



# Town of Simsbury

933 HOPMEADOW STREET

SIMSBURY, CONNECTICUT

## **REQUEST FOR PROPOSAL**

### **PROFESSIONAL DESIGN SERVICES**

#### **WATER POLLUTION CONTROL FACILITY PRIMARY CLARIFIER RESTORATION**

The Town of Simsbury, through its Water Pollution Control Authority, is soliciting proposals from qualified firms for professional engineering services, for the design and preparation of construction documents for restoration work for the Primary Clarifiers. Two clarifiers exist at the WPCF located at 36 Drake Hill Road in Simsbury, CT. The goal of this engagement is that the clarifiers be made structurally sound and to be restored to a safe operational condition. An Engineering Inspection Report was performed and is included as Figure 1.

Please find the following enclosures:

Attachment A: Scope of Services

Attachment B: Insurance Requirements

Attachment C: Ethics Form

The Town of Simsbury reserves the rights: to accept any, all or any part of proposal; to reject any, all, or any part of proposal; to waive any non-material deficiencies in proposal response; and to award the contract of services that is in its judgement will be in the Town's best interests.

The Town of Simsbury is an equal opportunity/affirmative action employer. Small business enterprises, woman owned businesses, and minority owned businesses are encouraged to participate.

**Questions regarding this Request should be directed to Anthony Piazza via email at [apiazza@simsbury-ct.gov](mailto:apiazza@simsbury-ct.gov) Responses to all salient questions will be provided by addendum and sent via email to all consultants invited to bid.**

**Amy Meriwether, Director of Finance / Treasurer  
Town of Simsbury**

**TOWN OF SIMSBURY, CONNECTICUT**  
**PROFESSIONAL DESIGN SERVICES**  
**WATER POLLUTION CONTROL FACILITY**  
**PRIMARY CLARIFIER RESTORATION**

## **SCOPE OF WORK**

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Town of Simsbury (the “Town”), through its Water Pollution Control Authority, is requesting proposals for professional engineering consultant services for the design and preparation of bidding and construction documents for restoration of the WPCF Primary Clarifiers. These clarifiers have been off line for ten (10) years and have some structural deterioration, some of which was addressed during the 2005 plant upgrade. The scope of work includes assistance with bidding and contract award, and construction administrative services.

The intent of the restoration is to stabilize the structural integrity and restore clarifiers to a safe operational condition..

An inspection report of the clarifiers was performed through outside services and is provided as Figure 1. Professional engineering consultant services are intended to be comprehensive and include all aspects required to prepare and submit, if needed, the Clean Water Fund Application, generate drawings, bid documents, technical specifications, permits, construction cost estimates, and assist with construction engineering services. Other Services may be required that are deemed to be in the best interest of the Town of Simsbury.

### **Scope of Services**

The following scope of services is anticipated, but not limited to, for the project:

#### **Phase 1 – Evaluate Primary Clarifiers, Preliminary Design and Construction Documents**

- Evaluation of Primary Clarifiers
- Project Coordination including meetings with Town representatives
- Preliminary Restoration Design of Primary Clarifiers

## **Phase 2 – Preparation of Clean Water Fund Application**

- Preparation of Clean Water Fund application
- Submission of Application to State DEEP
- Project Coordination including meetings with Town representatives

## **Phase 3 – Design and Construction Documents**

- Development of Plans and Construction Details
- Development of Cost Estimate
- Development of Specifications
- Submission of all Construction Documents to Town for review, and schedule a review meeting
- Preparation of permits for Town, as may be required

## **Phase 4 – Bidding Assistance**

- Development of Bidding Documents
- Notify interested bidders that might meet the Town's requirements
- Receive Bidder questions & issue addenda
- Review Bids & Provide recommendation of contract award to the Town
- Prepare Construction Contract Documents for execution by Town

## **Phase 5 – Construction Engineering (CE) Services**

- Preparation of Clean Water Fund Application
- Development of Preliminary Plans and Construction Details
- Development of Preliminary Cost Estimate

## **PROJECT SCHEDULE**

Submission of Clean Water Fund Application is expected by the 2023 CT DEEP priority list deadline. Design and construction documents are expected to be completed concurrently with the Clean Water Fund Application. Bidding for the construction is expected in 2023 and construction of the repairs is expected in 2024.

