AGENDA
UTILITIES SERVICE BOARD MEETING

Utilities Service Center Boardroom
City of Bloomington Utilities
600 E Miller Dr
Bloomington, IN 47401

Seth Debro, President
Kirk White, Vice President
Jeff Ehman
Amanda Burnham
Jim Sherman
Megan Parmenter
Molly Stewart
David Hittle, ex officio
Matt Flaherty, ex officio

This meeting may be attended electronically via Zoom by using the following link:
https://bloomington.zoom.us/j/87604316317?pwd=a08qzy8gberrty3lOQr8O6zTJ5C7kO.1
Meeting ID: 876 0431 6317
Passcode: 907967

Monday, November 3, 2025
4:30 p.m. Bid Opening

I. Call to Order
II. Bid Opening - Dillman Wastewater Treatment Plant Structural Repair
III. Petitions and Communications*
IV. Adjournment

*Public Comment will be limited to 5 minutes per person

Dillman WWTP Structural Bid Form

Contractor	Type of Repair	Estimated Quantity	Unit Cost	Total Cost
	Inject Cracks	300 LF		
	Concrete Spall	40 SF		
	Joint Repair	300 LF		
	30% Contingency:			
	Total Estimated Cost:			

Dillman WWTP Structural Bid Form

Contractor	Type of Repair	Estimated Quantity	Unit Cost	Total Cost
	Inject Cracks	300 LF		
	Concrete Spall	40 SF		
	Joint Repair	300 LF		
	30% Contingency:			
	Total Estimated Cost:			

Dillman WWTP Structural Bid Form

Contractor	Type of Repair	Estimated Quantity	Unit Cost	Total Cost
	Inject Cracks	300 LF		
	Concrete Spall	40 SF		
	Joint Repair	300 LF		
	30% Contingency:			
	Total Estimated Cost:			

Dillman WWTP Structural Bid Form - Engineers Estimate

Type of Repair	Estimated Quantity		Unit Cost	Total Cost
Inject Cracks	300	LF	$90	$27,000
Concrete Spall	40	SF	$175	$7,000
Joint Repair	300	LF	$150	$45,000
	30%			$23,700
	Total			$102,700

WESSLER ENGINEERING

More than a Project™

September 4, 2025

Mr. Daniel Hudson, Capital Projects Manager
City of Bloomington Utilities
401 North Morton Street
Bloomington, Indiana 47404

Re: Structural Inspection Report
Dillman Road WWTP Chlorine Contact Tanks and Basin Complex

Dear Mr. Hudson:

The purpose of this letter report is to share the results of the inspection and subsequent analysis of the concrete walls in the contact basins and the basin complex at the Dillman Road Wastewater Treatment Plant in Bloomington, Indiana. The inspection was performed on Wednesday, July 30, 2025 with the following individuals present:

- Garrett Towell – Dillman Road WWTP Superintendent, City of Bloomington
- Jakob Bruhl, P.E. – Structural Engineer, Wessler Engineering
- Jason Wang, E.I. – Engineer, Wessler Engineering
- Jack Hargis – Intern, Wessler Engineering

Wessler Engineering was asked to assess the structural condition of the concrete walls in the contact basin and basin complex to develop rehabilitation and repair recommendations and estimate the associated costs. The assessment was based on a visual inspection and review of construction drawings by Black & Veatch Consulting Engineers, dated 1977. Only Chlorine Contact Basin No. 1 was inspected because Chlorine Contact Basin No. 2 was in service. The exterior walls of the aeration tanks, digesters, and clarifiers in the Basin Complex were inspected from the tunnel and exterior perimeter of the building. The interiors of tanks and clarifiers in the Basin Complex were not inspected but the roof of the Basin Complex was inspected.

Recommended repair methods described in the remainder of this report have been successfully used by Wessler Engineering on other projects. Materials compliant with NSF/ANSI 61 are available for each of the recommended repair methods. Estimating the quantity of repairs has much uncertainty. The walls in the basin complex are coated and/or painted which made it difficult to identify all cracks and to identify the extents of cracks that were observed. It is possible that additional cracks may be found by a repair contractor. To account for this uncertainty, 30% contingency is included in the cost estimate.

Observations and Analysis

The Chlorine Contact Basins and Basin Complex (labeled on Figure 1) are located at the Wastewater Treatment Plant at Dillman Road, Bloomington, Indiana.

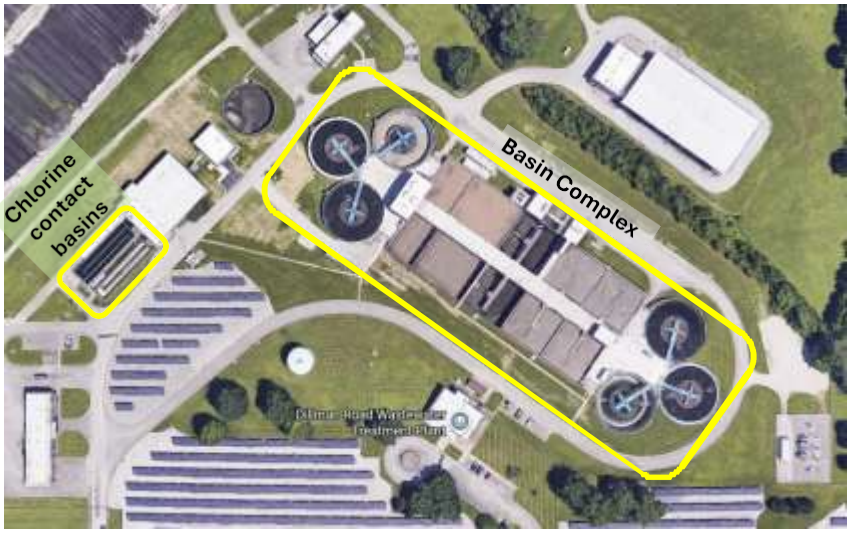


Figure 1 Aerial View of the Dillman Road Wastewater Treatment Plant

The only portion of the Chlorine Contact Basin that was inspected was Basin No. 1 (the western most basin) because Basin No 2 was in operation at the time of the inspection. This basin is comprised of 14-foot tall, 12-inch thick reinforced concrete walls and an 18-inch thick concrete mat foundation. The contact basin is uncovered.

The Basin Complex is comprised of eight rectangular tanks of varying size, six 100-foot-diameter clarifiers (three on each end), and several ancillary building structures adjacent to and atop the complex. Portions of the rectangular tank and clarifier walls are observable from a tunnel in the center of the complex. Other portions of the walls are observable from the exterior of the complex.

All structures are reinforced concrete. Wall thicknesses of the rectangular tanks vary. Perimeter wall thickness of the clarifiers is 12-inches.

The inspection identified three categories of needed repair: (1) concrete cracks, (2) concrete spall, and (3) expansion joint failure. Enclosure 1 shows the general location of each identified repair location. Each type of repair, if not addressed, can increase the rate at which further deterioration occurs and weaken the structure, leading to potentially more costly repairs in the future and increased risk of needing to take the structure out of service. The cracks and spall, if not repaired, create greater increased risk than the joints.

Concrete Cracks

There are wide cracks that are severely leaking in the wall between Chlorine Contact Basin No. 1 and No. 2. There are also two locations in which the water is moving through holes in or near cracks. Most of the cracks are wider than 0.04-inch, a common threshold for waterproofing repairs. Cracks in concrete are normal, but as cracks widen the risk of embedded steel reinforcement corrosion increases, which can lead to decreased strength and accelerate additional deterioration. Cracks that are actively leaking are certain to allow water to contact reinforcing steel which, although unseen, is quite likely causing steel corrosion. An example crack on Basin No. 1 is shown in Figure 2. Most of the cracks extend nearly the full height of the wall but are most pronounced below the water line marks. Some of these cracks appear to have been previously repaired using cementitious materials but many of those repairs are flaking.

There are two locations where water is spraying out of a crack (see Figure 3). In one of these cases, it appears that there are small holes in a failed patch at the bottom of the wall. In the other case there is a large hole, approximately 1.5-inch diameter, at the base of the wall. The small pin holes can likely be repaired using the same method as crack repair. A different repair method may be necessary for the larger hole.

Cracks in the Basin Complex are not as severe as those observed in Chlorine Contact Basin No. 1. In the Basin Complex, many of the cracks were narrow and were dry at the time of the observation but evidence indicates many had previously leaked. For example, there are numerous locations where the paint has bubbled (in some cases still holding water) and/or peeled. It may be wise to repair these cracks to reduce the risk of occasional leaking. Examples of the cracks observed in the Basin Complex are shown in Figure 4.

Figure 2 Examples of cracks in contact basin no. 1 (left: full length of crack; right: close-up)

Figure 3 Holes spraying water in contact basin no. 1 (left: pinholes; right: large hole)

Figure 4 Examples of cracks in basin complex (left: wide crack; right: representative crack)

Repairing concrete cracks requires the area to be cleaned, all loose material removed, and two-component, elastic, polyurethane injected. This hydrophilic material will swell and stop leaks. The holes may be better repaired with a one-component, quick-setting, Portland-cement-based hydraulic repair mortar. Repair materials compliant with NSF/ANSI 61 are available.

Approximately 120-linear feet of crack repair is estimated to be necessary on contact basin no. 1 and 180-linear feet of crack repair in the basin complex. Current cost estimates are $90/linear foot for a total estimated cost for concrete crack repair of $27,000.

Concrete Spall

There is concrete spall and exposed reinforcing steel on the underside of the concrete deck over the effluent outfall and the underside of the concrete walkway between the two contact basins. The depth of the spalled surfaces range from one to three inches. There is also exposed rebar in these two locations that appears to be due to inadequate concrete cover during construction. Additionally, the bottom one foot of the north end of the interior wall is severely worn, exposing reinforcing steel. This may be partially due to spall but may also be due to the movement of grit in the wastewater over time. Regardless of the cause, the same repair method is appropriate. Photos of these surfaces are shown in Figure 5 and Figure 6.

Figure 5 Concrete spall and exposed reinforcing steel on underside of deck over effluent outfall

Figure 6 Concrete spall/wear at base of north end of interior wall

Spall reduces the amount of concrete cover for embedded steel reinforcement which increases the risk of steel corrosion and further deterioration. Additionally, spalled surfaces are rough and contain loose material and microcracks which trap more water than a smooth concrete surface. When this trapped water freezes, additional spalling occurs, and the process of deterioration accelerates. Cases in which reinforcing steel is already exposed are of great risk of rapid corrosion. Steel corrosion causes the bar volume to increase which creates internal stress in the concrete leading to additional spall and accelerating the deterioration.

Repairing concrete spall requires the area to be cleaned, all loose material removed, corrosion inhibitors applied to exposed reinforcing steel, and cement-based patching material used to fill the spalled volume. Repair materials compliant with NSF/ANSI 61 are available.

Approximately 40-square feet of spall repair is estimated. Current cost estimates are $160/square foot for a total estimated cost for concrete spall repair of $7,000.

Joint Filler Failure

Eight of the joints in the walls and one joint in the northwest portion of the roof of the Basin Complex show signs of localized failure. These joints were included in the structure to allow for expansion and contraction of parts of the structure relative to other portions. These wall joints consist of a waterstop and compressible filler and caulk as shown in Figure 7 which is a detail from the 1972 construction drawings prepared by Black and Veatch. The roof joint detail is similar to the wall but is topped with elastomeric flashing and neoprene roofing (see Figure 8).

