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Core4 Services
9a/62 Bishop St,
Kelvin Grove QLD 4059

13th Jun 2024
Job No. S5466

Concrete Remedial Works - 85 Deakin St, Kangaroo Point

Introduction & Background

Design Sirs has been engaged by Core4 Services to conduct at structural assessment of concrete cancer to the ground floor slabs and provide recommended repairs to same. Concerns had been raised after concrete cracking & spalling was noted below the slab during pool re-fit works

The structure is a 4-storey multi-residential dwelling with 1 basement below, it has been constructed with suspended slab floors which are supported by block masonry walls. The ground floor slab is supported on band beams & concrete columns below. Built in approx. 1995, the building is approximately 29 years old.

The pool retrofit works completed on-site between Nov.-Dec. 2023 were understood to have been related to drainage issues around the slab & that large amounts of water was ponding/ leaking to slab area around the pool. Works have been finished & drainage issues remediated.

Site Inspection

Design Sirs attended site on 31st March 2023 with Core4 Services, weather at the time of inspection was fine & sunny. The scope of the investigation was limited to a visual inspection of the ground floor slab, with a specific focus on the slab region as indicated in figure 1 below. The slab outside the area shaded green was found to be in good condition, with negligible indication of concrete cancer/ deterioration

Appendix A provides a photographic record of defects & inspection, Appendix B provides indicative site plan for defect severity & location.

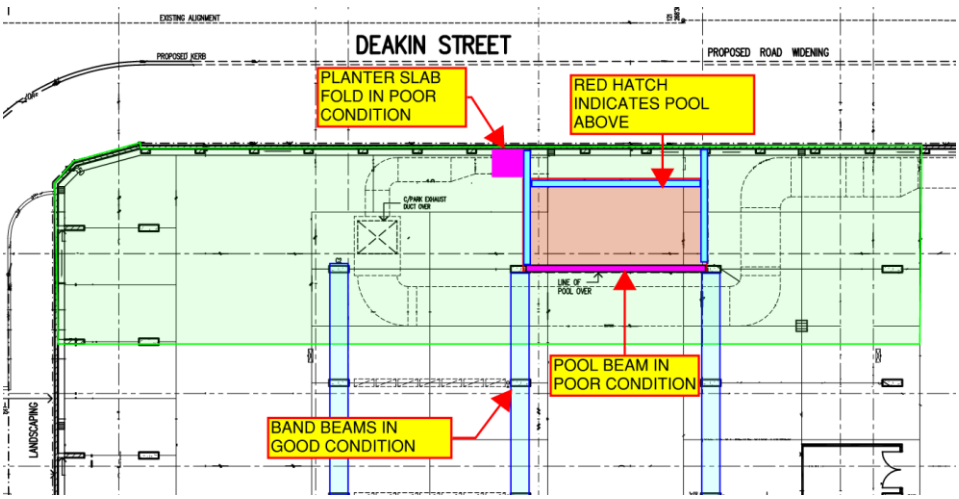


Figure 1 - Area of investigation shown in green.

The slab within the shaded green area was found to be in a condition appropriate for its age, however there were scattered area of staining and water ingress to the concrete slab, refer photos 1-4. These areas of minor staining were primarily located around pipe penetrations & the area of slab with garden beds above.

A section of slab supporting the front planter box has large vertical cracks along the surface & areas of spalling, refer photo 10

The pool on the ground floor above is supported by a concrete beam on each side, the concrete beam as indicated in figure 1, has sever concrete cancer. Large cracks approx. 3-5mm in width can be seen along the length of the beam, refer photo 17-20

Discussion

As noted in the introduction, slab pool surround had issue with water drainage, as concrete cancer/ water staining is localised to this area it is likely a result of the water drainage issues.

It is additionally noted that minor concrete cancer was seen at location of carpark exhaust ventilation and around various pipes located around the slab below garden beds/ landscaping above. This indicates that water drainage/ ingress issues may extend to this area on the ground floor & would also need repair to mitigate any further concrete cancer

Repair Works

Design Sirs recommends checking any drainage pipes/ grates to the ground floor garden/ landscape area to confirm to further water issues.

For concrete cancer repairs, works are classified into 3 categories for defects & repair work, with location & severity shown on plan in Appendix B.

Defect Classification

Design Sirs classified on-site concrete cancer defects into the following categories:

- Class A:
  - Minor concrete defect and/or staining
  - No reinforcement exposed, minor/ no cracking
- Class B:
  - Moderate visual indication of early concrete cancer
  - concrete cracking/ spalling
  - some (100mm or less) reinforcement showing, some indication of corrosion
- Class C:
  - Severe indication of concrete cancer
  - Concrete cracked and/or fallen away in chunks
  - Moderate reinforcement exposure with significant corrosion.