## **PROPOSAL & SELECTION**

Interested firms are requested to submit two (2) copies of qualification data and one (1) electronic version via USB flash drive. The interested firm should also submit a detailed fee schedule, in a separate sealed envelope, to Amy Meriwether, Director of Finance, Town of Simsbury, 933 Hopmeadow St, Simsbury, CT 06070 by Thursday, September 15, 2022 at 2:00pm.

Each RFQ/RFP response/submission shall be delivered in a sealed envelope or package clearly identified as “WATER POLLUTION CONTROL FACILITY PRIMARY CLARIFIER RESTORATION, TOWN OF SIMSBURY”. Fee Proposals should be submitted in a separately sealed envelope or package clearly identified as “Fee Proposal: WATER POLLUTION CONTROL FACILITY PRIMARY CLARIFIER RESTORATION, TOWN OF SIMSBURY”.

## **RESPONSE FORMAT**

Please provide the following information:

### **Company Profile:**

A company profile, including the firm name, business address, telephone number, year established (include former firm names and year(s) established, if applicable), type of Township, and parent company, if any.

### **Experience:**

Provide information indicative of experience on other projects (please limit to five projects) of similar complexity that document successful and reliable experience in past performance within the last seven (7) years, as is related to this proposal. Identify local governmental clients for whom similar services have been provided, including name of client, client contact person, description of services performed. Provide resumes of key staff.

### **Personnel:**

Provide an organizational chart, short form resumes, and summary of staff qualifications. Demonstrate current capacity and current expertise in structural work. Respondent shall document knowledge and experience of personnel in structural engineering, structural rehabilitation, and any relevant expertise.

### **Conflicts:**

All Respondents must certify that neither the Respondent, nor any employee thereof, has any conflict of interest, either direct or indirect, in connection with the services sought herein, pursuant to Federal or State law. If so, state the name and address of the other contracting party and reason.

### **Technical Approach:**

Provide a description of the Proposer's approach to the project, including implementation of the RFP Scope of Services, Estimated schedule for work completion, estimated staff hours for the various tasks, and any other relevant information. List any permitting that will be required and any alternate or innovative approaches that can be taken on this project.

### **References:**

The respondent shall provide references for five (5) structural rehabilitation projects of similar size performed over the past seven (7) years.



Include the client name, project cost, and a brief summary of work, along with name, address, and phone number of a responsible contact person.

**Capacity/Schedule:**

Capacity to perform services timely for the Town is critical and could be impacted by other obligations firms may have in the general area. Provide a typical schedule outlining the numbers of staff you would assign to a project and their responsibilities.

**Fee:**

Include fee table divided by task, include design phase tasks, including for preliminary, 90%, and final design, bidding phase tasks, and construction phase tasks. Fees should be provided as hourly not to exceed. No extra payment will be provided for mileage. Firm should include all tasks that they deem are necessary to provide the services requested in this proposal, even if they are not specifically called out in this document.

**QUESTIONS:**

Any questions about this project should be directed to Mr. Anthony Piazza, WPCF Superintendent, [apiazza@simsbury-ct.gov](mailto:apiazza@simsbury-ct.gov), or mailed to Town of Simsbury, Water Pollution Control Facility, 933 Hopmeadow St., Simsbury, CT 06070. To receive consideration, such questions must be received by Wed., September 7, 2022 at 3:00pm. No oral interpretations shall be made to any respondent as to the meaning of any of the documents. Every request for an interpretation shall be made in writing. The Town will respond to all appropriate questions received via an addendum available to all prospective consultants. Such addenda will become part of this Request for Proposals and the resulting contract. At least three (3) days prior to the receipt of proposals, the Town will post a copy of any addenda to its website located at:

<https://www.simsbury-ct.gov/finance/pages/public-bids-and-rfp>

It shall be the responsibility of each prospective proposer to determine whether addenda have been issued, and if so, to download copies directly from the Town's website.

