

## GENERAL NOTES

## 1. SURFACE SEALING AND CRACK FILLING ADHESIVE.

## 1.1. SURFACE SEALING FOR VERTICAL AND OVERHEAD SURFACES.

- 1.1.1. THE SURFACE SEALANT SHALL BE SUITABLE FOR BONDING THE INJECTION PORTS TO THE CONCRETE SUBSTRATE AND FOR SEALING THE SURFACE OF THE MAJOR CRACKS AND CRACK FILLING OF THE MINOR CRACKS.
- 1.1.2. THE SURFACE SEALING ADHESIVE SHALL BE GREY IN COLOUR, SHALL BE COMPATIBLE WITH THE INJECTABLE ADHESIVE AND SHALL HAVE SUFFICIENT STRENGTH AND ADHESION TO CONTAIN THE INJECTABLE ADHESIVE AT THE MAXIMUM INJECTION PRESSURE WITHIN THE CRACK DURING THE INJECTION AND CURING PROCESSES.
- 1.1.3. THE HARDENED SURFACE SEALANT ADHESIVE SHALL BE CAPABLE OF BEING EASILY REMOVED WITHOUT DAMAGE TO THE CONCRETE SURFACE AND SHALL NOT LEAVE A RESIDUE.

## 1.2. SURFACE SEALING FOR HORIZONTAL, TOP SURFACES

- 1.2.1. THE SURFACE SEALANT SHALL BE SUITABLE FOR USE IN CREATING A PONDING AREA ALONG THE CRACK FOR THE FILLING BY POURING METHOD.
- 1.2.2. THE SEALANT SHALL BE APPLIED AS A BEAD OR DAM ONTO THE CONCRETE SURFACE, BE CAPABLE OF RETAINING THE EPOXY ADHESIVE AND MAINTAIN THE SEALANT PROPERTIES UNTIL THE EPOXY ADHESIVE HAS HARDENED.
- 1.2.3. THE SURFACE SEALANT SHALL BE EASILY REMOVED AFTER HARDENING OF THE EPOXY ADHESIVE.
- 1.2.4. THIXOTROPIC ACRYLIC- OR POLYURETHANE-SEALANTS TO BE USED IN STRICT COMPLIANCE TO EPOXY ADHESIVE MANUFACTURER'S INSTRUCTIONS.

## 1.3. SUITABLE FOR TROWELLING APPLICATION, SHALL BE NON-SLUMP AND SHALL HAVE EXCELLENT GAP FILLING PROPERTIES.

## 2. INJECTION ADHESIVE

- 2.1. SHALL BE UNFILLED, SOLVENT-FREE, TWO-PART EPOXY CONSISTING OF RESIN AND HARDENER COMPONENTS.
- 2.2. SHALL BE SUITABLE FOR INJECTION INTO CRACKS AND VOIDS UNDER LOW PRESSURE AND SHALL MEET THE REQUIREMENTS FOR INJECTABILITY CLASS P3 (EN 1504-5)
- 2.3. THE EPOXY SHALL BE LOW VISCOSITY MODIFIED ALIPHATICS OR AR/AMIDAMINES WITH A HIGH RESISTANCE TO MOISTURE AND LOW CREEP VALUES UNDER SUSTAINED LOADS.
- 2.4. SHALL MEET THE REQUIREMENTS FOR FORCE TRANSMITTING STRUCTURAL FILLING OF CRACKS IN ACCORDANCE WITH EN 1504-5.
- 2.5. SHALL BE SUPPLIED IN LIQUID FORM AND IN SEPARATE SEALED CONTAINERS. EACH COMPONENT SHALL HAVE A DIFFERENT IDENTIFIABLE COLOUR WHICH RESULTS IN A DISTINCTIVE HOMOGENEOUS COLOUR WHEN THOROUGHLY MIXED. THESE COMPONENTS SHALL MIX READILY TO A SMOOTH LIQUID CONSISTENCY OF LOW TO MEDIUM VISCOSITY AND SHALL BE SUITABLE FOR INJECTION INTO CRACKS ON SURFACES RANGING FROM HORIZONTAL, TOP TO VERTICAL, AS WELL AS INVERTED OVERHEAD, SURFACES.
- 2.6. THE VISCOSITY OF THE EPOXY SHALL BE MATCHED TO THE CRACK WIDTH AND MATERIAL MACROPOROSITY SURROUNDING THE CRACK, GENERALLY BETWEEN 200 CP AND 400 CP AT 25°C.
- 2.7. THE ADHESIVE SHALL BE CAPABLE OF BONDING TO DRY AND MOIST SURFACES WHERE THE INJECTED ADHESIVE DISPLACES MOISTURE PRESENT IN CRACKS AND CAVITIES.
- 2.8. THE MIXED ADHESIVE SHALL BE FREE OF LUMPS AND THE COMPONENTS SHALL NOT SEPARATE OR SETTLE OUT DURING THE POT LIFE OF THE ADHESIVE.
- 2.9. THE ADHESIVE SHALL BE CAPABLE OF CURING TO THE REQUIRED STRENGTH OF 30MPa AT TEMPERATURES BETWEEN 10°C AND 40°C IN RELATIVE HUMIDITY OF UP TO 95%.
- 2.10. THE ADHESIVE MUST CURE SUFFICIENTLY TO DEVELOP THE SPECIFIED MECHANICAL PROPERTIES WITHIN 7 DAYS, WITH NEGLIGIBLE SHRINKAGE ON CURING.