Recommended Repairs

- Class A:

  Class A repairs may be considered optional, but if not repair will require yearly monitoring
  - Scabble back surface concrete until all stained concrete is removed. Up to the depth of reinforcement if necessary
  - Any reinforcement that is exposed shall be wired brushed clean of any rust & painted with SikaTop Armatec -110 EpoCem
  - Repair concrete with Sika MonoTop -352 NFG concrete repair mortar
- Class B:
  - Prop each side of region to be repaired, props shall be spaced at 1.5m centres max.
  - Clean area & remove any loose concrete from area.
  - Scrabble back/ hammer out 50mm each end along exposed reinforcement min. or until clean reinforcement clean of rust is found
  - Confirm extent of corrosion and wire brush clean steel reinforcement
  - Paint steel reinforcement in SikaTop Armatec -110 EpoCem
  - Repair concrete with Sika MonoTop -352 NFG concrete repair mortar

- Class C:
  - Refer Repairs details, Appendix C

We trust this covers the repair requirements. If you have any questions or concerns please don't hesitate to contact the writer directly

Design Sirs

Mark Carroll-Chilts
Senior Structural Engineer
BEng, MIEAust, NER, RPEQ

APPENDIX A

PHOTOGRAPHIC RECORD

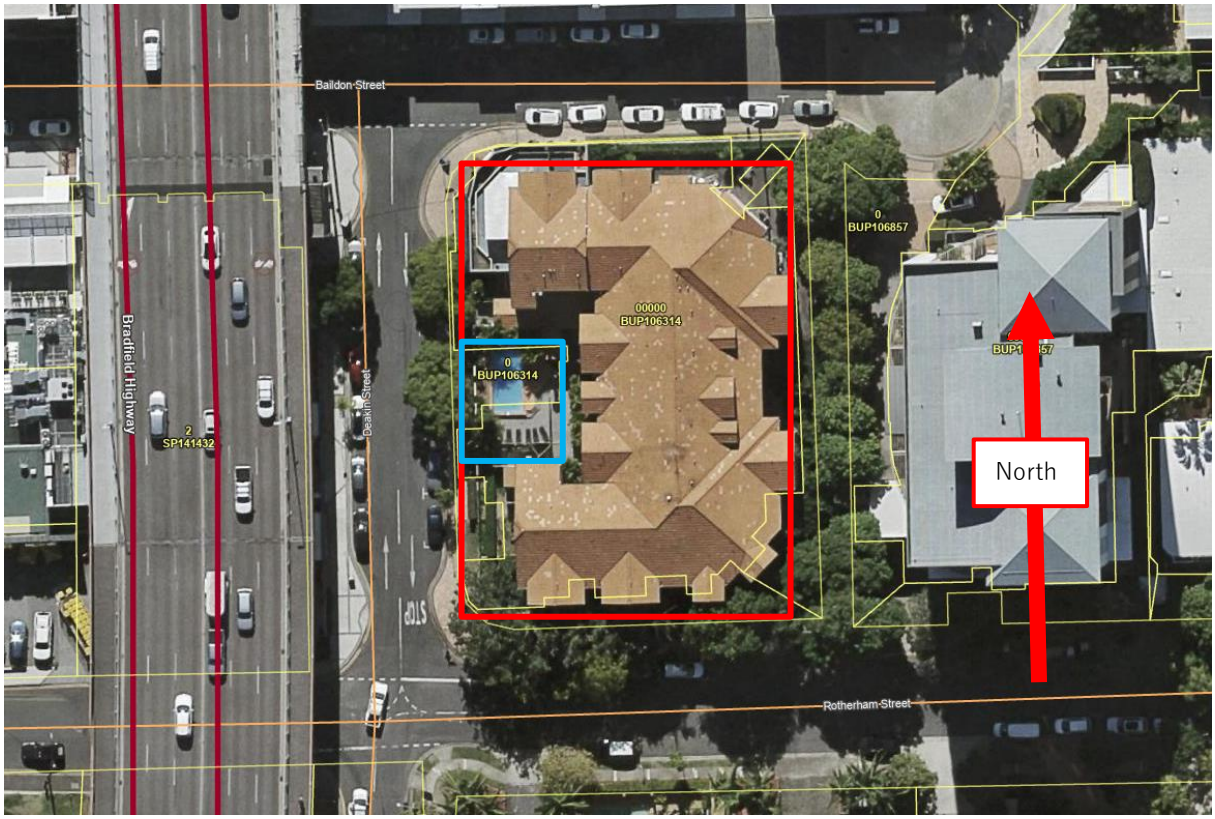
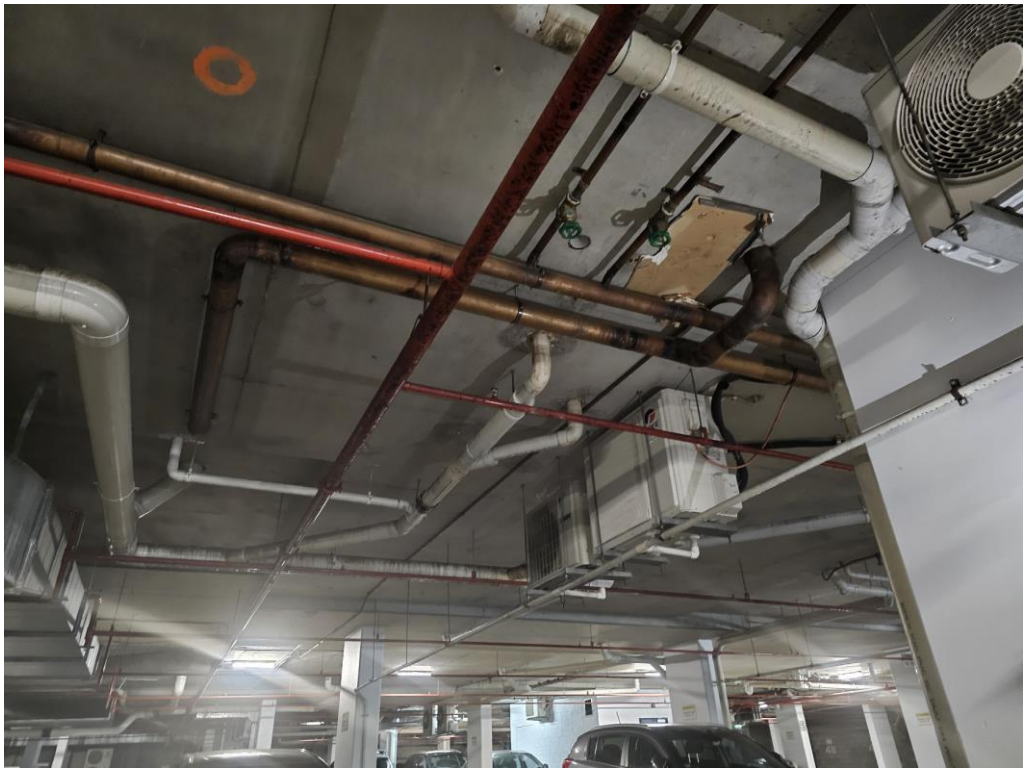