**SELECTION:**

The Town of Simsbury will review all proposals to determine the firm that can best meet the needs of the Town for the restoration of the WWTF Primary Clarifiers. This will include consideration of fee, company history, references and any other pertinent information

**TAX EXEMPTIONS:**

The consultant shall be aware that the Town of Simsbury is exempt from Federal Excise Taxes and Connecticut Sales and Use Taxes. Appropriate tax-exempt forms will be provided to the successful consultants(s) as part of the contract award process

## **ATTACHMENT B: INSURANCE REQUIREMENTS**

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The Consultant must carry insurance under which the Town is named as an assured, as follows:

Such insurance must be by insurance companies licensed to write such insurance in Connecticut against the following risks with the following minimum amounts and minimum durations.

(Minimum Limits)		
A. General Liability (including, Contractual Liability, Products, Premises Completed Operations, Advertisizing Injury and Independent Contractors)	Each Occurrence	\$ 1,000,000
	General Aggregate	\$ 2,000,000
	Products/Completed Operations Aggregate	\$ 2,000,000
B. Professional Liability	Each Claim or Each Occurrence	\$ 1,000,000
	Aggregate	\$ 1,000,000
C. Auto Liability	Combined Single Limit	
	Each Accident	\$ 1,000,000
D. Worker's Compensation, as required by State Statute		

Insurances A, B, and C must provide for a 30 day notice to the Town of cancellation/or restrictive amendment.

Insurances A and C must be for the whole duration of the contract and for twelve (12) months after acceptance of the project by the Town.

Subcontractors must carry A, and C in the same amounts as above for the duration of the project and until acceptance by the Town.

Certificates of insurance must be submitted to the Town of Simsbury WPCA prior to the signing of the contract and within ten days of notification of award of contract. Should any insurance expire or be terminated during the period in which the same is required by this contract, the WPCA shall be notified and such expired or terminated insurance must be replaced with new insurance and a new certificate furnished to the WPCA.

Failure to provide the required insurance and certificates may, at the option of the Town, be held to be a willful and substantial breach of this contract.

**ATTACHMENT C:  
CODE OF ETHICS FORM**

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The Consultant must sign and return the enclosed Code of Ethics Form as part of their bid package.

**TOWN OF SIMSBURY**

**Acknowledgement Form  
and  
Charter Section 1103  
Code of the Town of Simsbury**

**ACKNOWLEDGEMENT FORM**

I have read Section 1103 of the Charter of the Town of Simsbury, the Code of Ethics Ordinance, and the Guidelines issued thereunder. I understand my responsibilities as a Contractor retained by the Town of Simsbury, and I am in compliance with the Charter and the Code of Ethics. I have indicated in the space below any areas of conflict should they arise in matters before our board, commission, agency or department, and I agree to report any future conflicts under the provisions of Section 1103 of the Charter.

Areas of Exception

**CONFLICTS OF INTEREST  
SECTION 1103**

**CONFLICTS OF INTEREST.** It is hereby declared to be the policy of the Town that any elected or appointed officer, any member of any board or commission or any employee of the Town who has a financial interest, direct or indirect, in any contract, transaction or decision of any officer or agent of the Town or any board or commission, shall disclose that interest to the Board of Selectmen, which shall record such disclosure upon the official record of its meetings. Such disclosure of a financial interest, direct or indirect, in any contract, transaction or decision of any officer or agent of the town or of any board or commission shall disqualify such elected or appointed official or such member of a board of commission or such town employee from participation in the awarding, assignment or discussion of said contract, transaction or decision. Violation by any such official, board or commission member or employee of the provisions of this section shall be grounds for his/her removal.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Name (Please Print)

\_\_\_\_\_  
Date

A copy of the Town Code is available from the Office of the Town Clerk or is available on line at [http://www.simsbury-ct.gov/sites/simsburyct/files/file/file/towncode\\_1.pdf](http://www.simsbury-ct.gov/sites/simsburyct/files/file/file/towncode_1.pdf)



## Figure 1 - Engineering Inspection Report

### **SILVA ENGINEERING, LLC**

[www.silvaengineering.com](http://www.silvaengineering.com)

**90 Quarry Street, Lower Level  
Willimantic, CT 06226**

*Consulting Engineers*

**Phone: 860.423.4506  
Fax: 860.423.1875**

November 20, 2020  
Silva Project No. 20169.01

Mr. Anthony Piazza  
Superintendent  
Water Pollution Control Authority  
36 Drake Hill Road, Simsbury, CT 06070

Ref: Visual Inspection of Clarifier Basins  
Simsbury Water Pollution Control Facility  
36 Drake Hill Road, Simsbury, CT

Dear Mr. Piazza:

Silva Engineering, LLC (SILVA) has been contracted by the Simsbury Water Pollution Control Authority (SWPCA) to perform a structural inspection of the two reinforced concrete Original Clarifier Basins at the Simsbury Wastewater Treatment Facility (WWTF).