ADHESION BY TENSILE BOND STRENGTH (EN 1504-5) CLASS F2

ADHESION BY TENSILE BOND STRENGTH AFTER THERMAL AND WET-DRYING CYCLES CLASS F1

GLASS TRANSITION TEMPERATURE &gt; 40°C

HEAT DISTORTION TEMPERATURE (HDT) &gt; 50°C

MODULUS OF ELASTICITY IN FLEXURE (AT 20°C) 2.0 GPa - 10.0 GPa

STATIC BEHAVIOUR FOR TEMPERATURES -20°C TO 40°C UNDER CYCLIC LOADING

MODULUS OF ELASTICITY IN COMPRESSION &gt; 2.0 GPa

BULK SHEAR STRENGTH &gt; 12MPa AT 20°C.

TENSILE STRESS CARRIED BY THE BONDED JOINT IN A PULL-OFF TEST &gt; 14MPa

## 2.11. SLANT SHEAR STRENGTH OF SCARF-JOINTED PRISMS

INTERFACE ANGLE OF 50° &gt; 50MPa

INTERFACE ANGLE OF 60° &gt; 60MPa

INTERFACE ANGLE OF 70° &gt; 70MPa

## 3. PACKAGING AND HANDLING

- 3.1. THE MANUFACTURER SHALL PROVIDE A DATED, CODED AND TITLED INSTRUCTION SHEET WITH EACH DELIVERY OF ADHESIVE. THE FOLLOWING INFORMATION SHALL BE CONTAINED ON THE SHEET IN A CLEAR AND UNAMBIGUOUS MANNER:

- a) THE GENERAL CHEMICAL TYPE OF EACH COMPONENT USED IN THE ADHESIVE;
- b) RECOMMENDED STORAGE CONDITIONS AND SHELF LIFE WHEN STORED UNDER THESE CONDITIONS;
- c) PREPARATION INSTRUCTIONS FOR STEEL AND CONCRETE SURFACES;
- d) INSTRUCTIONS FOR USE OF PRIMERS, INCLUDING OPTIMUM DRY FILM THICKNESS AND PERMISSIBLE RANGES;
- e) MIXING INSTRUCTIONS, INCLUDING ALLOWABLE VARIATIONS IN MIX RATIO AND ANY TEMPERATURE CONTROL REQUIREMENTS DURING THE MIXING PROCESS;
- f) APPLICATION INSTRUCTIONS, INCLUDING LIMITS ON PRESSURE, TEMPERATURE, OPEN TIME AND RELATIVE HUMIDITY BEFORE INJECTION;
- g) SAFETY PRECAUTIONS FOR ALL COMPONENTS OF THE ADHESIVE; AND
- h) CURING CONDITIONS AND TEMPERATURE-RELATED PRECAUTIONS.

## 6. INJECTION PORT

- 6.1. THE LOCATING PIN SHALL BE SUPPLIED WITH A LENGTH OF WIRE FLATTENED AT THE END FOR ACCURATE POSITIONING OF THE TUBE OVER A CRACK.

## 7. PRESSURE INJECTION EQUIPMENT

- 7.1. THE PRESSURE INJECTION EQUIPMENT SHALL BE CAPABLE OF CONTINUOUSLY SUPPLYING THE FRESHLY MIXED EPOXY RESIN ON DEMAND. THE EQUIPMENT SHALL BE FITTED WITH PROPERLY CALIBRATED POSITIVE DISPLACEMENT PUMPS AND A PRESSURE GAUGE CAPABLE OF RECORDING CORRECT PRESSURES APPLIED UP TO 2.0 MPa WITH 0.1 MPa DIVISIONS.

- 7.2. THE TWO COMPONENTS OF THE EPOXY INJECTION COMPOUND SHALL BE FED SEPARATELY TO THE EXTRUSION GUN AND SHALL ONLY BE MIXED TOGETHER WITHIN THE PRESSURE CHAMBER OF THE GUN AT THE TIME OF INJECTION. ON NO ACCOUNT SHALL READY-MIXED EPOXY BE FED TO THE EXTRUSION GUN.