FIGURE 1: Site Plan: 85 Deakin St. Kangaroo Point - Red outline indicates site, blue indicates focus of investigation

PHOTOGRAPH 1.: Defect Class A: Visible staining of concrete, some efflorescence visible



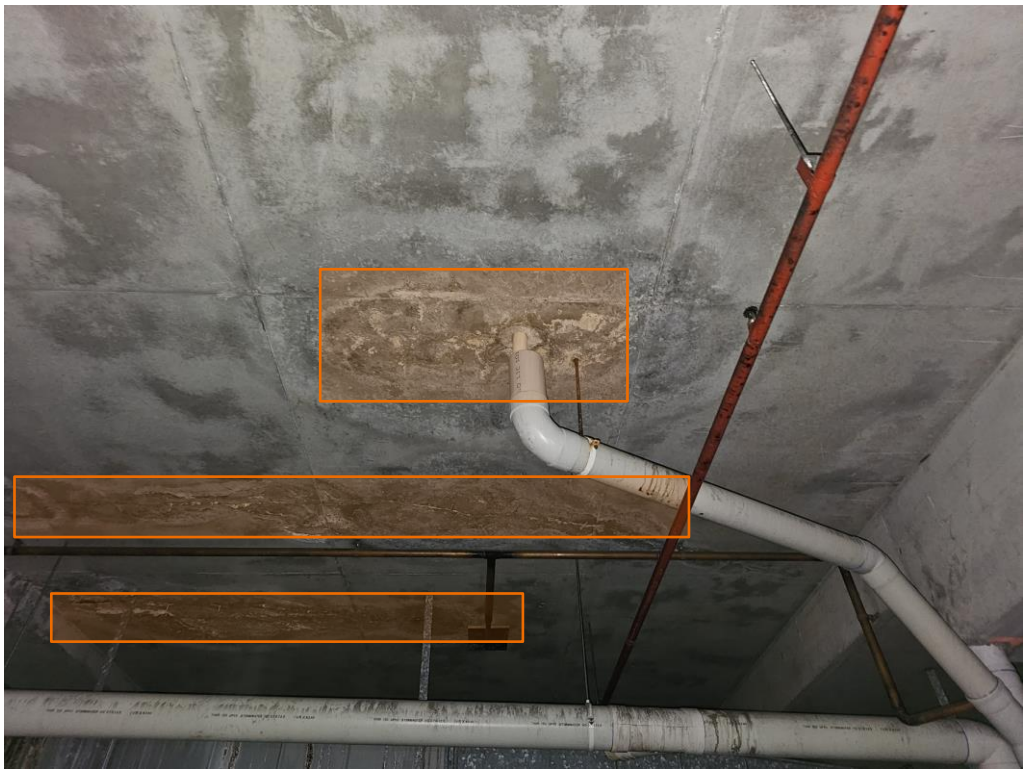
PHOTOGRAPH 2.: Defect Class A: Visible staining of concrete, located around pipe penetration