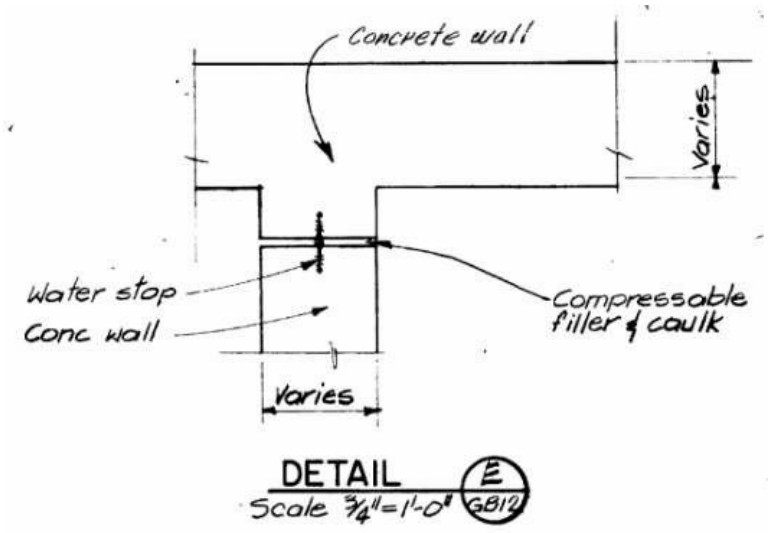


Figure 7 Wall Joint Detail (from Sheet GB-12, 44 of 190, 1982 construction drawings)

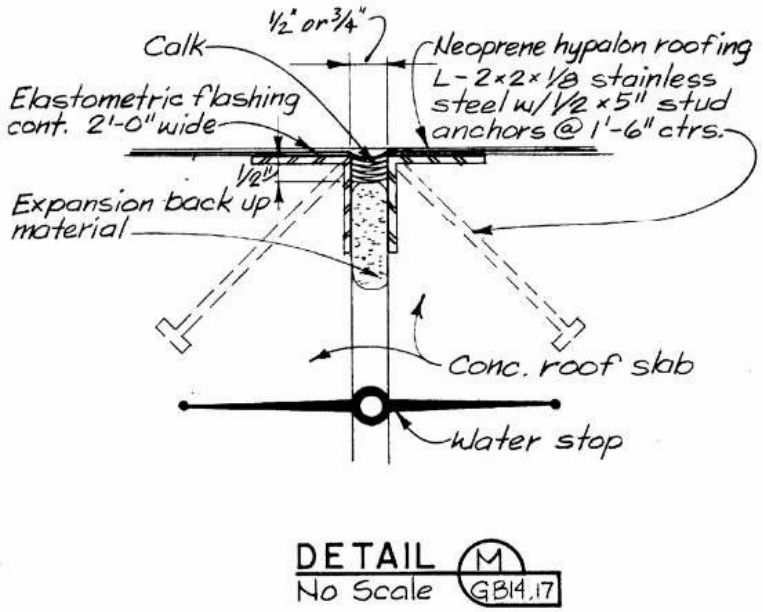


Figure 8 Roof Joint Detail (from Sheet GB-12, 44 of 190, 1982 construction drawings)

Some of the expansion joints are actively leaking as shown in Figure 9. The joint shown in Figure 9 is representative of all the leaking joints observed in the Basin Complex. These leaks indicate that the waterstop may have failed within the expansion joints.

Figure 9 Active Leak Through an Expansion Joint in the Basin Complex

Repairing expansion joints in the wall requires work on both sides of the joint. Therefore, the tanks need to be empty to repair the joints. Although the leaks appear to be present in relatively small portions of these joints, it is recommended to repair the joints along the full height of the

wall. Repair requires the area to be cleaned, all loose material removed, and a high-performance joint sealing system applied on the interior, liquid containing, side of the wall. On the exterior of the wall the area needs to be cleaned, all loose material removed, and compressible filler and caulk reapplied in the joint. Repair materials compliant with NSF/ANSI 61 are available.

The roof joint repair requires the area to be cleaned, all loose material removed, and new expansion back up material, caulk, and elastomeric flashing installed. Roof joint repair will also require repair of the roofing membrane so this repair may be best suited to be done during the next scheduled roofing project.

Approximately 300-linear feet of joint repair is estimated. Current cost estimates are $150/linear foot for a total estimated cost for joint repair of $45,000.

Recommended Scope Language and Example Specifications

As the City of Bloomington Utilities develops contracts for the recommended repairs, Wessler Engineering recommends this work be done on a unit price basis based on the identified deficiency that includes type and quantity and a specified repair type for each type of deficiency. This would allow the City of Bloomington Utilities to repair the deficiencies and adjust the extent of repair based on need as the repairs are conducted in the field. While Enclosure 1 shows the identified repair locations, it is possible that the repair and rehabilitation contractor may find other locations or determine that some locations are not in need of repair.

Recommended repairs can be covered by a single specification that provides necessary information about the repair materials and techniques. An example specification is provided as Enclosure 2 and example repair materials are included as Enclosure 3.

Conclusions

Repairs of cracks, concrete spall and exposed rebar within the Chlorine Contact Basin are necessary. There are wide cracks in the shared wall between Basin No. 1 and No. 2 that are actively leaking. There is concrete spall and exposed rebar on the underside of the concrete deck over the effluent outfall; there is exposed rebar on the underside of the concrete walkway between the two contact basins.

Repairs of cracks and joints within the Basin Complex are necessary. Within the complex there are expansion joints in which the filler material has failed and these joints are actively leaking. A roof expansion joint has also failed and is allowing water to penetrate the building. There are cracks in some of the tank walls and the floor that are actively leaking or show signs of recently leaking. There are leaks around some of the wall penetrations through which pipes are in place.

There were no cracks or joints observed in either structure that appear to be at risk of causing structural failure. However, repairs are recommended to reduce the risk of reinforcing steel corrosion due to water intrusion. If not repaired, water penetrating the cracks increases the risk for additional reinforcing steel deterioration, further deterioration of concrete, and eventually a loss of strength. Joints may get progressively worse but are unlikely to cause additional steel or concrete deterioration if not repaired.

Cracks of the size observed on this structure can be effectively repaired by hydrophilic urethane injection. Spall can be repaired by cleaning and patching the areas. Expansion joints can be repaired using a joint sealing system on the wet side of the wall and removing and replacing the compressible filler and caulk on the dry side.

Based on observations, the structures are safe to remain in service. However, if repairs are not made, additional deterioration will occur, likely at an increasing rate. Therefore, it is recommended to repair the cracks, spall and joints. Wessler Engineering has experience with repairs and rehabilitation of similar reinforced concrete structures. Each of the repair methods recommended in this letter report have been successfully used on multiple projects.

Wessler Engineering appreciates the opportunity to provide assistance to the City of Bloomington Utilities. Do not hesitate to contact us if you have questions regarding the observations and conclusions of this letter report.

Sincerely,

WESSLER ENGINEERING

Jakob C. Bruhl, Ph.D.,
P.E. Senior Project
Manager

Enclosures

1. Schematic of Repair Locations
2. Sample Repair Specification
3. Examples of Repair Materials

JCB:jcb :https://us-partner-integrations.egnyte.com/msoffice/wopi/files/46d5b7a0-72d3-41be-94e8-d853a7fab794/wopiserviceid_tp_egnyte_plus/wopiuserid_186.wesslerengineering.egnyte.com/dillman wwtp structural assessment-final.docx

Wessler Engineering

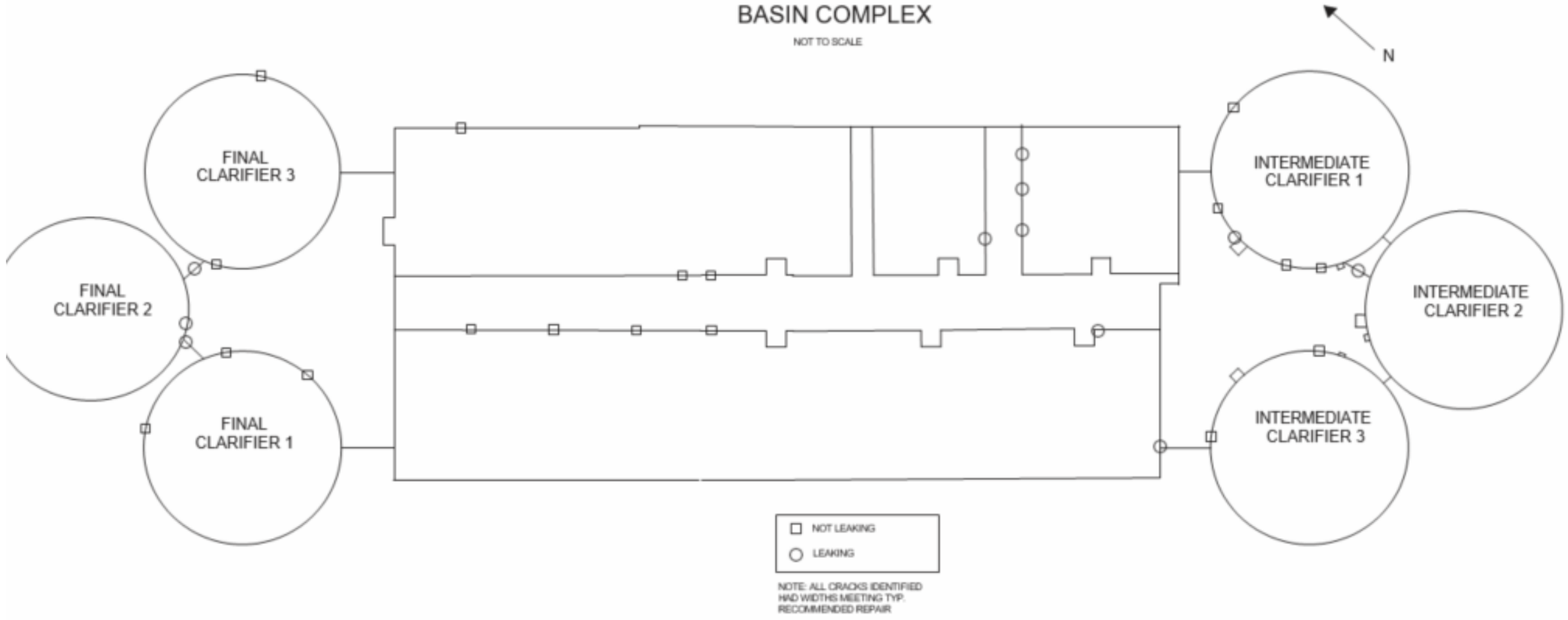
Structural Inspection Report

Dillman Road WWTP Chlorine Contact Tanks and Basin Complex

ENCLOSURE 1
SCHEMATIC OF REPAIR LOCATIONS

BASIN COMPLEX

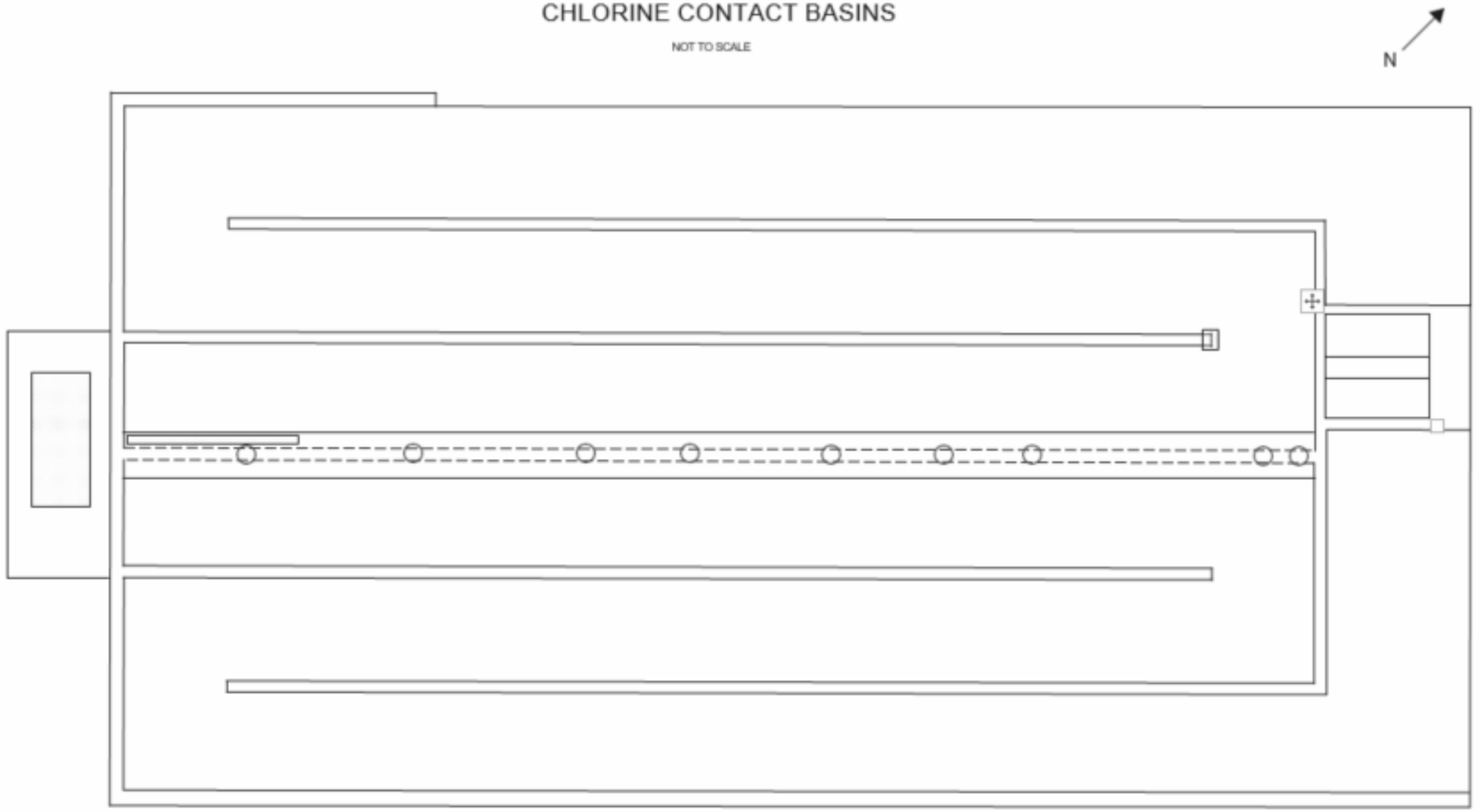
NOT TO SCALE



NOTE: ALL CRACKS IDENTIFIED HAD WIDTHS MEETING TYP. RECOMMENDED REPAIR

CHLORINE CONTACT BASINS

NOT TO SCALE



LEAKING CRACK

SPALLED AREA

NOTE: ALL CRACKS IDENTIFIED HAD WIDTHS MEETING TYP. RECOMMENDED REPAIR

Wessler Engineering

Structural Inspection Report

Dillman Road WWTP Chlorine Contact Tanks and Basin Complex

ENCLOSURE 2
SAMPLE REPAIR SPECIFICATION

CONCRETE REPAIRS AND REHABILITATION

PART 1 - GENERAL

1.1 Summary

A. Section Includes: Repair of cracks, spalled concrete, exposed reinforcing steel, and deteriorated expansion/contraction joints in wastewater treatment process structures.