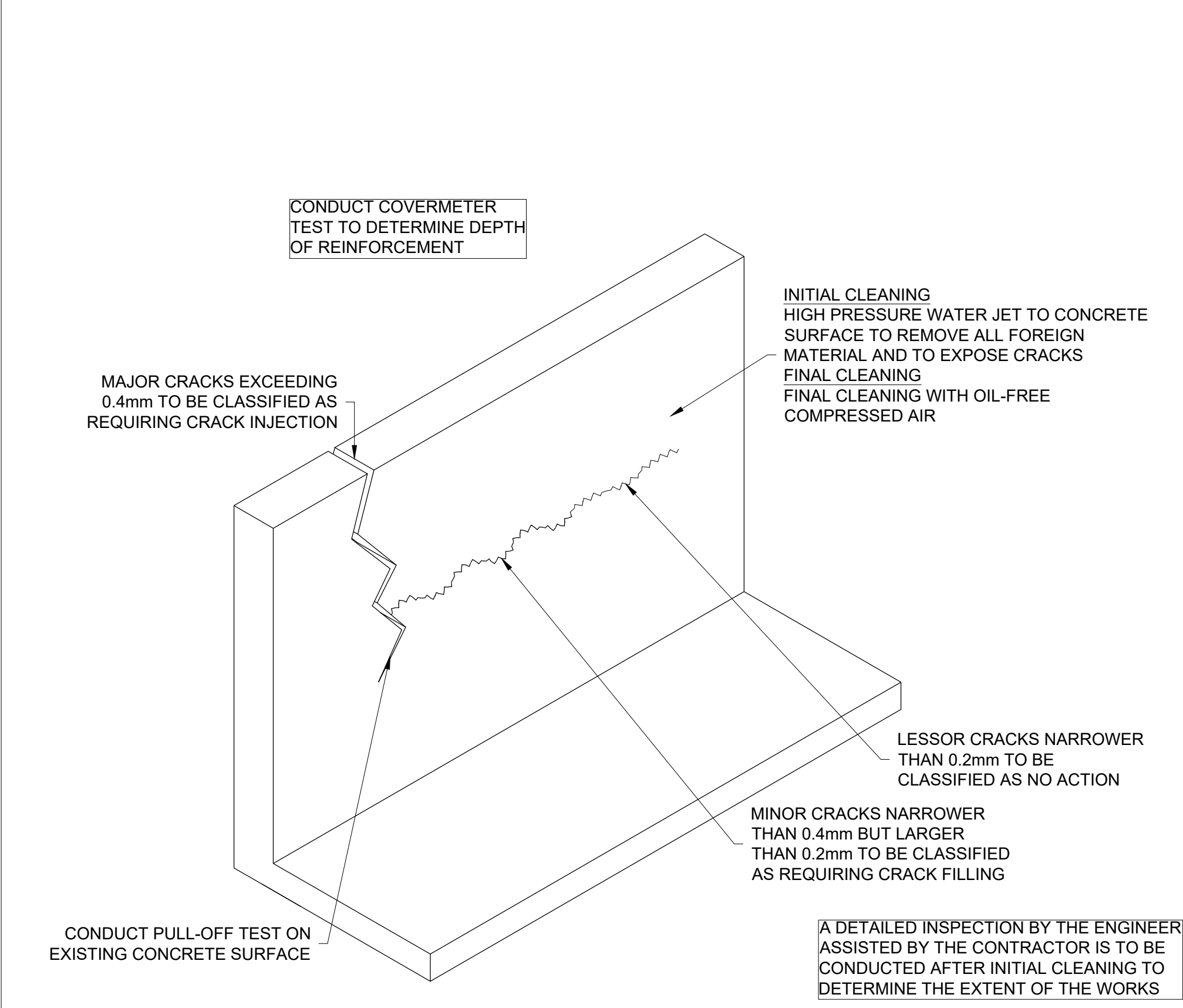
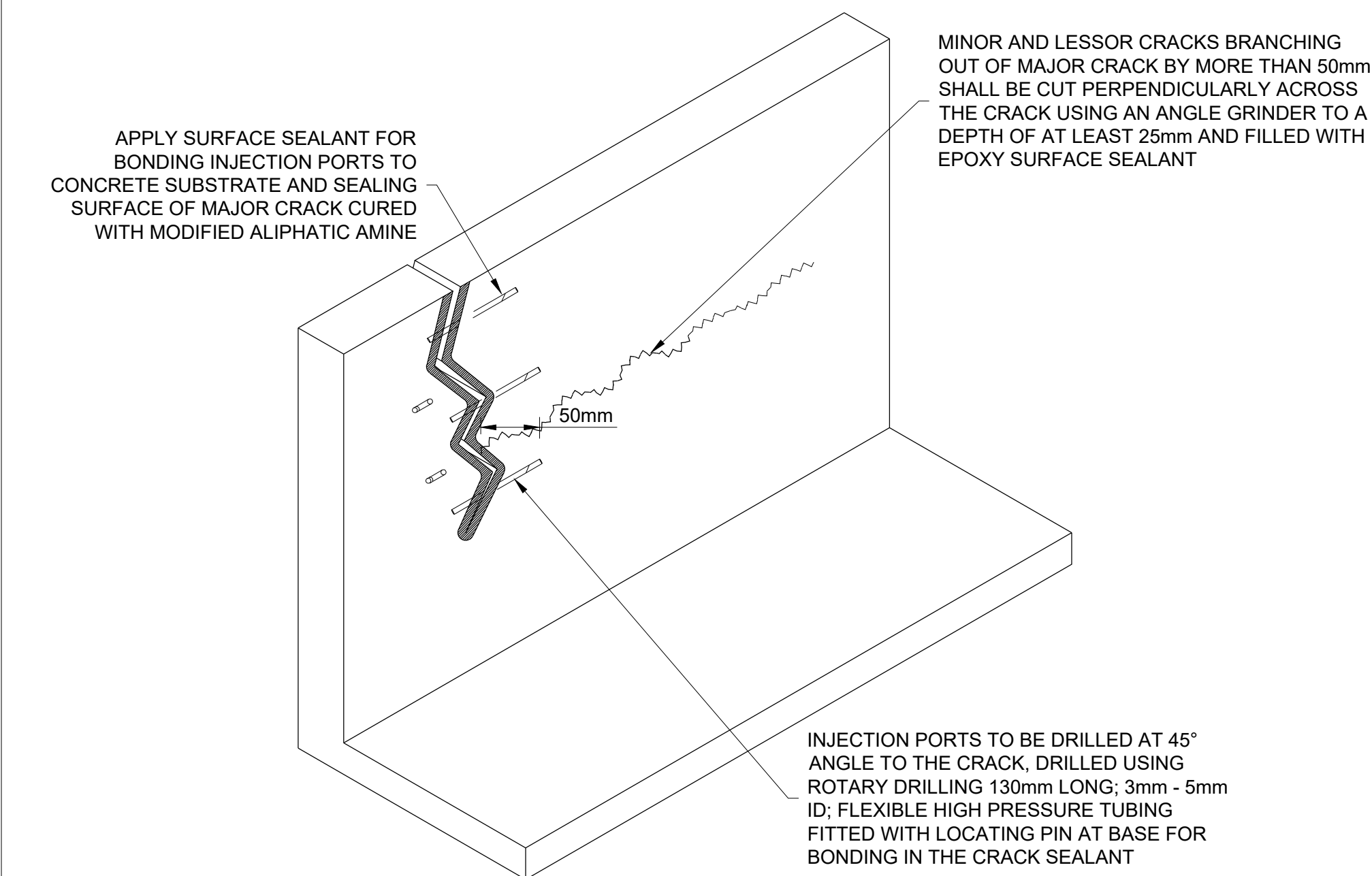