### **SUMMARY**

Our visual inspection of the clarifier basins revealed areas of significant structure distress within the longitudinal walls of the basins. At one location, there was a visible punch through failure of the wall at its connection to the lateral bracing strut. Active inward movement of the wall between the remaining bracing struts was observed, with concentric cracking visible on the interior wall surfaces around each strut at several locations.

Additional evaluation will be required in order to identify the specific causes leading to the observed areas of structural failure. Regardless of the findings from any further studies, it is likely that the clarifier basins will need to undergo significant structural repairs, including removal and replacement of the top portion of the basin walls, and the replacement of the bracing struts. Additional repairs will also be required to address the observed condition of the concrete, particularly areas of significant 1- 1/2 inch deep scaling observed on the slab surfaces of the basins.

We understand that the basins have not been used for several years, and that it is unlikely that they will be used in the future. Therefore, prior to a commencing any significant and potentially costly reconstruction of these basins, it is recommended that the feasibility of abandoning and either filling or removing these structures be evaluated. The work required to abandon the existing structures may be more cost effective in the long term since the future costs required for the maintenance of these inactive structures would be eliminated.

## INTRODUCTION

The scope of our site investigation, which was conducted on October 6 and 7, 2020, was limited to a visual inspection of the inactive Clarifier Basins. These basins are part of an integral structure which includes the inactive Effluent Channel (at the west end) and Pump Chamber (at the east end.) **See Figures No. 1 and No. 2.** The Inlet and Pump Chambers were not inspected and are not part of Silva's scope of services.



Photo Source: CRCOG GIS

**Figure No. 1 - Site of Simsbury Water Pollution Control Facility**

For the purposes of this report, the Clarifiers, Effluent Channel and Pump Chamber are assumed to be oriented lengthwise in a west-to-east direction, and listed overall dimensions are provided only for approximate sizing (unless noted otherwise).

### Available Drawings

The Water Pollution Control Facility was designed in 1970 by Tighe & Bond / George McDonnell Consulting Engineers, and was constructed shortly thereafter. In 2003, modifications and associated repairs were designed by Earth Tech Company. Construction and Design Drawings made available by SWPCA for SILVA's review included the following.

#### *Original Construction Drawings*

- Structural Concrete Steel Reinforcement Drawings, by Tighe & Bond, dated June 1970. These drawings include a layout of the original structure consisting of the Clarifier Basins, Effluent Channel and Pump Chamber.

### *Supplemental Drawings*

- Primary Clarifiers - Modification and Repair Drawings (3A-1, 3A-2, 3S-1, 3M-1, 3M-2, and 3M-3) prepared by Earth Tech Company, dated December 2003.

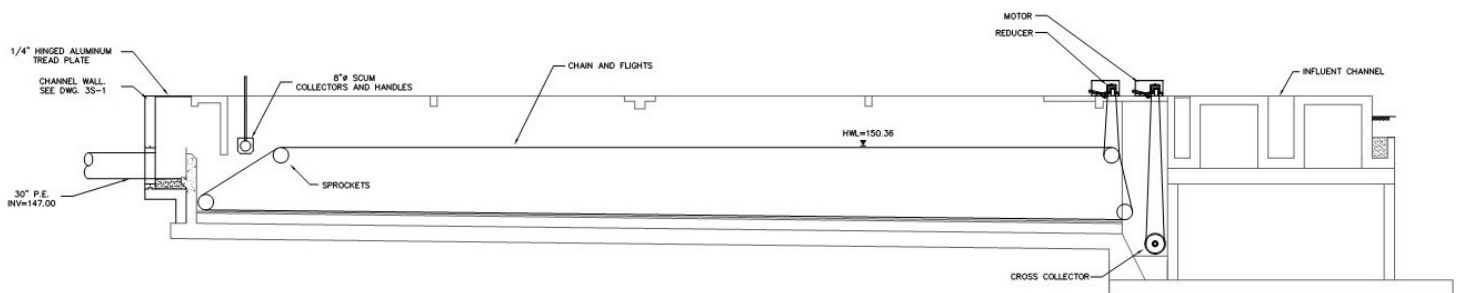
### Site Elements

During our inspection, SILVA observed that a majority of the WWTF site appears to be surrounded by an earthen flood control berm. A section of the berm is located north and parallel with the Primary Clarifier. The top of the berm is approximately 5-feet above the top of the north Clarifier wall, with a 4-inch per foot downward slope to the toe of the berm, which is located approximately 9 feet north of the Primary Clarifiers.