1.2 References

A. ACI 318-11 - Building Code Requirements for Structural Concrete

B. NSF International (NSF) Standard 61 "Drinking Water System Components – Health Effects"

C. SSPC: The Society for Protective Coatings (SSPC)

1. Complete all Work in accordance with the following requirements.
   - **a. SSPC-AB 1 "Mineral and Slag Abrasives"**
   - **b. SSPC-AB 2 " Specifications for Cleanliness of Recycled Ferrous Metallic Abrasives"**
   - **c. SSPC-AB 3 "Newly Manufactured or Re-Manufactured Steel Abrasives"**
   - **d. SSPC-VIS 1-02 "Visual Standard for Abrasive Blast Cleaned Steel"**
   - **e. SSPC-VIS 3-93 "Visual Standard for Power- and Hand-Tool Cleaned Steel"**
   - **f. SSPC-VIS 4-01 "Guide and Reference Photographs for Steel Surfaces Prepared by Water Jetting".**
   - **g. SSPC-VIS 5-01 "Guide and Reference Photographs for Steel Surfaces Prepared by Wet Abrasive Blast Cleaning".**
   - **h. SSPC-Guide 6 (CON) "Guide for Containing Debris Generated During Paint Removal Operations".**
   - **i. SSPC-PA 2 "Measurement of Dry Paint Thickness with Magnetic Gages".**
   - **j. SSPC-PA Guide 3 "A Guide to Safety in Paint Application".**
   - **k. SSPC-SP 12, Surface Preparation and Cleaning of Steel and Other Hard Materials by High- and Ultrahigh-Pressure Water Jetting Prior to Recoating".**
   - **l. SSPC-SP-13, Surface Preparation of Concrete.**
   - **m. SSPC-SP 14, Industrial Blast Cleaning.**
   - **n. SSPC-SP 15, Commercial Grade Power Tool Cleaning.**
2. Modification of Standards
   - **a. The SSPC-VIS 1-02, the SSPC-Vis 3-93, and the SSPC-Vis 4-01 shall be used taking into account staining from prior paint applications.**
   - **b. The SSPC Standards SSPC-SP 6, Commercial Blast Cleaning and SSPC-SP 10, Near-White Blast Cleaning shall be modified to apply to each square inch instead of the approximately 9 square inch area indicated in paragraph 2.6 of each of these standards, and shall be referred to hereinafter as SSPC-SP 6, Commercial Blast Cleaning (modified) and SSPC-SP 10, Near-White Blast Cleaning (modified). Where the foregoing standards, recommendations, and specifications are conflicting, said conflicts shall be brought to the attention of the Engineer.**

D. Manufacturer's published product data unless changed in writing by the home office of the manufacturer.

1.3 Quality Assurance

A. Concrete Repair Standards – Complete all design and concrete repair Work in accordance with ACI 318 and ACI-506.2.

B. Installer Qualifications: Engage an Installer who has successfully completed within the last 3 years at least 3 joint sealer applications similar in type and size to that of this Project.

C. Single Source Responsibility for Joint Sealer Materials: Obtain joint sealer materials from a single manufacturer for each different product required.

1.4 Delivery, Storage, and Handling

A. Deliver materials to Project site in original unopened containers or bundles with labels informing about manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.

B. Store and handle materials in compliance with manufacturers' instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.5 Project Conditions

Structural Repair Location Descriptions

1. Chlorine Contact Basins

- Basin Nos. 1 and 2:
  - Reinforced concrete walls, 14 ft height, 12 in. thickness, supported by an 18 in. thick mat foundation.
  - Both basins are uncovered, increasing exposure to weathering and freeze–thaw cycles.
  - Inspection identified:
    - Concrete cracking (vertical and diagonal, primarily along wall faces and corners).
    - Localized spalling along wall tops and interior face.
    - Expansion joint deterioration, allowing infiltration and loss of watertightness.

2. Basin Complex – Rectangular Tanks

- Eight rectangular tanks of varying dimensions, constructed of reinforced concrete.
  - Observed deficiencies:

  - Wall cracking (noted near corners, mid-span walls, and around penetrations).
  - Surface spalling and delamination due to chemical attack and age-related wear.
  - Joint sealant failures, allowing seepage between tank sections.

3. Basin Complex – Clarifiers

- Six clarifiers, each 100 ft diameter, three located on each end of the complex.
- Perimeter walls: reinforced concrete, 12 in. thickness.
- Deficiencies observed:

  - Circumferential cracking at waterline elevation and around inlet/outlet structures.
  - Concrete spalls on interior faces, particularly near scum baffles and weirs.
  - Expansion joint failures at clarifier perimeters, permitting leakage and accelerated degradation.

4. Ancillary Structures & Tunnel Areas

- Several ancillary buildings are adjacent to or constructed directly on top of the Basin Complex.
- Inspection from the central underground tunnel revealed:

  - Concrete cracking visible on exposed wall sections.
  - Spalled patches at beam–wall intersections.
  - Joint separation where slabs and walls meet, creating pathways for water infiltration.

A. Confined Space Entry – Comply with and have available documented Confined Entry Space Procedures at the project site at all times as required by OSHA 29 CFR 1910.146. In addition, comply with any state and local requirements that are more restrictive than the federal requirements.

B. Plant Shut Down - All Work must be completed during the period the treatment plant is shut down. Contractor is responsible for coordinating the Work within this time and in conjunction with other Work at the site. (NOTE: This will need to be tailored to the operations of the plant and coordinated with Garrett Towell. The Chlorine Contact Basin cracks can be repaired while keeping No. 2 in operation. Cracks in the walls within the Basin Complex can also be repaired without emptying any tanks in that structure. The joint repairs will require tanks to be emptied.)

C. Draining of Tank (required for joint repair) - Coordinate draining of the tank and perform the Work in close cooperation with the Owner. The tank must be drained during all surface preparation and rehabilitation. If needed, provide pumps, hoses and other equipment necessary to drain the tank completely. Provide a full complement of personnel working on a daily basis until the Work is completed.

D. Environmental Conditions: Do not proceed with installation of joint sealers or crack injection materials under the following conditions:

1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealer or crack injection material manufacturers.
2. When joint substrates are wet due to rain, frost, condensation, or other causes.

E. Joint and Crack Width Conditions: Do not proceed with installation of joint sealers where joint widths are less than allowed by joint sealer manufacturer for application indicated. Do not proceed with crack injection where crack widths are less than allowed by crack injection material manufacturer for application indicated.

F. Joint Substrate Conditions: Do not proceed with installation of joint sealers until contaminants capable of interfering with their adhesion are removed from joint substrates.

G. Accessibility for Observation – Make the Work accessible to the Resident Project Representative at all times using the Contractor's rigging and equipment. If assistance is required for the Resident Project Representative to safely access the Work, furnish labor to assist the Resident Project Representative. Include the cost of this labor in the base contract amount.

1.6 Scheduling

A. Notification – Notify the Owner and the Engineer at least seven (7) days before starting this Work at the site. Reconfirm the commencement of Work twenty-four (24) hours prior to starting the Work.

B. Work Schedule – Accomplish the repairing and cleaning of the tank in such a way as to minimize the length of time the tank is out of service and to minimize the number of days required for observing the repairing and cleaning operations.

C. Times for Work—Work should be performed between 8:00 a.m. and 5:00 p.m. Coordinate all access to the site with the Plant Superintendent, Garrett Towell. Plan to complete the Work during the Owner's normal working hours.

D. Observation – The Owner plans to engage a designated Resident Project Representative to perform observation of the repair Work, cleaning, and painting.

1.7 Warranty

A. Provide a 1-year warranty on the Work in this Section.

PART 2 - PRODUCTS

2.1 Materials, General

A. Compatibility: Provide all related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

B. All products that could come in contact with potable water must meet the applicable standards for potable water contact. All such materials must be ANSI 61/NSF 61 approved – consult manufacturer for appropriate product to use for the application.

C. Provide joint sealers that have been produced and installed to establish and maintain watertight and airtight continuous seals.

2.2 Manufacturers and Products

A. Vertical Concrete Crack Repair: two-component, elastic, low viscosity, expanding polyurethane resin

1. Sika Corporation – "Injection-201 CE"
2. Or equal approved in writing by Engineer

B. Vertical and Overhead Partial Depth Concrete Spall Repair: polymer-modified, cement-based, fast-setting, non-sag mortar

1. Sika Corporation – "SikaTop 123 plus"
2. Or equal approved in writing by Engineer

C. Through-Holes Actively Leaking: quick-setting, cement-based hydraulic repair mortar

1. Sika Corporation – "SikaSet Waterplug"
2. Or equal approved in writing by Engineer

D. Expansion Joint Repair: high performance joint sealing system for expansion joints

1. Sika Corporation – "Sikadur-Combiflex SG"
2. Or equal approved in writing by Engineer

E. Additional Welded Wire Fabric Reinforcement: plain wire conforming to ASTM A185

PART 3 - EXECUTION

3.1 Examination

A. Carefully evaluate any rigging attachments present in the tank immediately prior to use for the type and magnitude of loads Contractor intends to impose on attachments. The Contractor is solely responsible for use of any existing or added attachments.

3.2 Preparation

A. Protection

1. Protect telemetry, electrical apparatus, and other equipment in the building and tank, including all wiring, from damage and dust or other deleterious material infiltration during the Work. Replace in kind, or repair to the satisfaction of the Owner, any items damaged by the operations of the Contractor at Contractor's expense.

B. Surface Preparation

1. Prepare concrete cracks and spall areas by wet blast cleaning to remove dust, laitance, grease, or other bond inhibiting materials and blow off with high pressure air.
2. Clean out joints immediately before installing joint sealers complying with joint sealer manufacturer's instructions and the following requirements.

3.3 Installation/Application

A. Install or apply all materials in accordance with manufacturer's instructions.

B. Interior Vertical Concrete Crack Repair

1. After wet blast cleaning and drying, prepare interior cracks greater than 1/32-inch wide in the vertical surfaces of the concrete according to the specifications of the concrete crack repair material manufacturer.
2. Fill the cracks in the concrete by injection with a two-component, elastic, low viscosity, expanding polyurethane resin.

C. Vertical and Overhead Partial Depth Concrete Spall Repair

1. Repair vertical and overhead areas repair (based on an average depth of 1 inch) of unsound or deteriorated concrete or shotcrete or other failed areas of concrete indicated by the Resident Project Representative by chipping to sound concrete and preparing according to the specifications of the concrete repair material manufacturer.
2. After wet blast cleaning and drying, place a concrete-based patching material in the deteriorated area and shape to the original contour of the concrete.

D. Cleaning Exposed Steel Reinforcement

1. After removing deteriorated concrete, abrasive blast clean any corroded reinforcing steel to the equivalent of an SSPC-SP 10, Near-White Blast Cleaning (modified).