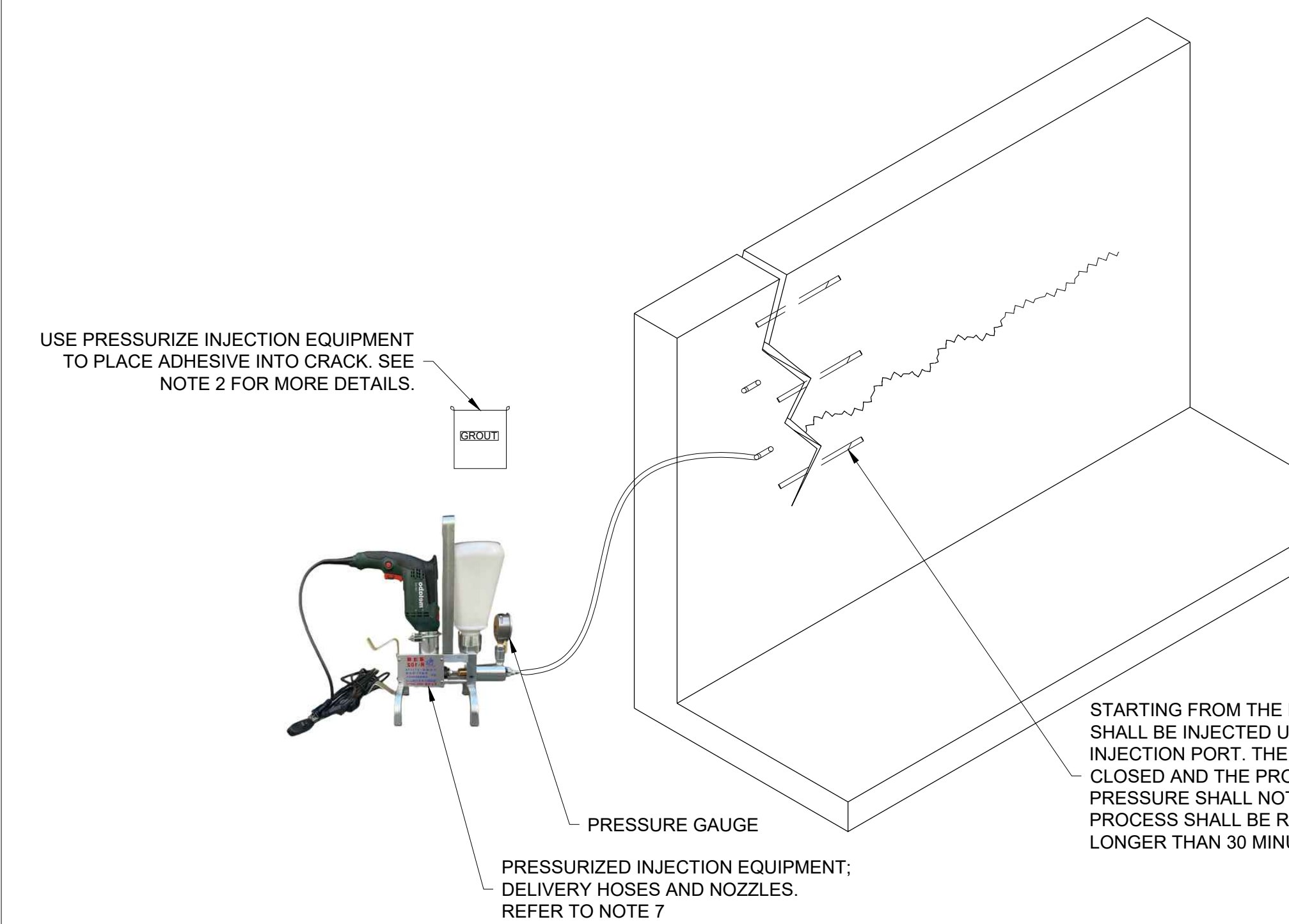
