br>Maker a Schon Skol<br>Maker a Skol |   | ¥  | antim II yaar             |
| 3. STRUCTURE  | TSF01 | TIMBER SHEET FLOORING TYPE 01    | 0383 - Sheet flooring and decking |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | _ | Y. | operations of its careful |

# Parts of buildings to be accessible

#### **Walkways**

Where provided walkways are required to be provided with landings at the top and bottom and all changes in direction and at every doorway, gate, or similar opening.

A landing is required at the top and bottom and at the change of direction of the two walkways to the north of the Special Programs classrooms. The landings at the top and bottoms should be indicated on the drawings so that any gradient across the landing is stated.



The final gradients of walkways must not be steeper than 1:20, otherwise the provisions for a ramp will be required.

Landings are required to have a minimum length of 1200mm where there is no change in direction and a minimum length of 1500mm where there is a change of direction not exceeding 90°. In addition, the internal corner shall be truncated for a minimum of 500mm in both directions for landings provided where there is a change in direction.

Landings provided for walkways with a change in direction of 180° are required to have a minimum length of 1540mm.



The floor or ground surface abutting the sides of the walkway are required to be provided with a firm and level surface of a different material to that of the walkway at the same level of the walkway, follow the grade of the walkway and extend horizontally for a minimum of 600 mm unless one of the following is provided to both sides of the walkway:

- A kerb with a minimum height of 65mm; or
- A kerb rail and handrail; or
- A wall not less than 450 mm in height.

The edge protection proposed to the walkway between the hall and admin buildings is required to be revised so that it complies one of the options in figure 19 of AS1428.1 2009 below.



The handrail HHR04 with kickplate will comply but it has to be specified on the drawings to both sides of the walkway.

Provide details of the edge protection to the walkways to the north of the Special Program building. Note that grass or turf will not meet the requirements for the adjacent surface to be firm and level.





As 1428.1 2009 states that where there is a change of direction not exceeding  $90^{\circ}$ , the landing shall be not less than 1500 mm. The internal corner shall be truncated for a minimum of 500 mm in both directions, as shown in Figure 25(B)

The mid landing to ramp 2 is required to be modified to reflect the requirements of figure 25B from As1428.1 2009 below.



The mid landings to the two walkways to the north of the Special Programs building are also required to comply with the stated landing requirements.



The gradient of all inclined surfaces should be stated on the drawings and all walkways are required to comply with the requirements of AS 1428.1 2009.

# <u>Ramps</u>

Where ramps are proposed, they are required to be provided with a maximum gradient of 1:14.

Ramps are required to be provided with landings at all changes in direction and at every doorway, gate, or similar opening. Ramps are required to be provided with landings at intervals of not greater than 9m for ramp gradients of 1:14 and at intervals of not greater than 15m for ramp gradients steeper than 1:20.

For ramp gradients between 1:14 and steeper than 1:20, landings are required to be provided at intervals that shall be obtained by linear interpolation.

Landings are required to have a minimum length of 1200mm where there is no change in direction and a minimum length of 1500mm where there is a change of direction not exceeding 90°. In addition, the internal corner shall be truncated for a minimum of 500mm in both directions for landings provided where there is a change in direction.



The widths of ramps and landings are required to be measured clear of handrails and kerbrails

Ramps shall have a handrail on each side of the ramp. The handrails are required to extend at least 300mm past the top and bottom of the ramp and have a turndown of 180° or be returned to the ground and are required to be continuous around landings.

Where the intersection of the base or top of a ramp is at an internal corridor, the ramp shall be set back by a minimum of 400mm so that the handrail extension does not protrude into the transverse path of travel.

Ramps and intermediate landings are required to be provided with kerbs or kerb rails on both sides that:

- Have a minimum height above the finished floor of 65mm.
- Have a height of the top of the kerb or kerb rail that is not within the range 75mm to 150mm above the finished floor.
- The kerb or kerb rail is not permitted to have longitudinal gaps or slots greater than 20mm within the range 75mm to 150mm above the finished floor.

Handrail HR04 with kerbrail will comply for the ramp but the handrail HR06A will not comply as it has a 75mm gap to the underside of the kerbrail instead of a max of 65mm and will not have a min height of 150mm if the 75mm kerbrail is lowered to close the bottom gap. See requirements below in diagram (b).



Ramp handrails with a height of 865-1000mm (900mm recommended) and 665-750mm (700mm recommended) are required to be installed on both sides of the ramp, are to be continuous throughout the ramp flight and, where practicable, around landings.

The cross-section of handrails is required to be circular or elliptical, not less than 30mm or greater than 50mm in height or width for not less than 270° around the uppermost surface.

The clearance between a handrail and an adjacent wall surface or other obstruction is required to be not less than 50mm. This clearance shall extend above the top of the handrail by not less than 600mm.



The ramp detail on LWD-505 should be revised to state a max gradient of 1:14 not a min gradient.