E. Additional Welded Wire Fabric Reinforcement

1. If additional steel reinforcement is determined by the Resident Project Representative to be required, furnished and installed new welded wire fabric utilizing plain wire and conforming to ASTM A185 and suitably splice to the existing reinforcement.
2. Place reinforcement to obtain a minimum 1-1/2 inches clear coverage for concrete protection.
3. Arrange, space, and securely tie bars, bar supports, and welded wire fabric together with 16-gauge wire to hold reinforcement accurately in position during concrete placement operations.
4. Set wire ties so ends are directed away from exposed concrete surfaces.
5. Comply with requirements of ACI 318 for minimum lap of spliced bars and welded wire fabric.

F. Through-Holes Actively Leaking

1. Apply the quick-setting, cement-based hydraulic repair mortar according to the specifications of the mortar material manufacturer.

G. Expansion Joint Repair

1. Remove joint filler and caulk.
2. Prepare the surfaces of the water containing side of wall according to the specifications of the joint repair material manufacturer. Do not use solvents for cleaning.
3. Apply the joint repair system according to the specifications of the joint repair material manufacturer.
4. Prepare the surfaces of the non-water containing side of wall by wet blast cleaning and drying.

H. At the completion of the Work, remove rigging attachments, if any installed on the tank by the Contractor, and clean and repair areas damaged by the removal of the attachments in accordance with these Specifications.

3.4 Cleaning

A. Clean off excess sealants or sealant smears adjacent to joints as Work progresses by methods and with cleaning materials approved by manufacturers of joint sealers and of products in which joints occur.

B. After curing and prior to disinfecting, remove all previously existing residue and construction debris and wash the tank interior with potable water.

3.5 Protection

A. Protect repaired areas during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion.

-END-

Wessler Engineering

Structural Inspection Report

Dillman Road WWTP Chlorine Contact Tanks and Basin Complex

ENCLOSURE 3
EXAMPLES OF REPAIR MATERIALS

BUILDING TRUST

PRODUCT DATA SHEET

EXAMPLE FOR CRACK INJECTION

Sika® Injection-201 CE

Elastic PUR-Injection resin for permanent watertight sealing

DESCRIPTION

Sika® Injection-201 CE is a very low viscous, elastic and solvent-free polyurethane injection resin. In contact with water, a uniform, closed and therefore watertight pore structure forms, which is elastic and flexible. Suitable for use in hot and tropical climatic conditions.

USES

Sika® Injection-201 CE may only be used by experienced professionals.

- Sika® Injection-201 CE is used for permanent watertight sealing with some flexibility to absorb limited movement, in dry, damp or water-bearing cracks and joints in concrete, brickwork and natural stone
- Sika® Injection-201 CE can be used for the injection of the SikaFuko®-System (non re-injectable!)
- For use in water-bearing cracks under hydrostatic pressure, preliminary injection shall be made with Sika® Injection-101 RC

CHARACTERISTICS / ADVANTAGES

- Permanently elastic, can absorb limited movements
- No shrinkage in subsequent dry conditions
- Due to its low viscosity it can penetrate into cracks >0.2 mm in width
- Cured Sika® Injection-201 CE is inert and chemically-resistant
- Solvent-free
- In cold temperatures (< +10°C) Sika® Injection-201 CE can be accelerated using Sika® Injection-AC20
- Can be injected as a one component system

APPROVALS / CERTIFICATES

- German KTW drinking water certificate
- Concrete injection for ductile filling of cracks, voids and interstices (D) according to EN 1504-5:2004, Declaration of Performance 35859175, certified by notified factory production control certification body 0761 and provided with the CE marking.

PRODUCT INFORMATION

Composition	Water reactive 2-part polyurethane resin, solvent free	
Packaging	Part A	10 kg, 20 kg
	Part B	10.6 kg, 21.2 kg
Shelf life	36 months from date of production if stored properly in undamaged, unopened, original sealed packaging.	
Storage conditions	Dry storage at temperatures between +5 °C and +35 °C. Protect from direct sunlight and humidity.	

Colour	Part A	colourless	
	Part B	brown	
Density	**Part A**	**Part B**	(ISO 2811)
	~1.00 kg/l	~1.07 kg/l	
	All density values determined at +20 °C		
Viscosity	~100 mPa·s (mixture, +20 °C)		(ISO 3219)

TECHNICAL INFORMATION

Shore A hardness	~43 (7 days)	(EN 868)
Modulus of elasticity in flexure	~2 MPa	(ISO 527-1)
Tensile strain at break	~35 %	(ISO 527)

APPLICATION INFORMATION

Mixing ratio

Part A:Part B 1:1 parts by volume

Reaction time table Sika® Injection-201 CE
(ISO 9514)

	Material Temperature		
Dosage*	**+5 °C**	**+10 °C**	**+20 °C**
0.0 %	~180 min	~180 min	~135 min
0.5 %	~60 min	~55 min	~38 min
1.0 %	~29 min	~32 min	~24 min
2.0 %	~16 min	~17 min	~13 min
3.0 %	~13 min	~14 min	~10 min
5.0 %	~9 min	~7 min	~5 min

*Dosage of Sika® Injection-AC20 in % by weight of Sika® Injection-201 Comp. A

The given data are laboratory parameters and may deviate depending on the object and conditions on site.

Ambient air temperature	+5°C min. / +35°C max.
Substrate temperature	+5°C min. / +35°C max.

BASIS OF PRODUCT DATA

All technical data stated in this Data Sheet are based on laboratory tests. Actual measured data may vary due to circumstances beyond our control.

IMPORTANT CONSIDERATIONS

Only for application by trained and experienced professionals.
For water intrusions that can not be stopped with Sika® Injection-201 CE, the fast foaming PUR injection resin Sika® Injection-101 RC can be injected until the water flow stops.

ECOLOGY, HEALTH AND SAFETY

User must read the most recent corresponding Safety Data Sheets (SDS) before using any products. The SDS provides information and advice on the safe handling, storage and disposal of chemical products and contains physical, ecological, toxicological and other safety-related data.

Regulation (EC) No 1907/2006 (REACH) - Mandatory training

As from 24 August 2023 adequate training is required before industrial or professional use of this product. For more information and a link to the training visit www.sika.com/pu-training.

APPLICATION INSTRUCTIONS

SUBSTRATE PREPARATION

Surfaces of cavities and cracks need to be clean, free of loose particles, dust, oil and any other bond-breaking substances. Any dirt must be blown out by compressed air.

MIXING

Empty parts A and B into a mixing vessel and mix slowly and thoroughly for at least 3 min (max. 250 rpm) until homogeneous, observing the safety precautions. The containers are supplied according to the required mixing ratio of 1 : 1 parts by volume.
Partial quantities can be measured out into separate vessels.
After mixing, pour the material into the pump's feed container, stir briefly and use within the pot life.
If the substrate and/or ambient temperatures are < +10°C, Sika® Injection-AC20 can be added to accelerate the reaction time.

CLEANING OF EQUIPMENT

Clean all tools and application equipment according to the Product Data Sheet for the Sika®Injection Cleaning System

LOCAL RESTRICTIONS

Note that as a result of specific local regulations the declared data and recommended uses for this product may vary from country to country. Consult the local Product Data Sheet for exact product data and uses.

LEGAL NOTES

The information, and, in particular, the recommendations relating to the application and end-use of Sika products, are given in good faith based on Sika's current knowledge and experience of the products when properly stored, handled and applied under normal conditions in accordance with Sika's recommendations. In practice, the differences in materials, substrates and actual site conditions are such that no warranty in respect of merchantability or of fitness for a particular purpose, nor any liability arising out of any legal relationship whatsoever, can be inferred either from this information, or from any written recommendations, or from any other advice offered. The user of the product must test the product's suitability for the intended application and purpose. Sika reserves the right to change the properties of its products. The proprietary rights of third parties must be observed. All orders are accepted subject to our current terms of sale and delivery. Users must always refer to the most recent issue of the local Product Data Sheet for the product concerned, copies of which will be supplied on request.

SIKA NORTHERN GULF
Bahrain / Kuwait
Tel: +973 177 38188
info@bh.sika.com
gcc.sika.com

SIKA SOUTHERN GULF
UAE / Oman / SIC
Tel: +971 4 439 8200
info@ae.sika.com
gcc.sika.com

Sika Saudi Arabia
Riyadh / Jeddah / Dammam
Tel. +966 11 217 6532
info@sa.sika.com
gcc.sika.com

BUILDING TRUST

PRODUCT DATA SHEET

SikaSet® Waterplug

(formerly MSeal 590)

EXAMPLE TO REPAIR LEAKING HOLES

ONE-COMPONENT, CEMENT-BASED, FAST-SETTING WATER-STOP REPAIR MORTAR

PRODUCT DESCRIPTION

SikaSet® Waterplug is a one-component, quick-setting, Portland-cement-based hydraulic repair mortar that instantly stops running water through holes or cracks in concrete or masonry. It expands as it sets to lock into place even under constant water pressure.

USES

- Non-moving (static) cracks and holes with running water or moisture seepage
- For immersion service
- For anchoring vertical bolts
- Basements
- Foundations
- Retaining walls
- Sewers

Locations

- Vertical, overhead, or horizontal
- Interior or exterior
- Above or below grade

Substrates

- Concrete and masonry

CHARACTERISTICS / ADVANTAGES

- Fast setting so it can stop running water and develop high strength quickly
- Fully hydraulic so it can be set above or below the water
- Shrinkage compensated so it expands to lock in place
- One component so it mixes easily with water only
- Ready to topcoat in 15 minutes with appropriate product to minimize downtime
- Durable non-metallic, non-gypsum formula to maintain volume stability over time
- Formulation is available for cold-weather applications for use in all seasons and climates
- Certified to the NSF/ANSI Standard 61 for potable water contact

PRODUCT INFORMATION

Chemical Base	SikaSet® Waterplug is a proprietary mix composed of cement, graded silica, calcium hydrocide, fillers, and additives.
Packaging	2.5 lb (1.14 kg) cans 10 lb (4.5 kg) cans 50 lb (22.7 kg) pails
Shelf Life	1 year when properly stored

Storage Conditions	Transport and store in an unopened container in a cool, clean, dry area between 45° and 90 °F (7° and 32 °C). Keep the container tightly sealed after opening to maintain the shelf life freshness of the unused portion of the remaining powder.

TECHNICAL INFORMATION

Compressive Strength	20 min–120 min	1,800 psi (12.4 MPa)	(ASTM C 109)
	1 day	4,000 psi (27.6 MPa)	
	7 days	5,000 psi (34.5 MPa)	
	28 days	5,500 psi (37.9 MPa)	
Flexural Strength	7 days	600 psi (4.1 MPa)	(ASTM C 348)
	28 days	1,500 psi (10.3 MPa)	
Tensile Strength	7 days	300 psi (2.1 MPa)	(ASTM C 190)
	28 days	350 psi (2.4 MPa)	

APPLICATION IN

Test results are averages obtained under laboratory conditions at 70 °F (21 °C) and 50% rh. Reasonable variations can be expected.

Coverage	Volume: 15.6 in_3/1 lb (254 cm_3/0.45 kg) Static cracks: ¾" by ¾" by 28"/1 lb (1.9 cm by 1.9 cm by 70 cm/0.45 kg).

BASIS OF PRODUCT DATA

Results may differ based upon statistical variations depending upon mixing methods and equipment, temperature, application methods, test methods, actual site conditions and curing conditions.

ENVIRONMENTAL, HEALTH AND SAFETY

For further information and advice regarding transportation, handling, storage and disposal of chemical products, user should refer to the actual Safety Data Sheets containing physical, environmental, toxicological and other safety related data. User must read the current actual Safety Data Sheets before using any products. In case of an emergency, call CHEMTREC at 1-800-424-9300, International 703-527-3887.

APPLICATION INSTRUCTIONS

NOTES ON INSTALLATION

- Do not apply to frozen or frost-covered surfaces.
- Do not apply to dynamic (moving) cracks.
- Do not use to fill expansion joints or control joints.
- Do not remix (retemper) hardened material.
- Always Pre-Dampen the substrate prior to placing SikaSet® Waterplug.
- Do not use it as a surface-applied coating or as a parging material.
- Do not fill voids greater than 30 in3 (490 cm3) in a single lift.
- Do not use if hard lumps have developed in the powder.
- Make certain the most current versions of the product data sheet and SDS are being used.
- Proper application is the responsibility of the user. Field visits by Sika personnel are for the purpose of making technical recommendations only and not for supervising or providing quality control on the jobsite.