### **DESCRIPTION**

The overall structure consists of an Effluent Channel, dual Clarifier Basins, and a Pump Chamber.

- *Effluent Channel:* This channel is located at the west end of the structure, with inside dimensions of 3.5 feet long x 43-feet wide, and is partially located over the Clarifier Basins. (Not part of Scope of Work)
- *Clarifier Basins:* Two parallel basins are located between the Effluent Channel and the Pump Chamber, with each basin approximately 93 feet long x 20 feet wide, with a floor slab that slopes downward west-to-east ranging approximately 12 feet deep (at the Effluent Channel) to 13 feet deep (at the Pump Chamber.) The slab also drops an additional 5 feet in depth adjacent to the Pump Chamber (which accommodated full-width horizontal screw conveyors.)
- *Pump Chamber:* This chamber is at the east end of the structure. For concept purposes, this Chamber is approximately 22 feet wide x 43 feet long, and 18 feet deep. (Not part of Scope of Work)



**Figure No. 2 – Cross Section (looking North)**

The Clarifier Basin includes the following structural reinforced concrete components and accessories:

- *Base Slab*, which slopes from west-to-east. This slab provides the base support for the north, south and center reinforced concrete walls.
- *Longitudinal Walls* (north, south and center), which vary in height from 12'-4" at the west end to 13'-4" at the east end.
- *Top Slabs* located at the west and east end of the Basins. The west slab is adjacent to the Effluent Channel and its associated aluminum tread plate for access to the channel. The east slab is adjacent to the Pump Chamber and Headhouse.
- *Bracing Struts* at the mid-point and quarter points of the Clarifier Basin. The mid-point bracing strut is in a T-shaped configuration (which accommodates a reinforced concrete catwalk.) And the two quarter point bracing struts are rectangular in shape.
- *1" Wide Vertical Expansion Joint* is located east of the Center Bracing Strut and is in the north, center and south longitudinal walls.

#### 2003 / 2004 Concrete Repairs

Supplemental Drawings that were provided included the following repairs to the Clarifier Basins as part of an overall repair / modification project for the WWTF.

- Epoxy crack injections for cracks greater than 1/4" wide.
- Removing and replacing joint sealant.
- Removing and repairing unsound, loose / hollow concrete.
- Repairing exposed steel reinforcement.

#### **OBSERVATIONS**

During our inspection we observed the conditions described below. Refer to the attached Sketches SK-01 through SK-07 and Photographs for additional information.

General Deterioration. The following summarizes observed structure conditions related to exposure of concrete to environmental factors.

##### *Structural Reinforced Concrete Slabs over Top of Clarifier Basins*

- The concrete slab surfaces (adjacent to the Effluent Channel and Pump Chamber) include areas of map cracking and light surface scaling. At several locations, surface patches / repairs in the concrete slab appear to be loose or hollow.
- The concrete surfaces of the catwalk slab at the center strut includes areas of surface scaling and exposed shallow steel reinforcement. The underside of the T-shaped strut also includes exposed stirrup reinforcement with concrete pop-outs.

##### *Structural Reinforced Concrete Walls*

- The concrete surfaces along the top of the basin walls include intermittent vertical shrinkage cracks.



*Structural Reinforced Concrete Slab at Bottom of Clarifier Basins*

- The floor slab surface includes areas of severe scaling (maximum measured depth of approximately 1-1/2 inches.) Standing water and vegetation was present in large areas of the basin floor slabs.

Structural Deficiencies of Reinforced Concrete Walls

Signs of visible active lateral displacement were observed near the top of the north and south longitudinal walls. This wall displacement is most notable at the mid-point between the reinforced concrete bracing struts, and at the wall segment immediately east of the expansion joint. Attached Sketch SK-07 documents locations of structural distress related to the lateral displacement of the walls.