PHOTOGRAPH 3.: Defect Class A: Visible staining of concrete, located around air con

PHOTOGRAPH 4.: Defect Class A: Staining to concrete around pipe penetrations. Wall also indicates water penetration with notable efflorescence to the block wall

PHOTOGRAPH 5.: Defect Class B: Reinforcement exposed due to concrete spalling

PHOTOGRAPH 6.: Defect Class B: Reinforcement exposed due to concrete spalling



PHOTOGRAPH 7.: Defect Class B: Larg area of straining, early stage of steel corrosion

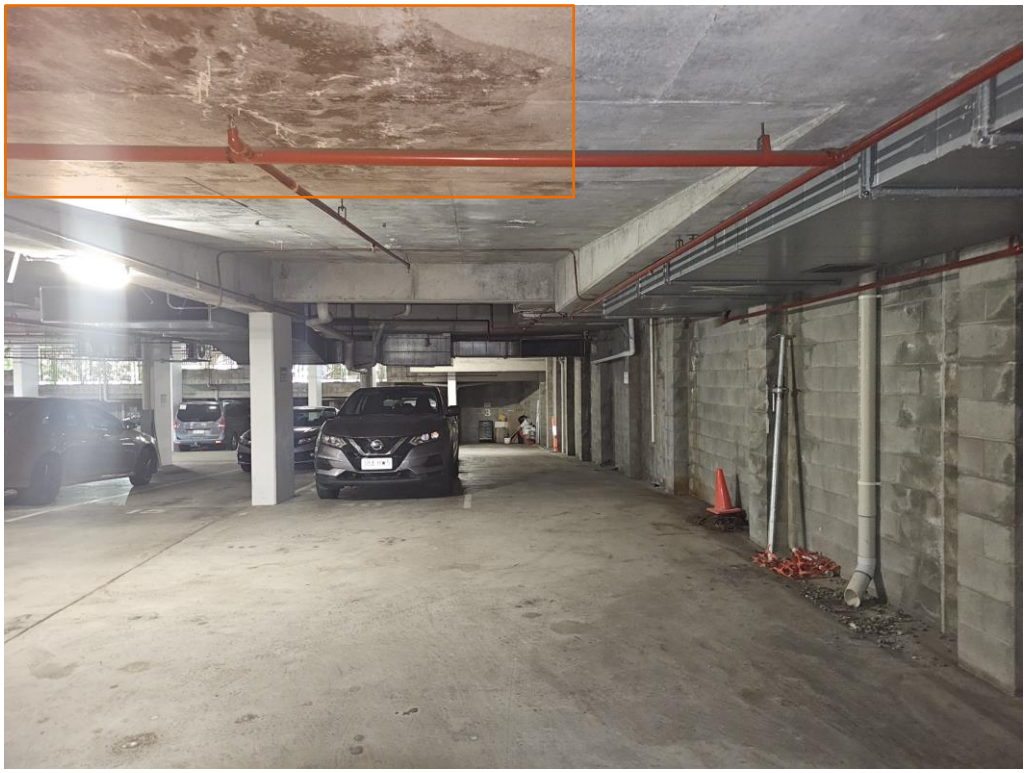
PHOTOGRAPH 8.: Defect Class A: Staining & material deposits to concrete around pipe penetration

wall

PHOTOGRAPH 9.: Defect Class B: Moderate strain to concrete, large crack at drip tray join

PHOTOGRAPH 10.: Defect Class C: large cracks across concrete face, large are of spalling with multiple chunks of concrete falling away to expose aggregate

PHOTOGRAPH 11.: Defect Class B: Larg area of straining, cracking to concrete surface



PHOTOGRAPH 12.: Defect Class B: Larg area of straining, cracking to concrete surface

PHOTOGRAPH 13.: Defect Class A: Visible staining of concrete, some efflorescence visible

PHOTOGRAPH 14.: Defect Class A: Visible staining of concrete, some efflorescence visible, no visible cracking or spalling of concrete

PHOTOGRAPH 15.: Defect Class A: Visible staining of concrete, some efflorescence visible around pipe penetration

PHOTOGRAPH 16.: Defect Class B: Visible staining of concrete, some efflorescence visible, some spalling of concrete along drip tray