MIXING

1. Mix SikaSet® Waterplug powder with clean, potable water.
2. Use powder (neat) without adding any aggregates, chemical additives, or admixtures.
3. Add just enough water to mix rapidly by hand to a stiff, low-slump, putty consistency. Mix no longer than 30 seconds.
4. Mix only enough SikaSet® Waterplug that can be successfully placed within 3 minutes under normal conditions (see Temperature). Do not retemper material after initially mixing.
5. Clean the mixing vessel and tools immediately after each use.

Temperature

Cold or hot air, surface, and material temperatures will retard or quicken SikaSet® Waterplug setting time. Special attention must be given when mixing and applying. The SikaSet® Waterplug and mixing water should feel neutral to the touch, normally 70 °F (21 °C). On average SikaSet® Waterplug will set in approximately 3–5 minutes.

Hot weather use

1. From 86° to 100 °F (30° to 37 °C), SikaSet® Waterplug will set very quickly. The material temperature should not be above 80 °F (26 °C) and mixing water over 100 °F (37 °C); otherwise set begins immediately and structural strength lessens when applying during these extreme conditions.
2. SikaSet® Waterplug should always be placed within 30–60 seconds after mixing.
3. If appropriate, use ice water when mixing to slow down the setting action.

Cold weather use

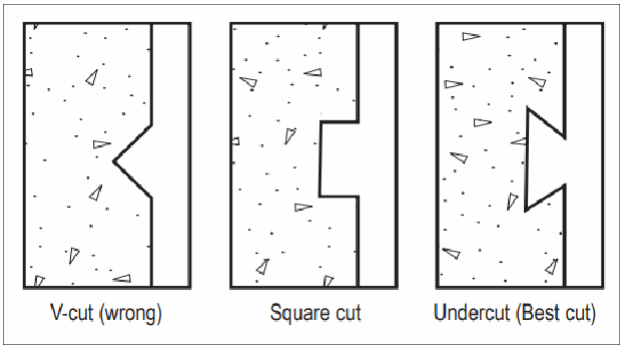
1. SikaSet® Waterplug should be stored or brought up to normal room temperatures, 40 to 70 °F (4 to 21 °C), before mixing and use. Do not apply SikaSet® Waterplug if the ambient air or surface temperatures are 40 °F (4 °C) or less or are expected to fall below 40 °F (4 °C) within 12 hours after initial placement.

APPLICATION

- Pre-dampen the substrate prior to installing SikaSet® Waterplug.
- Place SikaSet® Waterplug with minimum working, kneading, or rubbing.
- Force SikaSet® Waterplug repair mortar into cracks or holes and hold it in place (without twisting) until the set is fully achieved.
- Just prior to the final hard set, SikaSet® Waterplug may be “shaved” with a trowel until flush with the surrounding surface. Always shave from the center out, in the direction of the bond line.
- If the repair area is dry at the time of placement, keep the substrate damp for 15 minutes minimum, using a fine spray misting of water, before and after placement.

Sealing Junctions

- To seal static cracks at the junction of floors and walls, route or cut out the crack at least ¾" (19 mm) wide and deep, slightly undercutting if possible.
- Flush away all loose debris, dust, and dirt with clean water.
- Force SikaSet® Waterplug into the prepared crack with a round tool or margin trowel until a set is fully achieved and smooths out to form a cove at wall-to-floor junctions.
- Keep damp for at least 15 minutes.



Stopping Running Water

- To stop active water from running through concrete and masonry, cut out, crack, or hole to a minimum depth and width of ¾" (19 mm). Always square cut or undercut when possible; do not “V” cut.
- Start at the top and force SikaSet® Waterplug into crack. In areas of great pressure, do not place SikaSet® Waterplug into opening immediately. Hold SikaSet® Waterplug in hand or on a trowel until a slight warming occurs. Then press SikaSet® Waterplug firmly into the opening.
- Do not remove the trowel or hand pressure too soon

so as to provide some confinement to SikaSet® Waterplug expansion during its set. Do not twist SikaSet® Waterplug during placement or disturb during set time (5 minutes).
- After placement to stop the active water flow, carefully cut and “trowel shave” the patch level with the surrounding surface.

Sealing Leaks in Joints and Cracks

- To stop leaking mortar joints or static cracks in below-grade masonry and concrete walls, cut out defective mortar joints or cracks to a minimum width and depth of ¾" (19 mm). Undercut when possible.
- Force SikaSet® Waterplug into the opening and keep damp for at least 15 minutes or until a set is fully achieved.

Repairing Constructions Faults

- For patching holes and voids, etc., in concrete walls, remove all tie wires and wood or steel separators by cutting back from the surface to a minimum depth of ¾" (19 mm).
- When there is no active water present, repair mortars may be used more appropriately.

APPLICATION METHOD / TOOLS

Anchoring Hardware

- To anchor steel bolts or posts vertically in concrete or masonry, drill a hole deep enough to properly secure the bolt or post and large enough so there is at least ½" (13 mm) on all sides of the bolt or post.
- Fill the hole with SikaSet® Waterplug and tamp so that the entire hole is full. Immediately center bolt or post over the hole and force into the putty-like SikaSet® Waterplug.
- Tamp SikaSet® Waterplug firmly around the bolt or post; keep continuously moist for 15 minutes.
- Apply no pressure or stress to the bolt or post for a minimum of 5 hours after placement.

Top coating

1. Cured SikaSet® Waterplug repairs can be top coated with Sika Thoroseal®-581 or SikaTop®-584 Seal (see Form Nos. 1019906 and 1019908), both modified with Sika Thoroseal® Acryl 60 (see Form No. 1019073), as soon as an initial set is reached.
2. Cured SikaSet® Waterplug repairs can also be topcoated with various alkali-resistant acrylic coatings or used in conjunction with Sika Thorocoat®-400, Sikagard® HB 200, and Sika Thorocoat®-250 (see Form Nos. 1019100, 1019101, and 1019910).
3. SikaSet® Waterplug may also be used with preformed waterproof sheet membranes after an approximately 6–7 day cure.

CLEANING OF TOOLS

Clean tools and equipment immediately with water.

LEGAL DISCLAIMER

- **KEEP CONTAINER TIGHTLY CLOSED**
- **KEEP OUT OF REACH OF CHILDREN**
- **NOT FOR INTERNAL CONSUMPTION**
- **FOR INDUSTRIAL USE ONLY**
- **FOR PROFESSIONAL USE ONLY**

Prior to each use of any product of Sika Corporation, its subsidiaries or affiliates (“SIKA”), the user must always read and follow the warnings and instructions on the product’s most current product label, Product Data Sheet and Safety Data Sheet which are available at usa.sika.com or by calling SIKA’s Technical Service Department at 1-800-933-7452. Nothing contained in any SIKA literature or materials relieves the user of the obligation to read and follow the warnings and instructions for each SIKA product as set forth in the current product label, Product Data Sheet and Safety Data Sheet prior to use of the SIKA product.

SIKA warrants this product for one year from date of installation to be free from manufacturing defects and to meet the technical properties on the current Product Data Sheet if used as directed within the product’s shelf life. User determines suitability of product for intended use and assumes all risks. User’s and/or buyer’s sole remedy shall be limited to the purchase price or replacement of this product exclusive of any labor costs. **NO OTHER WARRANTIES EXPRESS OR IMPLIED SHALL APPLY INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. SIKA SHALL NOT BE LIABLE UNDER ANY LEGAL THEORY FOR SPECIAL OR CONSEQUENTIAL DAMAGES. SIKA SHALL NOT BE RESPONSIBLE FOR THE USE OF THIS PRODUCT IN A MANNER TO INFRINGE ON ANY PATENT OR ANY OTHER INTELLECTUAL PROPERTY RIGHTS HELD BY OTHERS.**

Sale of SIKA products are subject to the Terms and Conditions of Sale which are available at https://usa.sika.com/en/group/SikaCorp/termsandconditions.html or by calling 1-800-933-7452.

Sika Corporation
201 Polito Avenue
Lyndhurst, NJ 07071
Phone: +1-800-933-7452
Fax: +1-201-933-6225
usa.sika.com

BUILDING TRUST

PRODUCT DATA SHEET

SikaTop®-123 Plus

EXAMPLE FOR CONCRETE SPALL REPAIR

Two-component, polymer-modified, cementitious, non-sag mortar plus Sika FerroGard® 901 penetrating corrosion inhibitor

PRODUCT DESCRIPTION

SikaTop®-123 Plus is a two-component, polymer-modified, Portland cement-based, fast-setting, non-sag mortar. It is a high performance repair mortar for vertical and overhead surfaces and offers the additional benefit of Sika FerroGard® 901, a penetrating corrosion inhibitor included in its formulation.

USES

- On grade, above and below grade on concrete and mortar.
- On vertical and overhead surfaces.
- As a structural repair material for parking structures, industrial plants, walkways, bridges, tunnels, dams and ramps.
- Approved for repairs over cathodic protection systems

CHARACTERISTICS / ADVANTAGES

- Extremely low shrinkage proven by four industry standard test methods.
- High compressive and flexural strengths.
- Increased freeze/thaw durability and resistance to deicing salts.
- Increased density - improved carbon dioxide resistance (carbonation) without adversely affecting water vapor transmission (not a vapor barrier).
- Enhanced with Sika FerroGard® 901, a penetrating corrosion inhibitor - reduces corrosion even in the adjacent concrete.
- Compatible with coefficient of thermal expansion of concrete - Passes ASTM C 884.

APPROVALS / STANDARDS

- USDA certifiable for incidental food contact
- ANSI/NSF Standard 61 potable water approved compliant.
- Tested per ICRI Guidline NO. 320.3R for inorganic repair material data sheet protocol

PRODUCT INFORMATION

Packaging	Component A	1 gal (3.68 L) jug - 4/carton
	Component B	44 lb. (20 kg) bag
Appearance / Color	Gray powder	
Shelf Life	12 months from date of production if stored properly in original, unopened and undamaged sealed packaging	
Storage Conditions	Store dry at 40–95 °F (4–35 °C).	

Protect Component ‘B’ from moisture. If damp, discard material
Protect Component ‘A’ from freezing. If frozen, discard.

TECHNICAL INFORMATION

Compressive Strength	1 day	3,000 psi (20.7 MPa)	(ASTM C-109) 73 °F (23 °C) 50 % R.H.
	7 days	4,000 psi (27.6 MPa)	
	28 days	6,000 psi (41.4 MPa)	
Modulus of Elasticity in Compression	2.94 x 10_6 psi		(ASTM C-469)
Flexural Strength	28 days	1,500 psi (10.3 MPa)	(ASTM C-293) 73 °F (23 °C) 50 % R.H.
Splitting tensile strength	28 days	900 psi (6.2 MPa)	(ASTM C-496) 73 °F (23 °C) 50 % R.H.
Tensile Adhesion Strength	28 days	2,000 psi (13.8 MPa)	(ASTM C-882 modified)
	* Mortar scrubbed into substrate at 73 °F (23 °C) and 50 % R.H.		
Pull-Out Resistance	28 days	500 psi (3.4 MPa) Substrate failure	(ASTM C-1583)
Shrinkage	28 days	1x1x11-1/4'' specimen: 0.05 %	(ASTM C-157, mod. ICRI 320.3R)
	28 days	3x3x11-1/4'' specimen: 0.038 %	
Ring test			(ASTM C-1581)
		> 70 days	
	Average Max Strain	- 36 µstrain	
	Average Stress Strain	4.92 psi/day	
	Potential for Cracking	Low	
Baenziger block	90 days	No cracking	
Freeze-Thaw Stability	300 cycles	98 %	(ASTM C-666)
Rapid Chloride Permeability	28 days	< 500 C	(ASTM C-1202 AASHTO T-277)

APPLICATION INFORMATION

Fresh mortar density	132 lb/ft_3 (2.2 kg/l)	(ASTM C-138)
Coverage	0.39 ft_3 (0.01 m_3) per bag (Coverage figures do not include allowance for surface profile and porosity or material waste)	
Layer Thickness	**Min.** 1/8 " (3 mm)	**Max.** 1.5" (38 mm)
Product Temperature	65–75 °F (18–24 °C)	
Ambient Air Temperature	> 45 °F (7 °C)	
Substrate Temperature	> 45 °F (7 °C)	
Set Time	15 - 40 min.	(ASTM C-266)
Final set time	< 60 min.	(ASTM C-266)

Finishing time	20–60 minutes Note: All times start after adding Component 'B' to Component 'A' and are highly affected by temperature, relative humidity, substrate temperature, wind, sun and other job site conditions.

BASIS OF PRODUCT DATA

Results may differ based upon statistical variations depending upon mixing methods and equipment, temperature, application methods, test methods, actual site conditions and curing conditions.