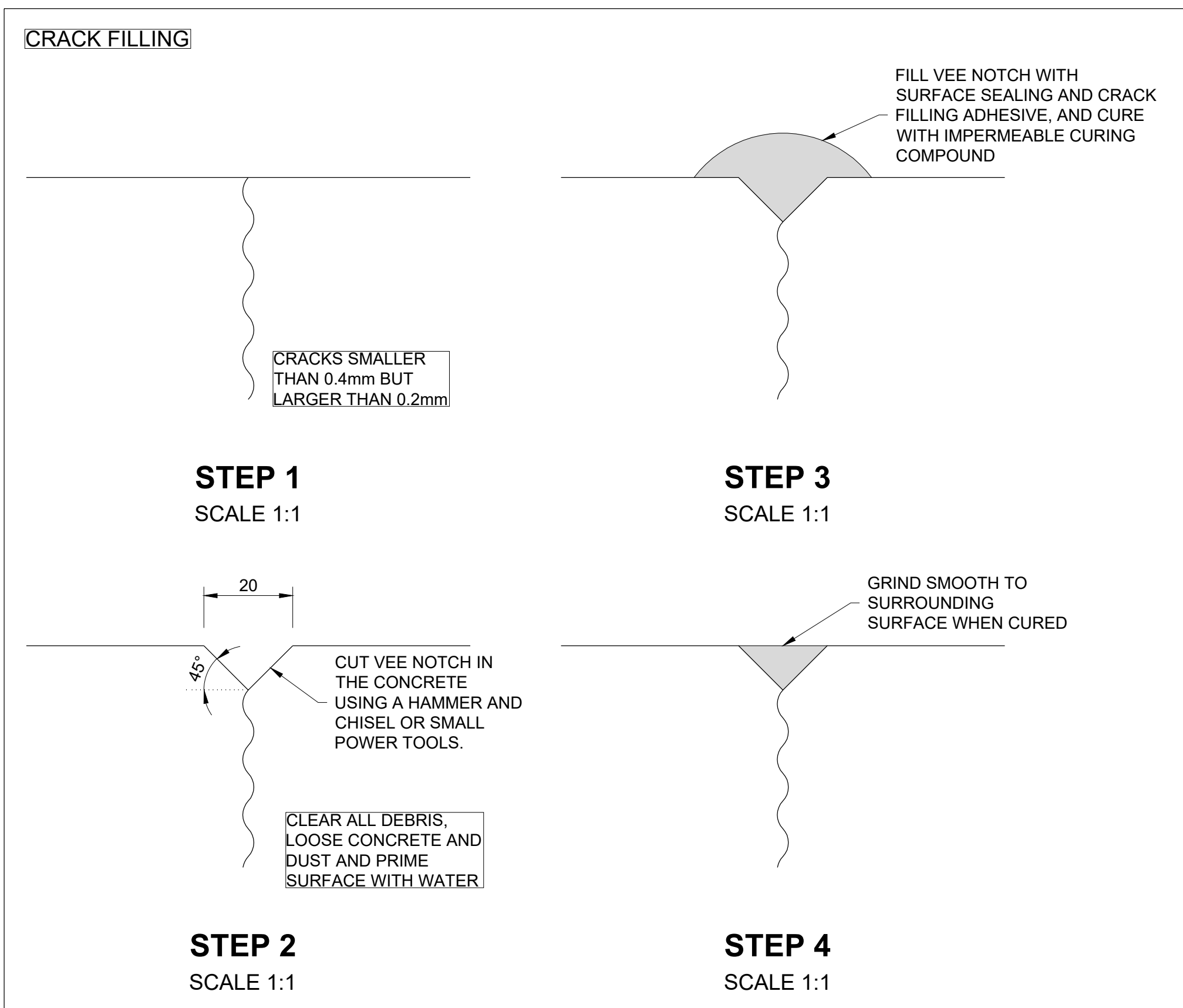
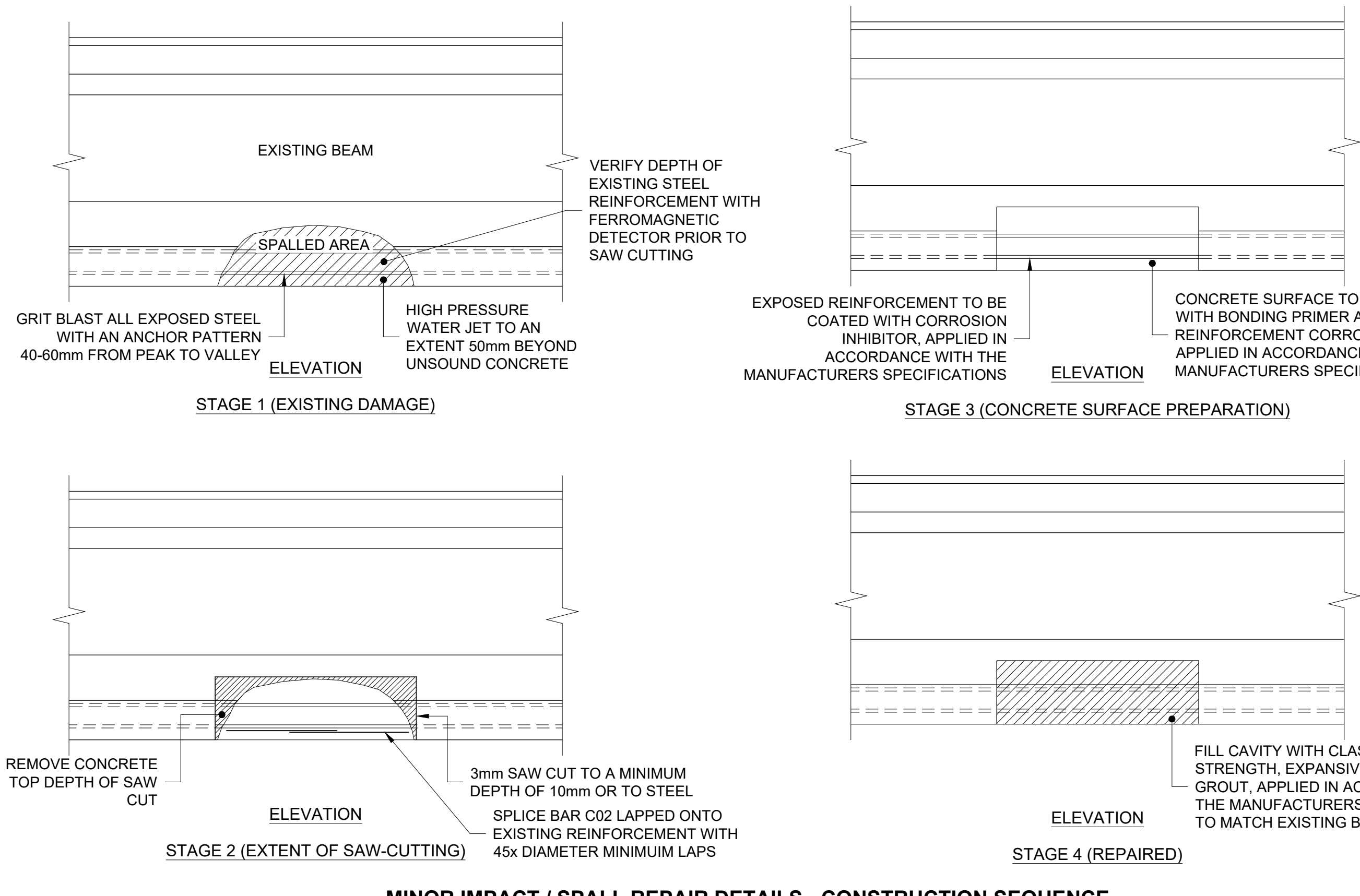