PHOTOGRAPH 17.: Defect Class C: Moderate cracking & spalling to concrete beam, beam supports pool above. Cracking depth up to 200mm into depth of beam

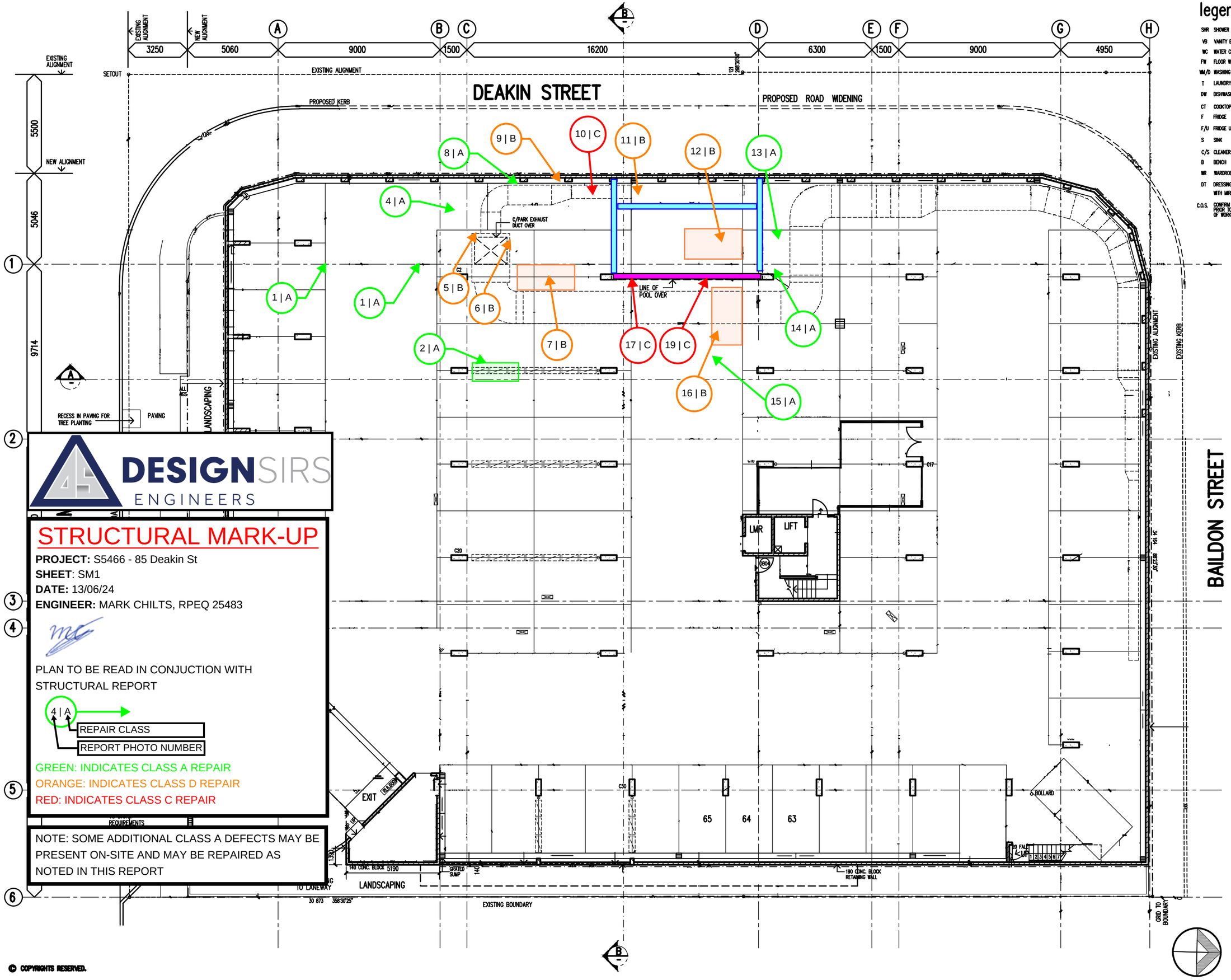
PHOTOGRAPH 18.: Defect Class C: Previous surface repairs evident

PHOTOGRAPH 19.: Defect Class C: Moderate cracking & spalling to concrete beam, beam supports pool above. Cracking depth up to 200mm into depth of beam

PHOTOGRAPH 20.: Defect Class C: Previous surface repairs evident

APPENDIX B

REPAIR LOCATION PLAN



STRUCTURAL MARK-UP

PROJECT: S5466 - 85 Deakin St
SHEET: SM1
DATE: 13/06/24
ENGINEER: MARK CHILTS, RPEQ 25483

PLAN TO BE READ IN CONJUCTION WITH STRUCTURAL REPORT

4 | A
REPAIR CLASS
REPORT PHOTO NUMBER

GREEN: INDICATES CLASS A REPAIR
ORANGE: INDICATES CLASS D REPAIR
RED: INDICATES CLASS C REPAIR

NOTE: SOME ADDITIONAL CLASS A DEFECTS MAY BE PRESENT ON-SITE AND MAY BE REPAIRED AS NOTED IN THIS REPORT

DESIGNSIRS ENGINEERS

legend:

SHR	SHOWER	D	SERVICES DUCT – 30 STC RATED
VB	VANITY BASIN CUPBOARD	HWU	GAS HOT WATER UNIT
WC	WATER CLOSET	S	SMOKE DETECTOR
FW	FLOOR WASTE	E	1 No 4.5 KG DRY POWDER CHEMICAL FIRE EXTINGUISHER
WM/D	WASHING MACHINE/DRYER	FH	FIRE HYDRANT
T	LAUNDRY TUB	FHR	FIRE HOSE REEL
DW	DISHWASHER	M EXIT	ILLUMINATED EXIT SIGN (in accordance with AS2293.1) ("M" denotes maintained fitting)
CT	COOKTOP	M EXIT	ILLUMINATED EXIT SIGN WITH DIRECTIONAL ARROW (in accordance with AS2293.1) ("M" denotes maintained fitting)
F	FRIDGE		ceiling mounted 22W circular flourescent light fitting complete with emergency pack (in accordance with ASD 2293.1)
F/U	FRIDGE UNDER BENCH	EM	1200 long single fluorescent light fitting 1 x 36W batten & diffuser complete with emergency pack ("EM" denotes emergency)
S	SINK		
C/S	CLEANERS SINK		
B	BENCH		
WR	WARDROBE		
DT	DRESSING TABLE BENCH, WITH MIRROR OVER		
C.O.S.	CONFIRM ON SITE PRIOR TO COMMENCEMENT OF WORKS		

notes:

+ R.L. 10.100 – INDICATES FINISHED LEVELS
RL 9.600 – INDICATES NEW LEVELS (STRUCTURAL)
TK 9.600 – INDICATES PROPOSED TOP OF KERB LEVELS

POISON UNDER CONCRETE SLABS IN ACCORDANCE WITH AS 3660 PART 1 – (NEW BUILDINGS)
REFER TO HYDRAULIC DRAWINGS FOR SEWERAGE AND STORMWATER DETAILS
REFER TO STRUCTURAL ENGINEERS DRAWINGS FOR DETAILS TO ALL R.C. FOOTING,SLABS & BLOCKWORK.
SERVICE PENETRATIONS BETWEEN FLOORS TO BE SEALED IN ACCORDANCE WITH SPECIFICATION C3.5 BUILDING CODE OF AUSTRALIA
ALL HANDRAILS/BALUSTRADES TO BE IN ACCORDANCE WITH CLAUSE D2.16 BUILDING CODE OF AUSTRALIA
ALL STAIRS TO BE IN ACCORDANCE WITH CLAUSE D2.13 BUILDING CODE OF AUSTRALIA

INDICATES A/C CONDENSER UNITS OVER

WALLS
Externally
All external walls to be concrete block retaining – where exposed, approved texture coating externally

Internally
internal walls indicated to be blockwork
LIFT & STAIR WALLS 90/90/90

COLUMN SETOUT
Generally centreline column (width only) to line with centreline carparking aisle. Otherwise as noted.

R.P.D.
LOT 5 ON RP 10806 & RP 10825
LOT 6 ON RP 159321 & B 3744
LOT 7 ON RP 10829 & B 3744
PARISH OF SOUTH BRISBANE
COUNTY OF STANLEY.

ISSUE	DATE	DESCRIPTION
O	29.07.97	STORE (LAYERS MAY BE FROZEN–ROOM*)
N	19.06.97	RE–PLOT SPOT LEVELS
M	31.02.97	NOMINATE SCREENS TO BASEMENT
L	9.10.96	PILASTERS ADDED TO RETAINING WALL,STAIR 1 ALTERED, GENERAL
K	26.9.96	DIMENSIONS AMENDED AT ENTRY
J	25.9.96	AMENDMENTS TO DIMENSIONS & RL'S TO STAIR
H	17.9.96	GRID DIM 5&6 CHANGED, BOUNDARY TO GRID DIM CHANGED NE CNR
G	16.9.96	DIMS REMOVED FROM STAIR & ENTRY
F	13.9.96	BOUNDARY AMENDED, DIMS CHANGED, ADDED
E	11.9.96	PRECAST CONC. CHANGED TO BLOCKWORK, AMENDMENTS TO STAIRS & LIFT, SETOUT, GENERAL
D	5.3.96	GENERAL AMENDMENTS
C	18.1.96	GENERAL AMENDMENTS
B	1.12.95	B.A. REISSUE

proposed tenement buiding rotherham street, kangaroo point, Q. 4169 for rivercity terraces pty ltd