ENVIRONMENTAL, HEALTH AND SAFETY

For further information and advice regarding transportation, handling, storage and disposal of chemical products, user should refer to the actual Safety Data Sheets containing physical, environmental, toxicological and other safety related data. User must read the current actual Safety Data Sheets before using any products. In case of an emergency, call CHEMTREC at 1-800-424-9300, International 703-527-3887.

DIRECTIVE 2004/42/CE - LIMITATION OF EMISSIONS OF VOC

0 g/l (EPA method 24)

LIMITATIONS

- Do not use solvent-based curing compound.
- Size, shape and depth of repair must be carefully considered and consistent with practices recommended by ACI or ICRI.
- For additional information on substrate preparation, refer to ICRI Guideline No. 310.2R.
- If aggressive means of substrate preparation is employed, substrate strength should be tested in accordance with ACI 503 Appendix A prior to the repair application.
- As with all cement based materials, avoid contact with aluminum to prevent adverse chemical reaction and possible product failure. Insulate potential areas of contact by coating aluminum bars, rails, posts etc. with an appropriate epoxy such as Sikadur® 32, Hi-Mod.

APPLICATION INSTRUCTIONS

SURFACE PREPARATION

Surface preparation

- Surface must be clean and sound. Remove all deteriorated concrete, dirt, oil, grease, and other bond-inhibiting materials from the area to be repaired.
- Be sure repair area is not less than 1/8" (3 mm) in depth.
- Preparation work should be done by high pressure water blast, scabbler or other appropriate mechanical means to obtain an exposed aggregate surface profile of ±1/16" (1.6 mm) (CSP-5).
- To ensure optimum repair results, the effectiveness of decontamination and preparation should be assessed by a pull-off test.
- Saw cutting of edges is preferred and a dovetail is recommended.
- Substrate should be Saturated Surface Dry (SSD) with clean water prior to application. No standing water should remain during application.

Priming

- Reinforcing steel: Steel reinforcement should be thoroughly prepared by mechanical cleaning to remove all traces of rust. Where corrosion has occurred due to the presence of chlorides, the steel should be high pressure washed with clean water after mechanical cleaning. For priming of reinforcing steel use Sika® Armatec® 110 EpoCem (consult PDS).

- Concrete Substrate:
  - Prime the prepared substrate with a brush or sprayed

applied coat of Sika® Armatec® 110 EpoCem (consult PDS).
- Alternately, a scrub coat of SikaTop®-123 Plus can be applied prior to placement of the mortar. The repair mortar has to be applied into the wet scrub coat before it dries.

MIXING

- Pour Component 'A' into mixing container.
- Add Component 'B' while mixing continuously.
- Mix mechanically with a low-speed drill (400–600 rpm) and mixing paddle or mortar mixer.
- Mix to a uniform consistency, maximum 3 minutes.
- Manual mixing can be tolerated only for less than a full unit. Thorough mixing and proper proportioning of the two components is necessary.

APPLICATION

- SikaTop®-123 Plus must be scrubbed into the substrate, filling all pores and voids.
- Force material against edge of repair, working toward center.
- After filling repair, consolidate, then screed.
- Material may be applied in multiple lifts.

Multiple lifts

- Where multiple lifts are required score top surface of each lift to produce a roughened surface for next lift.
- Allow preceding lift to reach initial set, 30 minutes minimum, before applying fresh material.
- Substrate should be Saturated Surface Dry (SSD) with clean water prior to application. No standing water should remain during application.
- Scrub fresh mortar into preceding lift.
- Allow mortar or concrete to set to desired stiffness, then finish with wood or sponge float for a smooth surface.

CURING TREATMENT

- As per ACI recommendations for Portland cement concrete, curing is required.
- Moist cure with wet burlap and polyethylene, a fine mist of water or a water based* compatible curing compound (ASTM C-309).
- Curing compounds adversely affect the adhesion of following lifts of mortar, leveling mortar or protective coatings.
- Moist curing should commence immediately after finishing.
- Protect freshly applied mortar from direct sunlight, wind, rain and frost.

* Pretesting of curing compound is recommended.

OTHER RESTRICTIONS

See Legal Disclaimer.

LEGAL DISCLAIMER

- **KEEP CONTAINER TIGHTLY CLOSED**
- **KEEP OUT OF REACH OF CHILDREN**
- **NOT FOR INTERNAL CONSUMPTION**
- **FOR INDUSTRIAL USE ONLY**
- **FOR PROFESSIONAL USE ONLY**

Prior to each use of any product of Sika Corporation, its subsidiaries or affiliates ("SIKA"), the user must always

read and follow the warnings and instructions on the product's most current product label, Product Data Sheet and Safety Data Sheet which are available at usa.sika.com or by calling SIKA's Technical Service Department at 1-800-933-7452. Nothing contained in any SIKA literature or materials relieves the user of the obligation to read and follow the warnings and instructions for each SIKA product as set forth in the current product label, Product Data Sheet and Safety Data Sheet prior to use of the SIKA product.

SIKA warrants this product for one year from date of installation to be free from manufacturing defects and to meet the technical properties on the current Product Data Sheet if used as directed within the product's shelf life. User determines suitability of product for intended use and assumes all risks. User's and/or buyer's sole remedy shall be limited to the purchase price or replacement of this product exclusive of any labor costs. **NO OTHER WARRANTIES EXPRESS OR IMPLIED SHALL APPLY INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. SIKA SHALL NOT BE LIABLE UNDER ANY LEGAL THEORY FOR SPECIAL OR CONSEQUENTIAL DAMAGES. SIKA SHALL NOT BE RESPONSIBLE FOR THE USE OF THIS PRODUCT IN A MANNER TO INFRINGE ON ANY PATENT OR ANY OTHER INTELLECTUAL PROPERTY RIGHTS HELD BY OTHERS.**

Sale of SIKA products are subject to the Terms and Conditions of Sale which are available at https://usa.sika.com/en/group/SikaCorp/termsandconditions.html or by calling 1-800-933-7452.

Sika Corporation
201 Polito Avenue
Lyndhurst, NJ 07071
Phone: +1-800-933-7452
Fax: +1-201-933-6225
usa.sika.com

Sika Mexicana S.A. de C.V.
Carretera Libre Celaya Km. 8.5
Fracc. Industrial Balvanera
Corregidora, Queretaro
C.P. 76920
Phone: 52 442 2385800
Fax: 52 442 2250537

EXAMPLE FOR EXPANSION JOINT REPAIR

Sikadur® Combiflex® SG System

High performance joint sealing system

Description

High performance joint sealing system for construction, expansion and connection joints as well as for cracks. When fixed to the joint, allows irregular and high movement in more than one direction, while maintaining a high quality seal.

The Sikadur Combiflex SG System consists of a modified flexible Polyolefin (FPO) waterproofing tape with advanced adhesion using Sikadur 31, Hi-Mod Gel (1:1 Mix Ratio).

Where to Use

Sealing system for expansion, construction and connection joints, as well as for cracks in:
- Tunnels and culverts
- Hydroelectric power plants
- Sewage treatment plants
- Basements
- Water retaining structures and drinking water reservoirs
- Around iron, steel and concrete pipes
- Swimming pools

Sealing of:
- Joints with extreme movement
- Building sections where varying settlement is expected
- Cracks

Repair/reinstatement of leaking joint sealing systems such as:
- Waterbars
- Joint sealants, etc.

Advantages

- Advanced adhesion, **no activation of tape required**
- Easy to install
- Suitable for both dry and damp concrete surfaces
- UL Listed for potable water applications
- Extremely flexible
- Performs well within a wide range of temperatures
- Excellent adhesion to many materials
- Weather and water resistant
- Approved for contact with potable water
- Good resistance to many chemicals
- Root resistant
- Versatile system suitable for many difficult situations

Typical Data *(Material and curing conditions 73°F (23°C) and 50% R.H.)*

RESULTS MAY DIFFER BASED UPON STATISTICAL VARIATIONS DEPENDING UPON MIXING METHODS AND EQUIPMENT, TEMPERATURE, APPLICATION METHODS, TEST METHODS, ACTUAL SITE CONDITIONS AND CURING CONDITIONS.

Shelf life Combiflex Kit - 2 years in original, unopened containers.

Storage Conditions Store dry at 40°-85°F (4°-30°C.) **Condition material to 65°-85°F** before using.

Color Sikadur 31, Hi-Mod Gel (1:1 Mix Ratio), adhesive - light gray.
FPO sheeting - concrete gray.

Typical Technical Data for Sikadur 31, Hi-Mod Gel (1:1 Mix Ratio), Adhesive:

Pot Life Approximately 60 minutes.

Tack Free Time 1.5 - 2.5 hours

Typical Technical Data for Combiflex SG:

Tensile Properties (ASTM D-412)

Tensile Strength > 1,740 psi (12 MPa)

Elongation at Break > 600%

Tear Resistance (ASTM D-624) Die C

Tear Strength 69 lb/in. (12 N/mm)

Low Temperature of Performance Maintained to -40°F

Typical Technical Data for Sikadur Combiflex System:

Peel Strength (ASTM D-903)

7 days **Substrate, Concrete** No loss of adhesion between the Tape and the Sikadur 31, Hi-Mod Gel (1:1 Mix Ratio), or the Sikadur 31, Hi-Mod Gel (1:1 Mix Ratio) and the concrete

Chemical Resistance

Long term to:
Water, lime water, cement water, seawater, salt solutions, domestic sewage, bitumen (according to EN 1548), bitumen emulsion coatings (staining possible), etc.
Temporary to:
Light fuel oil, diesel, diluted alkali and mineral acids, ethanol, methanol, petrol, etc.

Ozone Resistance

3 month Exposure Water/Ozone (3 ppm) - No Effect; Air/Ozone (2-300 ppm) - No Effect

Constructi

Constructi

Coverage	Sikadur Combiflex SG Tape - 20 lineal ft./roll. Sikadur 31, Hi-Mod Gel (1:1 Mix Ratio) - 40 lineal ft./gal.
Packaging	Kits: Pre-measured kits containing 4 in. wide by 20 ft. long Sikadur Combiflex SG tape, 60 oz. of Sikadur 31, Hi-Mod Gel (1:1 Mix Ratio). The components may be also be purchased separately: Sikadur Combiflex SG Tape - 4, 8 and 12 in. wide by 20 ft. long and 82 ft. long. Sikadur 31, Hi-Mod Gel (1:1 Mix Ratio) - 3 gal. units, and 1 gal. unit.
Limitations	■ Minimum surface temperature 40°F. ■ Do not thin Sikadur 31, Hi-Mod Gel (1:1 Mix Ratio). Solvents will prevent proper cure. ■ Maximum application thickness of epoxy is 1/8 in. ■ Epoxy is a vapor barrier after cure. ■ Cover plates over joint are required when using Sikadur Combiflex SG Tape in traffic areas. ■ If joints are to be subjected to water pressure, the tape must be supported in the joint. Hard foam or joint sealant is recommended. ■ For exposure to negative water pressure, the Sikadur Combiflex SG Tape must be secured with a steel plate fixed on one side. ■ The Sikadur Combiflex SG Tape must be protected from mechanical damage. ■ Not an aesthetic product. Color may alter due to variations in lighting and/or UV exposure.

How to Use

Surface Preparation Surface must be clean and sound. It may be dry or damp but free of standing water. Remove dust, laitance, grease, curing compounds, impregnations, waxes, and any other contaminants.

Preparation Work: Concrete - Should be cleaned and prepared to achieve a laitance and contaminant free, open textured surface by blastcleaning or equivalent mechanical means.

Steel - Should be cleaned and prepared thoroughly by blastcleaning.