# Threshold Ramps

AS1428.1 2009 requires a max grade of 1:8 for threshold ramps and they should not be under the door, they should start at its edge or a max distance of 20mm from it.

Provide details for review.

# <u>Stairs</u>

Stairs are required to have opaque risers and the stair nosing's are not permitted to project beyond the face of the riser.

Each stair tread nosing is required to be provided with a strip not less than 50mm and not more than 75mm deep across the full width of the path of travel. The strip may be set back a maximum of 15mm from the front of the nosing and is required to have a minimum luminance contrast of 30% to the background. (Note that black nosing strips should be specified to uncoloured concrete stairs.)

Stair handrails with a height of 865-1000mm (900mm recommended) and 665-750mm (700mm recommended) are required to be installed on both sides of the stairs, are to be continuous throughout the stair flight and, where practicable, around landings.

The stairs between the Hall Building and the Admin Building and to the west of the Homebase building are required to have a handrail located on both sides of the stair, (rather than one handrail in the middle).



The cross-section of handrails is required to be circular or elliptical, not less than 30mm or greater than 50mm in height or width for not less than 270° around the uppermost surface.

Where a handrail terminates at the bottom of a flight of stairs, the handrail is required to extend at least one tread depth parallel to the line of nosings plus minimum of 300mm horizontally from the last riser. The handrail is required to extend a minimum of 300mm horizontally past the nosing on the top riser.



In order to achieve compliance with the requirement for the stair handrail to extend at least one tread width at the base of the flight it is necessary for adjacent flights to be offset from each other as shown in the diagram below.

The handrail detail on the architectural drawing (A-D6001(3)) is required to be revised to show that the upper handrail has a height of between 865-1000mm and not 725mm.



Please send further details of the handrail to the library stair as it does not appear to be located at the side of the stairs.



The landings to the stairs are required to have a maximum gradient of 1:50.



The front stairs to the stage in the hall is required to be provided with As1428.1 2009 compliant handrails to both sides of the stair.



The adjacent flights in stairs 3, 4 and 5 are required to be offset from each other to maintain a constant handrail height as per the figure below from AS1428.1 2009.





The stair to the side of the tiered seating in Stairs 3 and 4 are required to be provided with a handrail on both sides of the stairs. (Please refer to the comment in the BCA report regarding the redesign of the treads to be a constant dimension.)



# **Doorways**

Doorways are required to be provided with a minimum clear opening width of 850mm and where sliding doors are provided the clear opening width must allow for a minimum 60mm gap between the door handle and the door frame when the door is open and closed.



Circulation spaces are required to be provided at every doorway, gate, or similar entry way, on a continuous accessible path of travel. The circulation space required will depend on the type of door ie swing or sliding and the angle of approach ie side or front on etc.

Where possible the required circulation space should be provided with a construction tolerance and the required dimension of any latch side wall should be stated on the drawings.



Door handles and related hardware are required to be of the type that allows the door to be unlocked and opened with one hand. The handle is required to be such that the hand of a person who cannot grip will not slip from the handle during the operation of the latch. 'D' type handles shall be provided on sliding doors.

The clearance between the handle and the back plate or door face at the centre grip section of the handle is required to be not less than 35mm and not more than 45mm.

Where snibs are installed, they shall have a lever handle of a minimum length of 45mm from the centre of the spindle.

For doors other than fire doors where a door closer is fitted, the force required at the door handle to operate the door shall not exceed 20N.

Where an outward opening door is not self-closing, a horizontal handrail or pull bar is required to be fixed on the closing face of a side-hung door.



The developed design drawings are required to show dimensioned compliant door circulation spaces including to the Admin Building as shown below.



The developed design drawings are required to show compliant door clearances and circulation spaces including to the Homebase Building as shown below.



The pan in the accessible wc is not permitted to encroach into the door circulation space.



The basin in the accessible wc's in the Homebase building is not permitted to encroach into the door circulation space.







All sliding doors are required to have a minimum latch side circulation space of 395mm and this is required to be dimensioned on the final drawings.

The same detail applies to all sliding doors in Homebase 1 in each cluster.



The concrete setout plan do not show any set downs in the floor slab for the wet area off of the library. Set downs are required to be shown in the developed drawing to ensure level door thresholds when tile floors are built up.



# Switches & Controls

All switches and controls on an accessible path of travel, other than general purpose outlets, are required to be located not less than 900 mm nor more than 1100mm above the plane of the finished floor and not less than 500mm from internal corners.

This applies to light switches, intercoms, card readers etc and this requirement should be stated on the architectural and services drawings.

#### Exemptions

The following areas are not required to be accessible:

- An area where access would be inappropriate because of the particular purpose for which the area is used.
- An area that would pose a health or safety risk for people with a disability.
- Any path of travel providing access only to an area exempted by (a) or (b).