TITLE

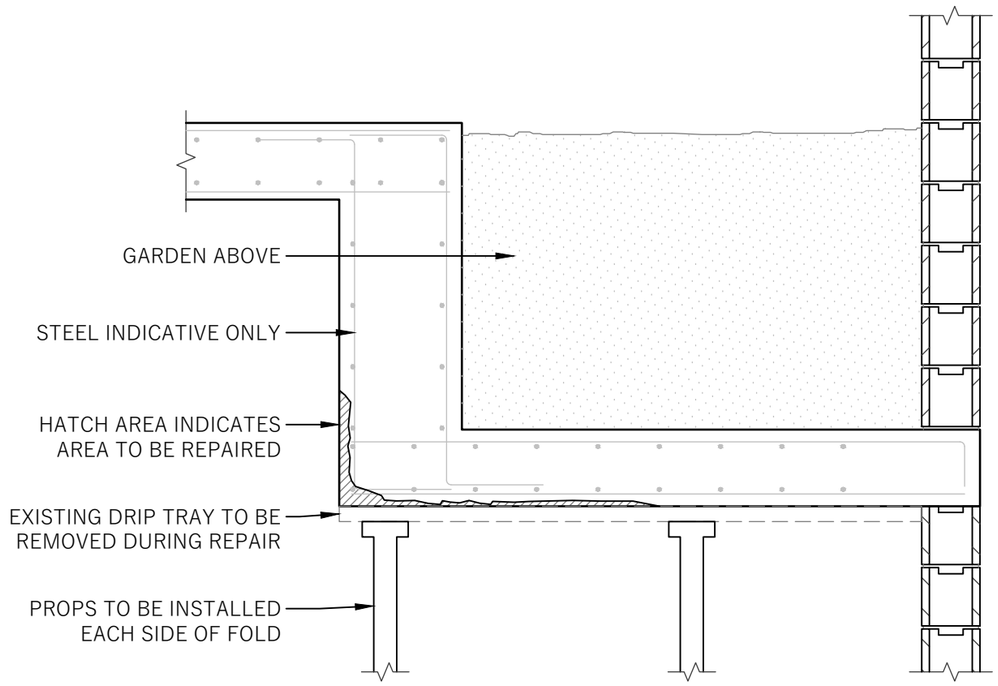
basement floor plan

raymond barber. architect.
suite 1. 261 given terrace. paddington Q 4064 phone (07) 3681388

DATE	DRAWN	CHECKED	SCALE		ISSUE
Nov '95	G.H.	R.H.	A1 – 1:100 A3 – NTS	703–WD 02	0

APPENDIX C

REPAIR DETAILS



- PROP SECTION AS NOTED ON DETAIL, PROPS SHALL BE RATED FOR 100kN EACH (10 TONNE)
- REMOVE EXISTING DRIP TRAY FOR REPAIR WORKS
- SCRABBLE BACK/ HAMMER OUT CONCRETE EACH END OF EXPOSED REINFORCEMENT BAR UNTIL CLEAN STEEL IS FOUND
- WIRE BRUSH CLEAN STEEL REINFORCEMENT
  ANY BARS MISSING OVER 25% OF MASS - CONTACT ENGINEER
- INSTALL SACRIFICIAL ANODE, SIKA FERROGARD -510 PATCH, AT 600 CRS.
  - PRE-DILL HOLE INTO EXG. CONCRETE AT PERIMETER OF REPAIR AREA
  - CLEAR DUST & PRE-WET HOLE FOR 15 MINS.
  - REMOVE EXCESS WATER AND APPLY SIKA FERROGARD -500 CRETE
  - INSTALL FERROGARD 510 PATCH, FULLY EMBED TO 500 CRETE MORTAR
  - FIX ANODE CONDUCTING WIRE TO REPAIRED REINFORCEMENT
- REPAIR CONCRETE WITH SIKA MONOTOP -412 NFG CONCRETE REPAIR MORTAR WITHIN 2 HOURS OF INSTALLING ANODE
- PROPS SHALL REMAIN IN PLACE FOR 7 DAYS
- IF DRIP TRAY IS TO BE RE-INSTATED, CONCRETE SHALL BE TREATED WITH CROMMELIN BLACKSEAL HEAVY DUTY BITUMEN PAINT, FOR A WIDTH OF 500mm, FOR THE FULL LENGTH OF DRIP TRAY

CLASS C REPAIR - AT SLAB FOLD, PHOTO 10

SCALE 1: 20

Rev.	Description:	Date	Appd.
01	ISSUED FOR CONSTRUCTION	13/06/24	D.C.