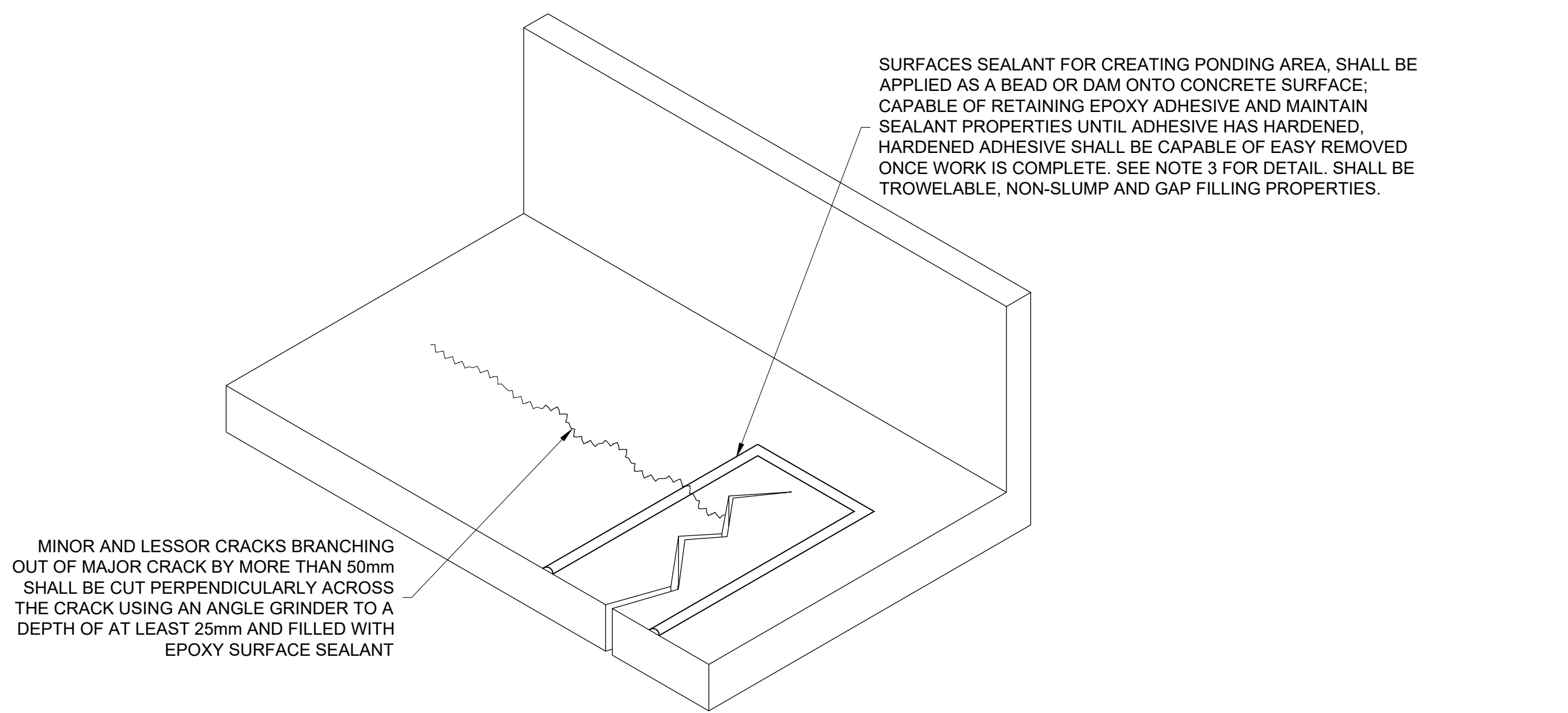