This generally applies to plant rooms and other areas used occasionally by maintenance personnel. It should not be used for exempting disabled access into storerooms or other areas used occasionally by staff.

#### Accessible carparking

The proposed accessible carparking is required to comply with the requirements of the BCA, AS1428.1 2009 and AS NZS 2890.6 2009.



AS NZS 2890.6 2009 requires parallel parking to be provided with a shared space on the non-trafficked side of the accessible carspace ie the non-road side.

The developed design drawings are required to show this for the parallel accessible car space in the main carpark.

See extract from the drawing and AS NZS 2890.6 2009 below.



AS NZS 2890.6 2009 states that if the route to parking spaces for people with disabilities is not readily apparent from the vehicular entrance to the car park, direction signs comprising the international symbol of access and an arrow should be used at the entrance and at each change of direction to direct traffic to the spaces. The symbol should point in the same direction as a left or right arrow.

The developed design drawings are required to provide details of the signage directing people to the accessible carspaces located on the Service Delivery Road from the vehicular entrance to the car park.





# <u>Signage</u>

Braille and tactile signage complying with the requirements of BCA Specification D3.6 is required to be provided to:

- The doorway to the male and female toilets;
- The doors to the male and female ambulant cubicles;
- The doorway to the accessible toilets.

The sign to the doorway of the accessible toilet must identify if the facility is suitable for left or right-handed use.

Braille and tactile signage complying with the requirements of BCA Specification D3.6 is required to be provided to a room provided with hearing augmentation.

The signage is required to include the international symbol for deafness and must identify:

- the type of hearing augmentation; and
- the area covered within the room; and
- if receivers are being used and where the receivers can be obtained.

Where a pedestrian entrance is not accessible directional signage incorporating the international symbol of access must be provided to direct a person to the location of the nearest accessible pedestrian entrance.

#### Hearing augmentation

A hearing augmentation system must be provided where an inbuilt amplification system, other than one used only for emergency warning, is installed in a room in a Class 9b building, at any ticket office, teller's booth, reception area or the like, where the public is screened from the service provider.

If a hearing augmentation system is an induction loop, it must be provided to not less than 80% of the floor area of the room or space served by the inbuilt amplification system.

If a hearing augmentation system is a system requiring the use of receivers or the like, it must be available to not less than 95% of the floor area of the room or space served by the inbuilt amplification system, and the number of receivers provided must not be less than:



- if the room or space accommodates up to 500 persons, 1 receiver for every 25 persons or part thereof, or 2 receivers, whichever is the greater; and
- if the room or space accommodates more than 500 persons but not more than 1000 persons, 20
  receivers plus 1 receiver for every 33 persons or part thereof in excess of 500 persons.

Any screen or scoreboard associated with a Class 9b building and capable of displaying public announcements must be capable of supplementing any public address system, other than a public address system used for emergency warning purposes only.

Provide drawings detailing the compliance of any proposed hearing augmentation system prior to the installation of the system. See details below from E000.01(1).

# PUBLIC ADDRESS SYSTEM

| SYMBOL     | DESCRIPTION                                   |
|------------|-----------------------------------------------|
| 12         | SURFACE MOUNTED 100V PA SPEAKER               |
| $\bigcirc$ | CEILING RECESSED 100V PA SPEAKER              |
|            | SURFACE MOUNTED HORN                          |
| PA         | PUBLIC ADDRESS SYSTEM CONTROL PC / MICROPHONE |
| ZR         | PUBLIC ADDRESS ZONE RECEIVER                  |
| ZA         | PUBLIC ADDRESS ZONE AMPLIFIER                 |

As stated above if the hearing augmentation system is a induction loop it must be provided to not less than 80% of the floor area of the room or space served by the inbuilt amplification system. The drawing provided show that loop provided to the hall has an area of 192m2 whereas 80% of the floor area of the room is 305m2.

Provide further information regarding the extent of the inbuilt amplification system in the room or space. If the inbuilt amplification system does not serve the whole room or space then the 80% calculation can be reduced to less than the minimum area of 305m2.





The Homebase Building is specified to have an inbuilt amplification system throughout the building however details of a hearing augmentation system are not provided on the documentation. Provide details in the developed design documents.



# Tactile indicators

Tactile indicators are to comply with AS1428.4.1 2009 must be provided to:

- a stairway used for general communication;
- a ramp;
- the underside of an overhead obstruction (eg stair soffit) unless a suitable barrier (eg handrail) is provided.

The protection of the underside of the stairs serving the Homebase Building is required to be included in the developed design drawing. Protection can be achieved by the provision of tactiles or rails as per the requirements of AS1428.4.1 2009. Please clarify if the underside of Stairs 3, 4 and 5 are to be enclosed.