DESIGNSIRS ENGINEERS
Structural Consulting Engineers
Residential, Commercial & Industrial
Investigation & Reporting

ENGINEERS AUSTRALIA Professional Engineer MEMBER

Mobile: 0411 201 605
Email: info@designsirs.com.au
80 Esther Street, Deagon QLD 4017

Date: JUN. 24
Drawn: D.C.
Design: M.C.
Certified: MARK CHILTS RPEQ: 25483

CLIENT: CORE4 SERVICES

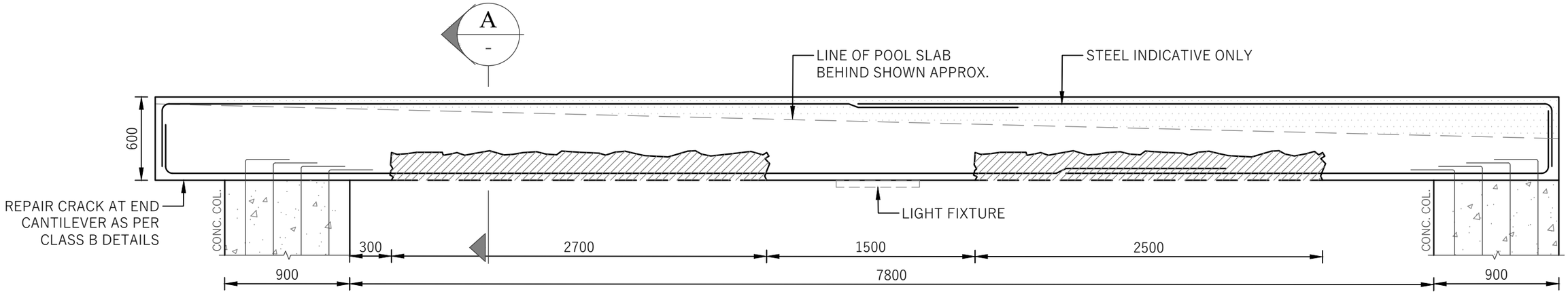
PROJECT: CONCRETE CANCER REPAIRS AT 85 DEAKIN STREET, KANGAROO POINT QLD 4169

TITLE: DETAIL SHEET 1

PROJECT NO.: S5466

DRAWING NO.: SD1

REV.: 01

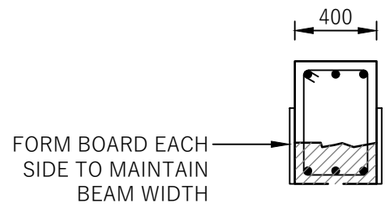


CLASS C REPAIR - AT POOL BEAM, PHOTO 17 & 19

SCALE 1: 30

THIS REPAIR METHOD IS ONLY VALID IF BEAM HAS R10 TIES AT 500 CRS. MIN TO BE CONFIRMED PRIOR TO WORKS

MAIN BEAM REINF. SHALL BE CONFIRMED PRIOR TO WORKS



SECTION A
SCALE 1:30
-

- PROP SLAB EACH SIDE OF BEAM AT 1.5m CRS, PROPS SHALL BE RATED FOR 100kN EACH (10 TONNE)
- CALL ENGINEER TO SITE TO CONFIRM EXTENT OF WORKS/ SET OUT OF WORKS
- SCRABBLE BACK/ HAMMER OUT CONCRETE IN THE 2.7m AND 2.5m SECTIONS SHOWN ABOVE FOR A HEIGHT OF 200mm
  REINFORCEMENT IS TO BE FULLY EXPOSED. ALL RUSTED REINF. IS TO BE EXPOSED UNTIL CLEAN STEEL IS FOUND
  ALL CONCRETE IT TO BE LEFT AS A WELL ROUGHENED SURFACE
- WIRE BRUSH CLEAN STEEL REINFORCEMENT
  ANY BARS MISSING OVER 25% OF MASS - CONTACT ENGINEER
- PAINT ALL REINFORCEMENT WITH SIKATOP ARMATEC -110 EPOCEM
- FORM UP BOX AROUNDREPAIR CONCRETE WITH SIKA MONOTOP -412 NFG CONCRETE REPAIR MORTAR
  - RECOMMEND USING FORM BOARDS EACH SIDE OF CONC.
  - SPRAY REPAIR MORTAR UP INTO FORM BOARDS TO INSTALL TO BEAM
  - SCREED BASE OF BEAM TO FINISH
- PROPS SHALL REMAIN IN PLACE FOR 7 DAYS

Rev.	Description:	Date	Appd.
01	ISSUED FOR CONSTRUCTION	13/06/24	D.C.

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CLIENT: CORE4 SERVICES

PROJECT: CONCRETE CANCER REPAIRS AT 85 DEAKIN STREET, KANGAROO POINT QLD 4169

PROJECT NO.: S5466

TITLE: DETAIL SHEET 2

DRAWING NO.: SD2

REV.: 01