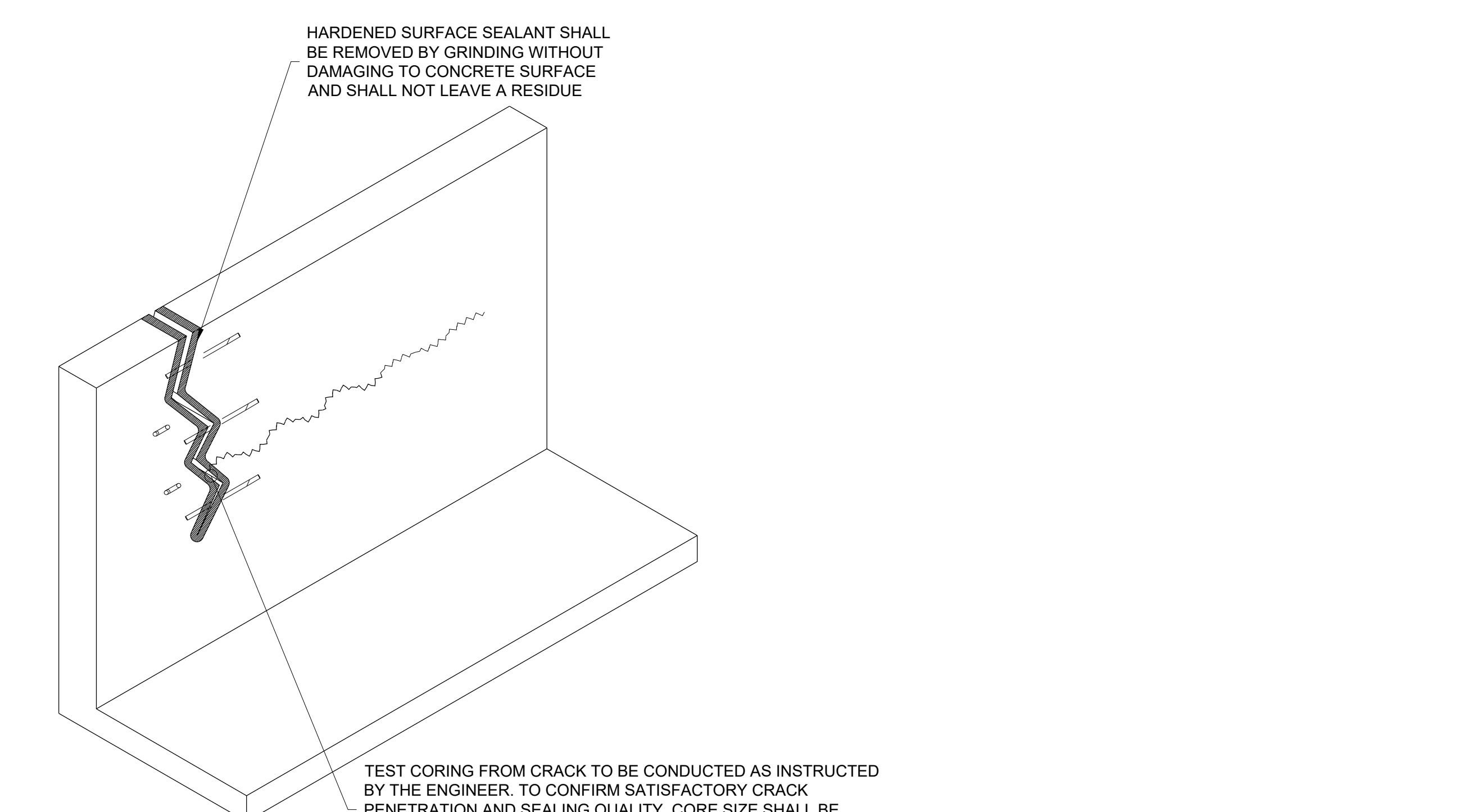
## 8. CRACK INJECTION AND FILLING EXECUTION