Mixing	Pre-mix each component of Sikadur 31, Hi-Mod Gel (1:1 Mix Ratio). Proportion 1 part Component 'B' to 1 part Component 'A' by volume into a clean pail. Mix thoroughly for 3 minutes using a Sika paddle on a low-speed drill (400-600 rpm) until uniform in color.
Application	If the surface of the Sika Combiflex SG Tape is contaminated or dirty, clean it with a dry or wet cloth. Use water but do not use solvent for cleaning. Check the Sikadur Combiflex SG tape for damages during storage and transport (i.e. heavy scratches) and remove critical parts if necessary. **NOTE: NO ACTIVATION ON SITE REQUIRED.** Apply the mixed Sikadur 31, Hi-Mod Gel (1:1 Mix Ratio), at a width of at least 1-1/2 in. on each side of the joint to a thickness of approximately 1/32 in. minimum. Work into the substrate for positive adhesion. Set the sheeting into the epoxy. Using a hard roller, force the sheeting down into the epoxy. Apply an additional 1/32 in. minimum layer of epoxy as a top coat to the Sikadur Combiflex Tape. Sikadur 31, Hi-Mod Gel (1:1 Mix Ratio) should not be applied in greater than a 1/8-in. thickness. When overlapping sheets, sheeting **must be** bonded together thermally with a hand-welding tool (i.e., Leister heat-welder or similar equipment available at waterproofing supply outlets). The welding area must be prepared by roughening the surface by Scotch® Brite or sand paper. Roughen the tapes only in the welding area. Overlaps must be 2 to 4 inches. Roll
Caution	**Component 'A' - Irritant; Sensitizer -** Contains epoxy resin and crystalline silica (sand). Can cause skin sensitization after prolonged or repeated contact. Skin and eye irritant. High concentrations of vapor may cause respiratory irritation. If sanded, crystalline silica dust may be generated and may cause lung injury (silicosis) and is listed as a suspect carcinogen by NTP and IARC (2A). Use only with adequate ventilation. Use of safety goggles and chemical resistant gloves is recommended. In case of exceedance of PELs, use an appropriate, properly fitted NIOSH approved respirator. Remove contaminated clothing. Consult MSDS for more detailed information. **Component 'B' - Corrosive; Sensitizer-** Contains amines and crystalline silica (sand). Contact with eyes or skin may cause severe burns. Can cause skin and/or respiratory sensitization after prolonged or repeated contact. Skin and eye irritant. High concentrations of vapor may cause respiratory irritation. Overexposure may cause liver, kidney, and/or central nervous system effects. If sanded, crystalline silica dust may be generated and may cause delayed lung injury (silicosis) and is listed as a suspect carcinogen by NTP and IARC (2A). Avoid skin contact. Use only with adequate ventilation. Use of safety goggles and chemical resistant gloves is recommended. In case of exceedance of PELs, use an appropriate, properly fitted NIOSH approved respirator. Remove contaminated clothing. Consult MSDS for more detailed information.
First Aid	In case of skin contact, wash immediately and thoroughly with soap and water. If symptoms persist, consult a physician. For respiratory problems, remove person to fresh air; if symptoms persist, contact a physician. Remove contaminated clothing.
Clean Up	In case of spills or leaks, wear suitable protective equipment, contain spill, collect with absorbent material, and transfer to suitable container. Ventilate area. Avoid contact. Dispose of in accordance with current, applicable local, state, and federal regulations.

Constructi

KEEP CONTAINER TIGHTLY CLOSED • KEEP OUT OF REACH OF CHILDREN • NOT FOR INTERNAL CONSUMPTION • FOR INDUSTRIAL USE ONLY

All information provided by Sika Corporation ("Sika") concerning Sika products, including but not limited to, any recommendations and advice relating to the application and use of Sika products, is given in good faith based on Sika's current experience and knowledge of its products when properly stored, handled and applied under normal conditions in accordance with Sika's instructions. In practice, the differences in materials, substrates, storage and handling conditions, actual site conditions and other factors outside of Sika's control are such that Sika assumes no liability for the provision of such information, advice, recommendations or instructions related to its products, nor shall any legal relationship be created by or arise from the provision of such information, advice, recommendations or instructions related to its products. The user of the Sika product(s) must test the product(s) for suitability for the intended application and purpose before proceeding with the full application of the product(s). Sika reserves the right to change the properties of its products without notice. All sales of Sika product(s) are subject to its current terms and conditions of sale which are available at **www.sikausa.com** or by calling 800-933-7452.

Prior to each use of any Sika product, the user must always read and follow the warnings and instructions on the product's most current Technical Data Sheet, product label and Material Safety Data Sheet which are available online at www.sikausa.com or by calling Sika's Technical Service Department at 800-933-7452. Nothing contained in any Sika materials relieves the user of the obligation to read and follow the warnings and instruction for each Sika product as set forth in the current Technical Data Sheet, product label and Material Safety Data Sheet prior to product use.

LIMITED WARRANTY: Sika warrants this product for one year from date of installation to be free from manufacturing defects and to meet the technical properties on the current Technical Data Sheet if used as directed within shelf life. User determines suitability of product for intended use and assumes all risks. Buyer's sole remedy shall be limited to the purchase price or replacement of product exclusive of labor or cost of labor. **NO OTHER WARRANTIES EXPRESS OR IMPLIED SHALL APPLY INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. SIKA SHALL NOT BE LIABLE UNDER ANY LEGAL THEORY FOR SPECIAL OR CONSEQUENTIAL DAMAGES. SIKA SHALL NOT BE RESPONSIBLE FOR THE USE OF THIS PRODUCT IN A MANNER TO INFRINGE ON ANY PATENT OR ANY OTHER INTELLECTUAL PROPERTY RIGHTS HELD BY OTHERS.**

Visit our website at www.sikausa.com **1-800-933-SIKA NATIONWIDE**

Regional Information and Sales Centers. For the location of your nearest Sika sales office, contact your regional center.

Sika Corporation
201 Polito Avenue
Lyndhurst, NJ 07071
Phone: 800-933-7452
Fax: 201-933-6225

Sika Canada Inc.
601 Delmar Avenue
Pointe Claire
Quebec H9R 4A9
Phone: 514-697-2610
Fax: 514-694-2792

Sika Mexicana S.A. de C.V.
Carretera Libre Celaya Km. 8.5
Fracc. Industrial Balvanera
Corregidora, Queretaro
C.P. 76920
Phone: 52 442 2385800
Fax: 52 442 2250537

CONCRETE REPAIRS AND REHABILITATION

PART 1 - GENERAL

1.1 Summary

A. Section Includes: Repair of cracks, spalled concrete, exposed reinforcing steel, and deteriorated expansion/contraction joints in wastewater treatment process structures.

1.2 References

A. ACI 318-11 - Building Code Requirements for Structural Concrete

B. NSF International (NSF) Standard 61 “Drinking Water System Components – Health Effects”

C. SSPC: The Society for Protective Coatings (SSPC)

1. Complete all Work in accordance with the following requirements.
   a. SSPC-AB 1 "Mineral and Slag Abrasives”
   b. SSPC-AB 2 " Specifications for Cleanliness of Recycled Ferrous Metallic Abrasives"
   c. SSPC-AB 3 "Newly Manufactured or Re-Manufactured Steel Abrasives"
   d. SSPC-VIS 1-02 "Visual Standard for Abrasive Blast Cleaned Steel"
   e. SSPC-VIS 3-93 "Visual Standard for Power- and Hand-Tool Cleaned Steel"
   f. SSPC-VIS 4-01 "Guide and Reference Photographs for Steel Surfaces Prepared by Water Jetting".
   g. SSPC-VIS 5-01 "Guide and Reference Photographs for Steel Surfaces Prepared by Wet Abrasive Blast Cleaning".
   h. SSPC-Guide 6 (CON) "Guide for Containing Debris Generated During Paint Removal Operations".
   i. SSPC-PA 2 "Measurement of Dry Paint Thickness with Magnetic Gages".
   j. SSPC-PA Guide 3 "A Guide to Safety in Paint Application".
   k. SSPC-SP 12, Surface Preparation and Cleaning of Steel and Other Hard Materials by High- and Ultrahigh-Pressure Water Jetting Prior to Recoating".
   l. SSPC-SP-13, Surface Preparation of Concrete.
   m. SSPC-SP 14, Industrial Blast Cleaning.
   n. SSPC-SP 15, Commercial Grade Power Tool Cleaning.
2. Modification of Standards
   a. The SSPC-VIS 1-02, the SSPC-Vis 3-93, and the SSPC-Vis 4-01 shall be used taking into account staining from prior paint applications.
   b. The SSPC Standards SSPC-SP 6, Commercial Blast Cleaning and SSPC-SP 10, Near-White Blast Cleaning shall be modified to apply to each square inch instead of the approximately 9 square inch area indicated in paragraph 2.6 of each of these standards, and shall be referred to hereinafter as SSPC-SP 6, Commercial Blast Cleaning (modified) and SSPC-SP 10, Near-White Blast Cleaning (modified).

Where the foregoing standards, recommendations, and specifications are conflicting, said conflicts shall be brought to the attention of the Engineer.

D. Manufacturer's published product data unless changed in writing by the home office of the manufacturer.

1.3 Quality Assurance

A. Concrete Repair Standards – Complete all design and concrete repair Work in accordance with ACI 318 and ACI-506.2.

A. Installer Qualifications: Engage an Installer who has successfully completed within the last 3 years at least 3 joint sealer applications similar in type and size to that of this Project.

B. Single Source Responsibility for Joint Sealer Materials: Obtain joint sealer materials from a single manufacturer for each different product required.

1.2 Delivery, Storage, and Handling

A. Deliver materials to Project site in original unopened containers or bundles with labels informing about manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.

B. Store and handle materials in compliance with manufacturers' instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.4 Project Conditions

Structural Repair Location Descriptions

1. Chlorine Contact Basins

- Basin Nos. 1 and 2:
  - Reinforced concrete walls, 14 ft height, 12 in. thickness, supported by an 18 in. thick mat foundation.
  - Both basins are uncovered, increasing exposure to weathering and freeze–thaw cycles.
  - Inspection identified:
    - Concrete cracking (vertical and diagonal, primarily along wall faces and corners).
    - Localized spalling along wall tops and interior face.
    - Expansion joint deterioration, allowing infiltration and loss of watertightness.

2. Basin Complex – Rectangular Tanks

- Eight rectangular tanks of varying dimensions, constructed of reinforced concrete.

- Observed deficiencies:

- Wall cracking (noted near corners, mid-span walls, and around penetrations).
- Surface spalling and delamination due to chemical attack and age-related wear.
- Joint sealant failures, allowing seepage between tank sections.

3. Basin Complex – Clarifiers

- Six clarifiers, each 100 ft diameter, three located on each end of the complex.
- Perimeter walls: reinforced concrete, 12 in. thickness.
- Deficiencies observed:

- Circumferential cracking at waterline elevation and around inlet/outlet structures.
- Concrete spalls on interior faces, particularly near scum baffles and weirs.
- Expansion joint failures at clarifier perimeters, permitting leakage and accelerated degradation.

4. Ancillary Structures & Tunnel Areas

- Several ancillary buildings are adjacent to or constructed directly on top of the Basin Complex.
- Inspection from the central underground tunnel revealed:

- Concrete cracking visible on exposed wall sections.
- Spalled patches at beam–wall intersections.
- Joint separation where slabs and walls meet, creating pathways for water infiltration.

A. Confined Space Entry – Comply with and have available documented Confined Entry Space Procedures at the project site at all times as required by OSHA 29 CFR 1910.146. In addition, comply with any state and local requirements that are more restrictive than the federal requirements.

B. Plant Shut Down - All Work must be completed during the period the treatment plant is shut down. Contractor is responsible for coordinating the Work within this time and in conjunction with other Work at the site. (NOTE: This will need to be tailored to the operations of the plant and coordinated with Garrett Towell. The Chlorine Contact Basin cracks can be repaired while keeping No. 2 in operation. Cracks in the walls within the Basin Complex can also be repaired without emptying any tanks in that structure. The joint repairs will require tanks to be emptied.)

C. Draining of Tank (required for joint repair) - Coordinate draining of the tank and perform the Work in close cooperation with the Owner. The tank must be drained during all surface preparation and rehabilitation. If needed, provide pumps, hoses and other equipment necessary to drain the tank completely. Provide a full complement of personnel working on a daily basis until the Work is completed.

C. Environmental Conditions: Do not proceed with installation of joint sealers or crack injection materials under the following conditions:

1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealer or crack injection material manufacturers.
2. When joint substrates are wet due to rain, frost, condensation, or other causes.

D. Joint and Crack Width Conditions: Do not proceed with installation of joint sealers where joint widths are less than allowed by joint sealer manufacturer for application indicated. Do not proceed with crack injection where crack widths are less than allowed by crack injection material manufacturer for application indicated.

E. Joint Substrate Conditions: Do not proceed with installation of joint sealers until contaminants capable of interfering with their adhesion are removed from joint substrates.

D. Accessibility for Observation – Make the Work accessible to the Resident Project Representative at all times using the Contractor's rigging and equipment. If assistance is required for the Resident Project Representative to safely access the Work, furnish labor to assist the Resident Project Representative. Include the cost of this labor in the base contract amount.

1.5 Scheduling

A. Notification – Notify the Owner and the Engineer at least seven (7) days before starting this Work at the site. Reconfirm the commencement of Work twenty-four (24) hours prior to starting the Work.

B. Work Schedule – Accomplish the repairing and cleaning of the tank in such a way as to minimize the length of time the tank is out of service and to minimize the number of days required for observing the repairing and cleaning operations.