Tactile indicators are required to have a luminance-contrast to the base surface as follows:



- Where the integrated TGSIs are of the same colour as the underlying surface—not less than 30% across its entire area.
- Where discrete TGSIs—not less than 45%.
- Where discrete TGSIs are constructed using two colours or materials, the raised surface shall have a section that has 60% luminance contrast for a diameter of 25 ±1 mm tested as required below

The developed design drawings are required to show the appropriate tactile indicators. Please ensure that the developed drawing show that the tactiles extend for the full width of the stairs and also to the top and bottom to the front stair to the stage.



# Wheelchair seating spaces in Class 9b

Where fixed seating is provided in a Class 9b assembly building, wheelchair seating spaces complying with AS 1428.1 2009 must be provided in the following ratios:

| Number of fixed seats | Number of wheelchair spaces | Grouping & location           |
|-----------------------|-----------------------------|-------------------------------|
| Up to 150             | 3 spaces                    | 1 single space & 1 group of 2 |
|                       |                             | spaces                        |

Wheelchair seating spaces are required to comply with the following requirement:

- They must be provided adjacent to, and on the same level as, other seating in the row and shall be accessed by a continuous accessible path of travel.
- They must be located to allow lines of sight comparable to those for general viewing areas and shall not be obstructed by opaque handrails or balustrades.

The fixed seating in the library has been removed and these requirements no longer apply.

#### Glazing on an accessway

All frameless or fully glazed doors, sidelights, including any glazing capable of being mistaken for a doorway or opening, shall be clearly marked for their full width with a solid and non-transparent contrasting line.

The contrasting line shall be not less than 75 mm wide and shall extend across the full width of the glazing panel. The lower edge of the contrasting line shall be located between 900 mm and 1000 mm above the plane of the finished floor level.

#### Accessible sanitary facilities

The BCA states that at least one accessible toilet must be provided in each storey that is provided with toilets.

The BCA states that where a storey has more than 1 bank of sanitary compartments containing male and female sanitary compartments an accessible toilet must be provided at not less than 50% of those banks.



The accessible toilets are required to be provided with the minimum circulation spaces and requirement stated in AS1428.1 2009 which includes:

- A minimum width of 1900mm and minimum length of 2300mm for toilet pans;
- The basin is not to encroach by more than 100mm into the required circulation space;
- A toilet pan with a seat height of 460-480mm, set out 450-460mm from the side wall to the centre line and located 790-810mm from the back wall to the front of the pan;
- A toilet seat with a minimum 30% luminous contrast to the floor finish;
- Grabrails at a height of 790-810mm and able to withstand a force of 1100 N applied at any position and in any direction without deformation or loosening or rotation of the fastenings or fittings;
- Backrests that have a height, at the lower edge of backrest to the top of the seat, of 120mm to 150mm, that have a vertical height of 150–200mm and a width of 350–400mm and that are capable of withstanding a force in any direction of 1100N;
- Washbasins that have a height of 800-830mm to the front edge.
- Ancillary fixtures and fittings eg toilet paper holder, shelves, mirrors, hooks etc and any accessible shower set out as per the requirement of As1428.1 2009.
- Where an outward opening door is not self-closing, a horizontal handrail or pull bar shall be fixed on the closing face of a side-hung door, as shown in Figure 36 of As1428.1 2009.
- Outward-opening doors shall have a mechanism that holds the door in a closed position without the use of a latch.

The BCA states that where two or more of each type of accessible unisex sanitary facility are provided, the number of left and right handed mirror image facilities must be provided as evenly as possible.

The developed design drawings are required to show further detail to ensure the required circulation space and fixture locations are compliant. Note that the showers are required to have a minimum dimension of 1600mm x 1100mm and not the 1200 x 1200 shown.



# Ambulant facilities

The BCA states that at each bank of toilets where there is one or more toilets in addition to an accessible toilet at that bank of toilets, an ambulant cubicle in accordance with AS 1428.1 must be provided for use by males and females.

The ambulant cubicles are required to be provided with the minimum circulation spaces and requirement stated in AS1428.1 2009 which includes:

- A width of 900-920mm and a clear width of not less than 900mm from the front of the pan to the cubicle door;
- A toilet pan with a seat height of 460-480mm and set out along the centre line of the cubicle;
- Grabrails at a height of 790-810mm and able to withstand a force of 1100 N applied at any position and in any direction without deformation or loosening or rotation of the fastenings or fittings;



- Doorways with a minimum clear width of 700mm;
- A 900x900mm circulation space to both sides of the cubicle doors and entry doors;
- Toilet paper holder and hooks set out as per the requirement of As1428.1 2009.

Provide developed design of the proposed toilets showing details of the ambulant cubicles.



# 4.0 DDA Optional Requirements

The following comments are the additional advisory requirements of the Disability Discrimination Act 1992 and AS1428.2 1992. These items do not have to be documented in order to obtain the Section 6.28 Crown Works Certificate which confirms the BCA (and AS1428.1 2009) compliance of the proposed works.