- 8.1. ALL WORK RELATED TO THE INJECTION OF CRACKS OR FILLING OF CRACKS WITH EPOXY SHALL BE EXECUTED IN ACCORDANCE WITH THE APPROVED METHOD STATEMENT AS CONFIRMED BY SITE TESTS ACCORDING TO COTO CLAUSE A14.5.7.3 a) TO e).

- 8.2. THE EXTENT OF WORK WILL BE INDICATED BY THE ENGINEER AND NO WORK MAY COMMENCE UNLESS INSTRUCTED BY THE ENGINEER.

FOR TENDER

(FOR TENDER PURPOSES ONLY)

STEP 1 : PREPARATION OF CONCRETE SURFACE AND IDENTIFICATION OF CRACKS  
SCALE 1:20STEP 2 : SURFACE SEALING FOR VERTICAL AND HORIZONTAL SURFACES  
SCALE 1:20STEP 3 : GROUT INJECTION OPERATION  
SCALE 1:20STEP 3 : GROUT POURING OPERATION  
SCALE 1:20MINOR IMPACT / SPALL REPAIR DETAILS - CONSTRUCTION SEQUENCE  
SCALE 1:20STEP 2 : SURFACE SEALING FOR HORIZONTAL AND TOP SURFACES  
SCALE 1:20STEP 4 : CLEAN UP AND QUALITY CHECKING  
SCALE 1:20

		CONSTRUCTION RECORD (AS-BUILT)	
		WORKS CONTRACT ENGINEER	
		Name :	
		Prof. Reg. No. :	
		Date :	
		SANRAL PROJECT MANAGER	
		Name :	
		Date :	
V2	2021/11/05	SCANNED ORIGINAL WITH SIGNATURES	
V1		ORIGINAL VERSION	
No.	DATE	REVISION	CONSULT. ENG.

DESIGNED BY		CONSULTANT APPROVAL	
NAME		Name	
Prof. Reg. No.		Prof. Reg. No.	
Date		Date	
CHECKED BY			
NAME			
Prof. Reg. No.			
Date			
DRAWN BY			
NAME			

HEAD OFFICE 48 Tambotie Avenue Val de Grace Pretoria 0184  PO Box 415 Pretoria 0001 South Africa Tel: (012) 844 8000	<b>SANRAL</b> SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LTD   BUILDING SOUTH AFRICA THROUGH BETTER ROADS
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THE DESIGN AND CONSTRUCTION MONITORING OF PAVEMENT AND SETTLEMENT REPAIRS ON NATIONAL ROUTE 2, SECTION 30 FROM BUSHVELD RETREAT FARM (KM 47.00) TO LHULUWE INTERCHANGE (KM 55.00)	PROJECT NUMBER N.002300-2020/1
MORRISFIELD AGRICULTURAL UNDERPASS CULVERT (IDC3761) ON THE N2-30 AT km 48.951	DRAWING LOCATION DATA
CRACK INJECTION AND GAP FILLING	ROUTE N2 SECTION 30 DRAWING TYPE km 48.951 BRIDGE/STRUCTURE No. IDC3761 CONSULTANT DRAWING No. TP2113/ST/IDC3761/02 SANRAL DOCUMENT #
SCALE : AS SHOWN	START N2 30 STRUCTURES - CULVERTS IDC3761 VER Y1
SHEET 02 OF 02	

PROJECT NUMBER	N.002300-2020/1
DRAWING LOCATION DATA	ROUTE N2 SECTION 30 DRAWING TYPE km 48.951 BRIDGE/STRUCTURE No. IDC3761 CONSULTANT DRAWING No. TP2113/ST/IDC3761/02 SANRAL DOCUMENT #
START	N2 30 STRUCTURES - CULVERTS IDC3761 VER Y1
END	N2 30 STRUCTURES - CULVERTS IDC3761 VER Y1