C. Times for Work—Work should be performed between 8:00 a.m. and 5:00 p.m. Coordinate all access to the site with the Plant Superintendent, Garrett Towell. Plan to complete the Work during the Owner’s normal working hours.

D. Observation – The Owner plans to engage a designated Resident Project Representative to perform observation of the repair Work, cleaning, and painting.

1.6 Warranty

A. Provide a 1-year warranty on the Work in this Section.

PART 2 - PRODUCTS

1.3 Materials, General

A. Compatibility: Provide all related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

B. All products that could come in contact with potable water must meet the applicable standards for potable water contact. All such materials must be ANSI 61/NSF 61 approved – consult manufacturer for appropriate product to use for the application.

C. Provide joint sealers that have been produced and installed to establish and maintain watertight and airtight continuous seals.

2.1 Manufacturers and Products

A. Vertical Concrete Crack Repair: two-component, elastic, low viscosity, expanding polyurethane resin

1. Sika Corporation – "Injection-201 CE"
2. Or equal approved in writing by Engineer

B. Vertical and Overhead Partial Depth Concrete Spall Repair: polymer-modified, cement-based, fast-setting, non-sag mortar

1. Sika Corporation – "SikaTop 123 plus"
2. Or equal approved in writing by Engineer

C. Through-Holes Actively Leaking: quick-setting, cement-based hydraulic repair mortar

1. Sika Corporation – "SikaSet Waterplug"
2. Or equal approved in writing by Engineer

D. Expansion Joint Repair: high performance joint sealing system for expansion joints

1. Sika Corporation – "Sikadur-Combiflex SG"
2. Or equal approved in writing by Engineer

E. Additional Welded Wire Fabric Reinforcement: plain wire conforming to ASTM A185

PART 3 - EXECUTION

3.1 Examination

A. Carefully evaluate any rigging attachments present in the tank immediately prior to use for the type and magnitude of loads Contractor intends to impose on attachments. The Contractor is solely responsible for use of any existing or added attachments.

3.2 Preparation

A. Protection

1. Protect telemetry, electrical apparatus, and other equipment in the building and tank, including all wiring, from damage and dust or other deleterious material infiltration during the Work. Replace in kind, or repair to the satisfaction of the Owner, any items damaged by the operations of the Contractor at Contractor's expense.

B. Surface Preparation

1. Prepare concrete cracks and spall areas by wet blast cleaning to remove dust, laitance, grease, or other bond inhibiting materials and blow off with high pressure air.
2. Clean out joints immediately before installing joint sealers complying with joint sealer manufacturer's instructions and the following requirements.

3.3 Installation/Application

A. Install or apply all materials in accordance with manufacturer's instructions.

B. Interior Vertical Concrete Crack Repair

1. After wet blast cleaning and drying, prepare interior cracks greater than 1/32-inch wide in the vertical surfaces of the concrete according to the specifications of the concrete crack repair material manufacturer.
2. Fill the cracks in the concrete by injection with a two-component, elastic, low viscosity, expanding polyurethane resin.

C. Vertical and Overhead Partial Depth Concrete Spall Repair

1. Repair vertical and overhead areas repair (based on an average depth of 1 inch) of unsound or deteriorated concrete or shotcrete or other failed areas of concrete indicated by the Resident Project Representative by chipping to sound concrete and preparing according to the specifications of the concrete repair material manufacturer.
2. After wet blast cleaning and drying, place a concrete-based patching material in the deteriorated area and shape to the original contour of the concrete.

D. Cleaning Exposed Steel Reinforcement

1. After removing deteriorated concrete, abrasive blast clean any corroded reinforcing steel to the equivalent of an SSPC-SP 10, Near-White Blast Cleaning (modified).

E. Additional Welded Wire Fabric Reinforcement

1. If additional steel reinforcement is determined by the Resident Project Representative to be required, furnished and installed new welded wire fabric utilizing plain wire and conforming to ASTM A185 and suitably splice to the existing reinforcement.
2. Place reinforcement to obtain a minimum 1-1/2 inches clear coverage for concrete protection.

3. Arrange, space, and securely tie bars, bar supports, and welded wire fabric together with 16-gauge wire to hold reinforcement accurately in position during concrete placement operations.
4. Set wire ties so ends are directed away from exposed concrete surfaces.
5. Comply with requirements of ACI 318 for minimum lap of spliced bars and welded wire fabric.

F. Through-Holes Actively Leaking

1. Apply the quick-setting, cement-based hydraulic repair mortar according to the specifications of the mortar material manufacturer.

G. Expansion Joint Repair

1. Remove joint filler and caulk.
2. Prepare the surfaces of the water containing side of wall according to the specifications of the joint repair material manufacturer. Do not use solvents for cleaning.
3. Apply the joint repair system according to the specifications of the joint repair material manufacturer.
4. Prepare the surfaces of the non-water containing side of wall by wet blast cleaning and drying.

H. At the completion of the Work, remove rigging attachments, if any installed on the tank by the Contractor, and clean and repair areas damaged by the removal of the attachments in accordance with these Specifications.

3.4 Cleaning

D. Clean off excess sealants or sealant smears adjacent to joints as Work progresses by methods and with cleaning materials approved by manufacturers of joint sealers and of products in which joints occur.

A. After curing and prior to disinfecting, remove all previously existing residue and construction debris and wash the tank interior with potable water.

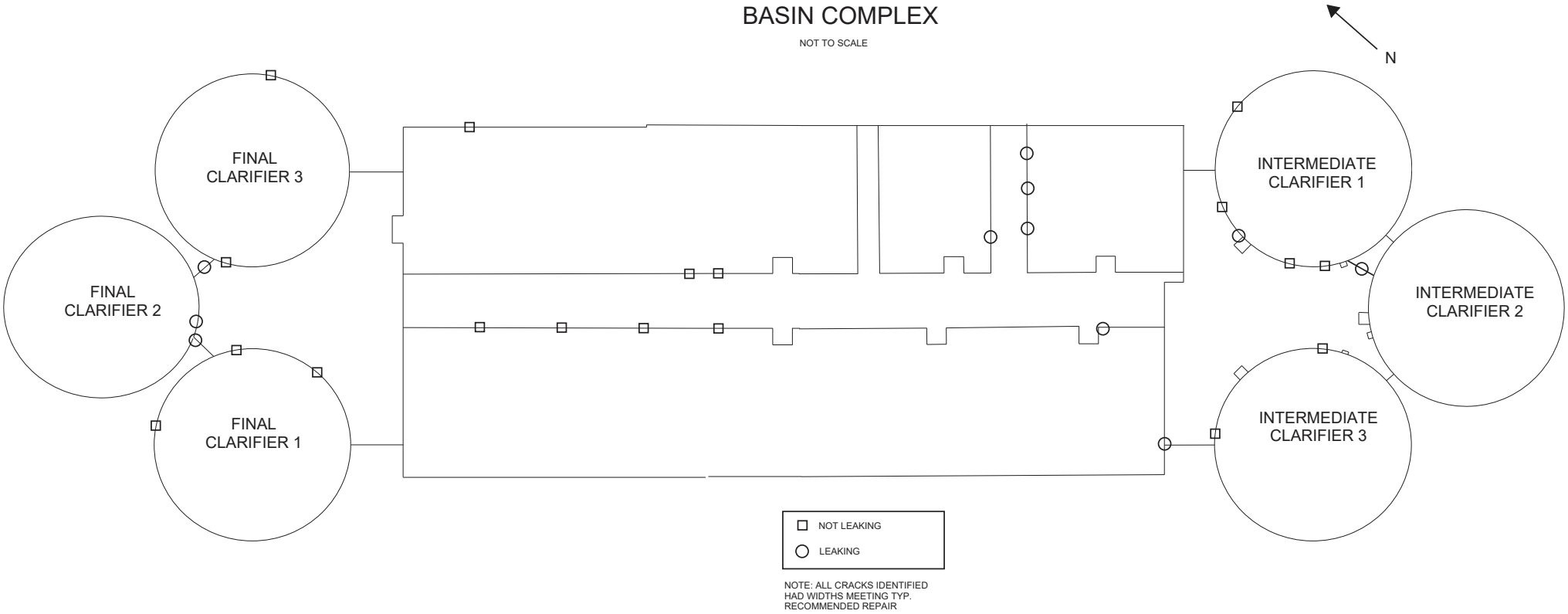
1.4 Protection

A. Protect repaired areas during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion.

-END-

BASIN COMPLEX

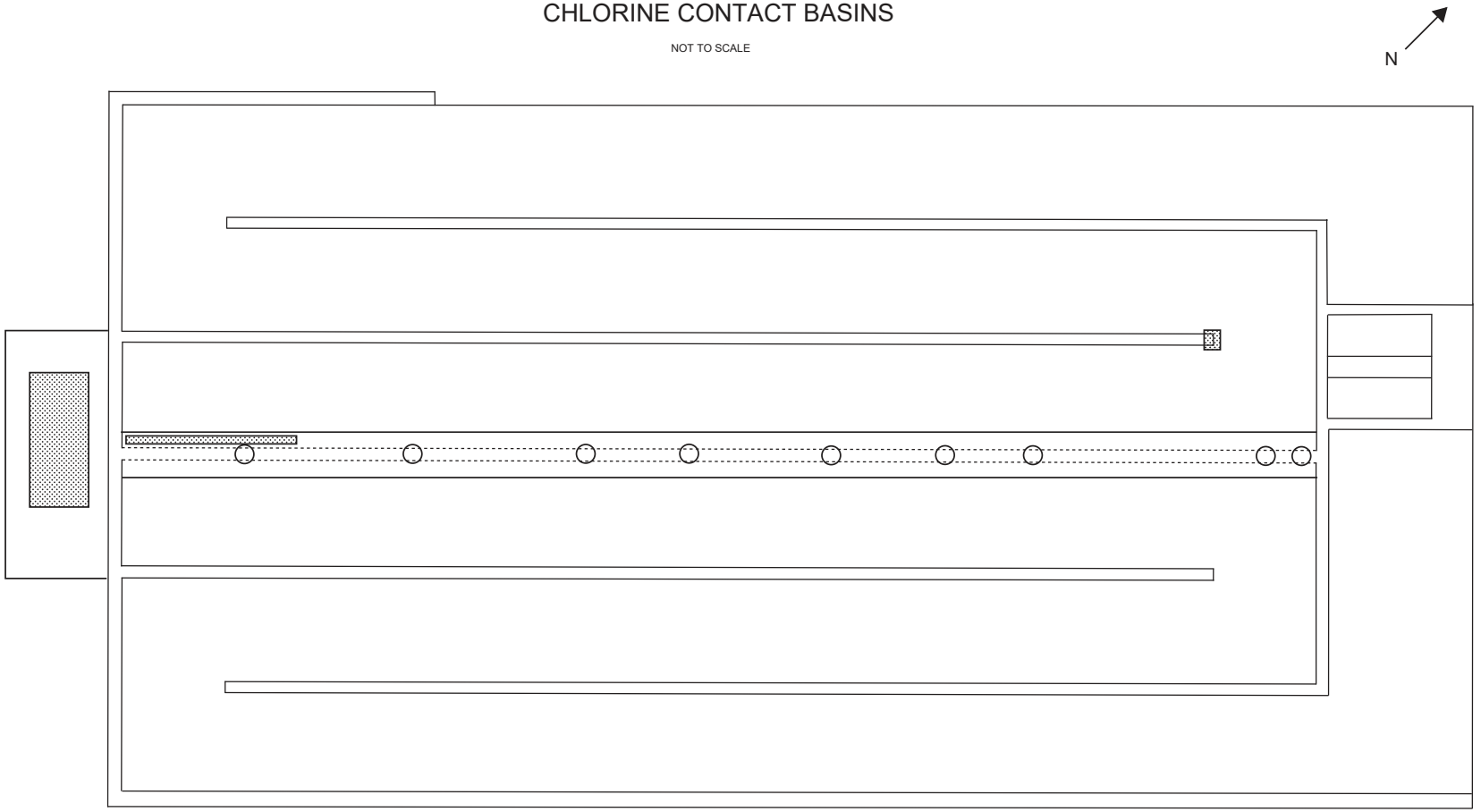
NOT TO SCALE



NOTE: ALL CRACKS IDENTIFIED HAD WIDTHS MEETING TYP. RECOMMENDED REPAIR

CHLORINE CONTACT BASINS

NOT TO SCALE



NOTE: ALL CRACKS IDENTIFIED HAD WIDTHS MEETING TYP. RECOMMENDED REPAIR