# Continuous Accessible Path of Travel

Accessible paths of travel within the boundary of the site shall be provided from transportation stops, accessible parking and accessible passenger loading zones, and public streets or walkways to the accessible building entrance they serve.

Accessible paths of travel shall connect accessible buildings, facilities, and spaces that are on the same site.

Currently there does not appear to be an accessible path of travel connecting the accessible buildings with the sports court as there is a walkway provided that has a gradient of 1:30 in places that does not comply with AS1428.1 2009 as it is not provided with landings and edge protection.





Provide confirmation if the pathways in the retained vegetation are to comply with AS1428.1 2009 and if so provide details confirming compliance.



Accessible paths of travel shall connect accessible building entrances with all accessible spaces and facilities within a building.

Accessible paths of travel shall connect accessible entrances of each accessible building with those exterior and interior spaces and facilities that serve it.

The minimum clear width of a path of travel is required to be 1200mm except at doors.

The accessible elements of buildings and facilities shall be arranged so as to minimize distances to be travelled between them.

# <u>Ramps</u>

Ramps are required to be provided with landings at the top and bottom of the ramp and at intervals not exceeding:

- for ramp gradients of 1 in 14: 6 m;
- for ramp gradients of 1 in 19: 14 m; and
- for ramp gradients between 1 in 19 and 1 in 14, at intervals which shall be obtained by linear interpolation.

# Ground and floor surfaces

Paving bricks with bevelled edges or chamfered arises and heavily textured and figured surfaces such as raked joint pavers shall not be used.

Where carpet is used on a ground or floor surface, the following requirements apply:

- The carpet shall be securely attached.
- Any pad, backing or cushioning shall provide a firm surface.
- The carpet shall have a level loop, a textured loop, a level cut pile or a level cut or uncut pile texture.
- The pile height shall be not more than 6 mm.
- Exposed edges of carpet shall be fastened to the floor surface and shall have a trim along the entire length of any exposed edge.
- Carpet edge trim shall create no ridge on the floor surface higher than 3 mm.



# Handrails

Where a handrail is not continued, a tactile indicator in the form of a domed button shall be provided.

Where there is a background wall, handrails shall have a luminance contrast factor with the wall of not less than 30%.

# **Doorways**

The minimum clear opening of a doorway shall be 850mm.

The circulation spaces at doorways shall comply with AS 1428.1 2009 except that 100mm shall be added to all length (L) values and 50mm shall be added to all width (W) values.

Glazing in joinery doors or flush doors shall be as follows:

- The lower edge of the glazing shall be not less than 300mm and not more than 1000mm above the bottom edge of the door.
- The upper edge of the glazing shall be not less than 1600mm above the bottom edge of the door.
- In width, the glazing shall extend not more than 200mm from the latch edge of the door and shall be not less than 150mm wide.

# <u>Stairs</u>

Stair risers are required to be provided with a strip of contrasting colour with a width of 25-50mm located just below the stair nosing.

# Accessible toilets & showers

At least one emergency call button which complies with AS 2999 shall be installed in each accessible toilet.

Toilet seats of moulded plastics shall comply with AS 1371. The design of the seat shall provide lateral stability.

Accessible showers shall have the additional requirements set out in AS1428.2 1992.

# Tactile Indicators

Tactile indicators are required to be provided to the following locations:

- kerb rams and step ramps
- pedestrian crossing at roadways
- pedestrian crossing in high use vehicle areas eg carparks
- vehicle pick up and drop off areas

# Lighting

Illumination levels shall be uniform and comply with the requirements for maintenance illumination set out in AS1680.2.3 2008.

- Doorway entrances 150 lx
- Passageways and walkways 150 lx
- Stairs 150 lx
- Ramps 150 lx
- Lifts See AS 1735.12
- Toilet and locker rooms 200 lx
- Counter tops 250 lx
- General displays 200-300 lx



• Illumination of signs - 200-300 lx

Lighting shall be placed so that unwanted reflections shall not occur on the sign. The luminance factor of the surface of numbers, letters or symbols shall be not less than 30% different from their background.

#### Tables, counters and worktops

Any reception desks or counters are required to have a minimum width of 800mm, have foot and knee clearances and have a section with a height of 830-870mm.

A bench with easily adjustable height within the range of 700mm to 850mm from the finished floor is preferred.

For vision-impaired users, horizontal surfaces should be a lighter colour than that of the vertical surfaces. The luminance factor of the vertical surface should be not less than 30% different from surrounding horizontal surface.

Street furniture, which includes objects such as seats, tables, drinking fountains, planter boxes, rubbish bins and the like, shall be of a colour which provides a contrast with their background and have a luminance factor of not less than 30%.

Where possible, a range of street seat heights should be provided and note that children and small people may prefer seats as low as 350 mm high.

The front of the seat shall have a clear space between any legs at ground level to within 150 mm of the front edge of the seat, and to within 100 mm of the seat height to allow for rearward adjustment of feet when rising. The seat shall drain free of water.

Where armrests are provided, the top surface of the armrests shall be at a height of 260 ±40 mm above the seat.

At each location where drinking fountains or water coolers are provided, at least one of these shall be in accordance with the requirements of AS1428.2 1992.

# 5.0 Conclusion

The design documentation provided to date has been assessed in respect to the deemed to satisfy provisions of Part D3 and F2 of the Building Code of Australia 2019, the Disability Access to Premises Standards 2010, the Disability Discrimination Act (DDA) 1992 and the relevant parts of AS1428.1 2009 and AS1428.4.1 2009.

The design is at a point where the design can be developed, further reviews are required to be carried out prior to the completion of the design.



# **APPENDIX A – DRAWINGS REVIEWED**

# Architectural drawings prepared by NBRS Architecture

| Drawing number, name and revision                                 | Drawing number, name and revision                                                    |
|-------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| 20018 - Door Hardware Schedule                                    | 20018-NBRS-DR-A-C1003 [5] C2 TEACHING BUILDING                                       |
|                                                                   | LOWER GROUND PLAN                                                                    |
| 20018-NBRS-DR-A-0000 [5] COVER SHEET                              | 20018-NBRS-DR-A-C1004 [5] C3 TEACHING BUILDING<br>LOWER GROUND PLAN                  |
| 20018-NBRS-DR-A-0010 [4] ACCOMMODATION<br>SCHEDULE SHEET 1        | 20018-NBRS-DR-A-C1005 [9] OVERALL TEACHING<br>BUILDING UPPER GROUND PLAN             |
| 20018-NBRS-DR-A-0011 [4] ACCOMMODATION                            | 20018-NBRS-DR-A-C1006 [5] C1 TEACHING BUILDING                                       |
| 20018-NBRS-DR-A-0012 [4] ACCOMMODATION                            | 20018-NBRS-DR-A-C1007 [5] C2 TEACHING BUILDING                                       |
| 20018-NBRS-DR-A-0100 [5] DEMOLITION PLAN                          | 20018-NBRS-DR-A-C1008 [5] C3 TEACHING BUILDING                                       |
|                                                                   | UPPER GROUND PLAN                                                                    |
| 20018-NBRS-DR-A-0200 [3] BUILDING SETOUT PLAN                     | 20018-NBRS-DR-A-C1011 [6] OVERALL TEACHING<br>BUILDING ROOF PLAN                     |
| 20018-NBRS-DR-A-0300 [7] OVERALL LOWER GROUND<br>PLAN (SITE PLAN) | 20018-NBRS-DR-A-C1501 [5] OVERALL TEACHING<br>BUILDING CONC SETOUT PLAN LOWER GROUND |
| 20018-NBRS-DR-Á-0301 [4] OVERALL UPPER GROUND                     | 20018-NBRS-DR-A-C1502 [4] C1 TEACHING BUILDING<br>CONC SETOUT PLAN LOWER GROUND      |
|                                                                   | 20018-NBRS-DR-A-C1503 [4] C2 TEACHING BUILDING                                       |
|                                                                   | 20018-NBRS-DR-4-C1504 [5] C3 TEACHING BUILDING                                       |
| DETAILS - SHEET 1                                                 | CONC SETOUT PLAN LOWER GROUND                                                        |
| 20018-NBRS-DR-A-5500 [1] WASTE BIN AREA DETAILS                   | 20018-NBRS-DR-A-C1505 [2] OVERALL TEACHING                                           |
|                                                                   | BUILDING CONC SETOUT PLAN UPPER GROUND                                               |
| 20018-NBRS-DR-A-8000 [3] DOOR SCHEDULE - VISUAL                   | 20018-NBRS-DR-A-C1506 [2] C1 TEACHING BUILDING<br>CONC SETOUT PLAN UPPER GROUND      |
| 20018-NBRS-DR-A-8100 [3] WINDOW SCHEDULE -<br>VISUAL              | 20018-NBRS-DR-A-C1507 [2] C2 TEACHING BUILDING<br>CONC SETOUT PLAN UPPER GROUND      |
| 20018-NBRS-DR-A-8101 [3] WINDOW SCHEDULE -<br>VISUAL              | 20018-NBRS-DR-A-C1508 [2] C3 TEACHING BUILDING<br>CONC SETOUT PLAN UPPER GROUND      |
| 20018-NBRS-DR-A-8301 [5] WALL TYPE SCHEDULE -<br>EXTERNAL         | 20018-NBRS-DR-A-C3001 [6] TEACHING BUILDING<br>ELEVATIONS 1                          |
| 20018-NBRS-DR-A-8302 [2] WALL TYPE SCHEDULE -<br>INTERNAL         | 20018-NBRS-DR-A-C3002 [6] TEACHING BUILDING<br>ELEVATIONS 2                          |
| 20018-NBRS-DR-A-A1001 [11] ADMIN LOWER GROUND<br>PLAN             | 20018-NBRS-DR-A-C3003 [6] C1 TEACHING BUILDING<br>ELEVATIONS                         |
| 20018-NBRS-DR-A-A1011 [5] ADMIN ROOF PLAN                         | 20018-NBRS-DR-A-C3004 [6] C2 TEACHING BUILDING<br>ELEVATIONS                         |
| 20018-NBRS-DR-A-A1501 [5] ADMIN CONC SETOUT<br>LOWER GROUND       | 20018-NBRS-DR-A-C3005 [6] C3 TEACHING BUILDING<br>ELEVATIONS                         |
| 20018-NBRS-DR-A-A3001 [6] ADMIN ELEVATIONS                        | 20018-NBRS-DR-A-C4001 [6] TEACHING BUILDING<br>SECTIONS 1                            |
| 20018-NBRS-DR-A-A4001 [6] ADMIN SECTIONS                          | 20018-NBRS-DR-A-C4002 [6] TEACHING BUILDING<br>SECTIONS 2                            |
| 20018-NBRS-DR-A-B1001 [9] HALL LOWER GROUND<br>PLAN               | 20018-NBRS-DR-A-C5401 [1] TEACHING BUILDING WALL<br>SECTIONS - 1                     |
| 20018-NBRS-DR-A-B1011 [3] HALL LOWER ROOF PLAN                    | 20018-NBRS-DR-A-C5402 [1] TEACHING BUILDING WALL<br>SECTIONS - 2                     |
| 20018-NBRS-DR-A-B1012 [1] HALL UPPER ROOF PLAN                    | 20018-NBRS-DR-A-C6001 [3] TEACHING BUILDING<br>STAIRS - STAIR 3                      |
| 20018-NBRS-DR-A-B1501 [5] HALL CONC SETOUT PLAN<br>LOWER GROUND   | 20018-NBRS-DR-A-C6002 [3] TEACHING BUILDING<br>STAIRS - STAIR 4                      |
| 20018-NBRS-DR-A-B3001 [6] HALL ELEVATIONS 1                       | 20018-NBRS-DR-A-C6003 [3] TEACHING BUILDING<br>STAIRS - STAIR 5                      |
| 20018-NBRS-DR-A-B3002 [6] HALL ELEVATIONS 2                       | 20018-NBRS-DR-A-D1001 [8] LIBRARY LOWER GROUND                                       |
| 20018-NBRS-DR-A-B4001 [6] HALL SECTIONS                           | 20018-NBRS-DR-A-D1002 [8] LIBRARY UPPER GROUND<br>PLAN                               |

# metrobc.com.au

Address: Suite 102, 12 Mount Street, North Sydney NSW 2060 | Email: admin@metrobc.com.au | Phone: (02) 9692 8477 | Fax: (02) 8209 4955



| Drawing number, name and revision              | Drawing number, name and revision              |
|------------------------------------------------|------------------------------------------------|
| 20018-NBRS-DR-A-B5401 [1] HALL WALL SECTIONS - | 20018-NBRS-DR-A-D1011 [5] LIBRARY ROOF PLAN    |
| SHEET 1                                        |                                                |
| 20018-NBRS-DR-A-B5402 [1] HALL WALL SECTIONS - | 20018-NBRS-DR-A-D1501 [5] LIBRARY CONC SETOUT  |
| SHEET 2                                        | PLAN LOWER GROUND                              |
| 20018-NBRS-DR-A-C1001 [6] OVERALL TEACHING     | 20018-NBRS-DR-A-D1502 [2] LIBRARY CONC SETOUT  |
| BUILDING LOWER GROUND PLAN                     | PLAN UPPER GROUND                              |
| 20018-NBRS-DR-A-C1002 [8] C1 TEACHING BUILDING | 20018-SCH007 DOOR SCHEDULE-Rev 2               |
| LOWER GROUND PLAN                              |                                                |
| 20018-NBRS-DR-A-D3001 [6] LIBRARY ELEVATIONS 1 | 20018-NBRS-DR-A-D3002 [6] LIBRARY ELEVATIONS 2 |
| 20018-NBRS-DR-A-D4001 [6] LIBRARY SECTIONS     | 20018-NBRS-DR-A-D6001 [3] LIBRARY STAIRS       |

Electrical drawings prepared by Stowe Australia

| Drawing number, name and revision | Drawing number, name and revision |
|-----------------------------------|-----------------------------------|
| WPS-STO-E000.00 1                 |                                   |
| WPS-STO-E000.01 1                 | WPS-STO-E300.01 1                 |
|                                   |                                   |
| WPS-STO-E200.01 1                 | WPS-STO-E310.01 1                 |
| WPS-STO-E210.01 1                 | WPS-STO-E320.01 1                 |
|                                   |                                   |
| WPS-STO-E220.01 1                 | WPS-STO-E320.02 1                 |
| WPS-STO-E220.02 1                 | WPS-STO-E330.01 1                 |
| WPS-STO-E230.01 1                 | WPS-STO-E600.01 1                 |
| WPS-STO-E300.01 1                 | WPS-STO-E600.02 1                 |

Security drawings prepared by Stowe Australia

| Drawing number, name and revision | Drawing number, name and revision |
|-----------------------------------|-----------------------------------|
| E100.02 1                         | E320.11.1                         |
| E300.11 1                         | E320.12 1                         |
| E310.11 1                         | E330.11 1                         |

Hydraulic drawings prepared by H.L. Mullane & Son Pty Ltd

| Drawing number, name and revision | Drawing number, name and revision |
|-----------------------------------|-----------------------------------|
| MARL-HY-DWG-H-000 2               | MARL-HY-DWG-H-203 2               |
| MARL-HY-DWG-H-001 2               | MARL-HY-DWG-H-300 2               |
| MARL-HY-DWG-H-002 2               | MARL-HY-DWG-H-301 2               |
| MARL-HY-DWG-H-100 3               | MARL-HY-DWG-H-302 2               |
| MARL-HY-DWG-H-101 2               | MARL-HY-DWG-H-303 2               |
| MARL-HY-DWG- H-200 2              | MARL-HY-DWG-H-304 2               |
| MARL-HY-DWG-H-202-2               | MARL-HY-DWG-H-400 1               |

Mechanical drawings prepared by Edwards & Vickerman Consulting Engineers Pty Ltd

| Drawing number, name and revision | Drawing number, name and revision |
|-----------------------------------|-----------------------------------|
| ME-100-01                         | ME-C2-300 01                      |
| ME-A-200 00                       | ME-C2-301 01                      |
| ME-A-300 01                       | ME -C3-200 00                     |
| ME-A-400 01                       | ME-C3-300 01                      |
| ME-B-200 00                       | ME-C3-301 01                      |
| ME-B-300 01                       | ME-C-300 00                       |
| ME-B-301 01                       | ME-C-301 00                       |
| ME-B-400 01                       | ME-C-400 01                       |
| ME-C1-200 00                      | ME-D-200 00                       |
| ME-C1-300 01                      | ME-D-300 01                       |
| ME-C1-301 01                      | ME-D-301 00                       |
| ME C2-200 00                      | ME-D-400 01                       |



Landscaping drawings prepared by NBRS Architecture

| Drawing number, name and revision | Drawing number, name and revision |
|-----------------------------------|-----------------------------------|
| 20018-NBRS-LWD-000 5              | 20018-NBRS-LWD-309 6              |
| 20018-NBRS-LWD-001 4              | 20018-NBRS-LWD-310 6              |
| 20018-NBRS-LWD-010 4              | 20018-NBRS-LWD-311 6              |
| 20018-NBRS-LWD-100 4              | 20018-NBRS-LWD-312 6              |
| 20018-NBRS-LWD-101 5              | 20018-NBRS-LWD-400 4              |
| 20018-NBRS-LWD-102 5              | 20018-NBRS-LWD-401 4              |
| 20018-NBRS-LWD-103 5              | 20018-NBRS-LWD-402 4              |
| 20018-NBRS-LWD-104 5              | 20018-NBRS-LWD-403 4              |
| 20018-NBRS-LWD-105 5              | 20018-NBRS-LWD-404 4              |
| 20018-NBRS-LWD-106 5              | 20018-NBRS-LWD-405 4              |
| 20018-NBRS-LWD-107 5              | 20018-NBRS-LWD-406 4              |
| 20018-NBRS-LWD-108 5              | 20018-NBRS-LWD-407 4              |
| 20018-NBRS-LWD-109 5              | 20018-NBRS-LWD-408 4              |
| 20018-NBRS-LWD-110 5              | 20018-NBRS-LWD-409 4              |
| 20018-NBRS-LWD-111 5              | 20018-NBRS-LWD-410 4              |
| 20018-NBRS-LWD-112 5              | 20018-NBRS-LWD-411 4              |
| 20018-NBRS-LWD-113 4              | 20018-NBRS-LWD-412 4              |
| 20018-NBRS-LWD-301 6              | 20018-NBRS-LWD-500 4              |
| 20018-NBRS-LWD-302 6              | 20018-NBRS-LWD-501 4              |
| 20018-NBRS-LWD-303 6              | 20018-NBRS-LWD-502 4              |
| 20018-NBRS-LWD-304 6              | 20018-NBRS-LWD-503 4              |
| 20018-NBRS-LWD-305 6              | 20018-NBRS-LWD-504 4              |
| 20018-NBRS-LWD-306 6              | 20018-NBRS-LWD-601 3              |
| 20018-NBRS-LWD-307 6              | 20018-NBRS-LWD-602                |
| 20018-NBRS-LWD-308 6              |                                   |