- Dimensions between North-to-Center and Center-to-South longitudinal walls were taken every 5 feet along the walls. These dimensions are included in the Tables shown in Sketch SK-07. In general, the measurements indicate varying degrees of inward wall movement between lateral bracing struts.
- Displacement of the unbraced top of wall segment located east of the expansion joint was measured relative to the wall on the west side of the joint, which is braced by the center strut. The measured displacement was as follows.

North Wall: 9/16 inch

South Wall: 1 inch

The top of the south wall adjacent to the expansion joint included patching repairs which were completed in 2003. Spalling was observed around the patch, indicating active movement of the wall since the repairs were completed. The spalled concrete exposed a horizontal steel pin that is embedded into the original concrete on both sides of the expansion joint. The exposed steel pin was bent inward on the east side, indicating significant differential wall movement.

The north wall likely also includes a similar pin as the south wall. The top of the wall immediately adjacent to the expansion joint sounded hollow when struck with a hammer, likely due to the movement of the pin popping the surrounding concrete.

South wall concentric cracking was visible around each bracing strut and indicates areas of high tensile stress in the concrete, likely caused by the differential displacement of the wall between the struts.

Significant shear failure was observed in the top of the south wall on each side of the west bracing strut connection. Additionally, visible punching shear failure occurred to the longitudinal wall at the bracing strut connection. Similar but less significant punching shear distress was also observed in the north longitudinal wall at the east and west bracing strut connections.

## EVALUATION

The shear failure of the south longitudinal wall at the west bracing strut is of significant concern. The west bracing strut is no longer effective and does not provide adequate bracing to the top of the westerly half of the south longitudinal wall.

On the east side of the expansion joint, it appears that only bracing of the top of the wall was provided by a steel pin. On the south side, a pin was observed to be bent and the longer effective. On the north side, the concrete surrounding the presumed pin is hollow and does not provide adequate confinement of the pin.

A review of the 1970 Construction Drawings appear to show that the Clarifier Basin north, center and south longitudinal reinforced concrete walls were designed to resist bending moments at the base connection with the reinforced concrete slab. It is however, unlikely that these walls were designed to be cantilever walls that do not rely on the restraint provided by the bracing struts.

As such, without effective bracing along the top of a significant portion of the longitudinal walls, it is very likely that inward displacement of these walls will continue until complete failure occurs.

Damage to the longitudinal wall bracing system may have been caused by unforeseen unbalanced forces acting externally on the north and south longitudinal walls of the Clarifier Basins. Further analysis will be required in order to identify the specific causes resulting in the concrete distress. Such an analysis will need to investigate and determine the following:

- Actual in-place concrete strength.
- Ability of the connection of the longitudinal wall and the concrete slab to resist bending moments.
- Ability of the longitudinal walls without bracing struts to support the backfill soil pressures.
- Ability of the top of the wall to transfer soil loads to the bracing struts (if required.)
- Effect of the potential unbalanced surcharge pressures from the earthen berm to the Clarifier Basin structure.
- Potential effects of clay backfill from the berm acting on the north Clarifier Basin structure.
- Effects of potential Live Load surcharges on the south longitudinal wall from vehicles using the service road.

## **RECOMMENDATIONS**

Our visual inspection of the clarifier basins revealed areas of significant structure distress within the longitudinal walls of the basins. Of significant concern is the visible punch through failure of the south longitudinal wall at its connection to the west lateral bracing strut. Another area of concern is the inward movement of the north and south foundation walls immediately to the east of the wall vertical expansion joints. If not repaired is likely that the north and south longitudinal walls of the basin will continue to moving inward until complete failure occurs.

Additional evaluation will be required in order to identify the specific causes leading to the observed areas of structural failure. Regardless of the findings from any further studies, it is likely that the clarifier basins will need to undergo significant structural repairs, including removal and replacement of the top portion of the basin walls as well as the replacement of the bracing struts.

Because the basins have not been used for several years, and will unlikely be used in the future, we recommend that the feasibility of abandoning and filling or removing these structures be evaluated prior to commencing any repairs the structure.

We are available to discuss our findings with the Simsbury Water Pollution Control Authority at your convenience. Please contact this office if you have any questions.

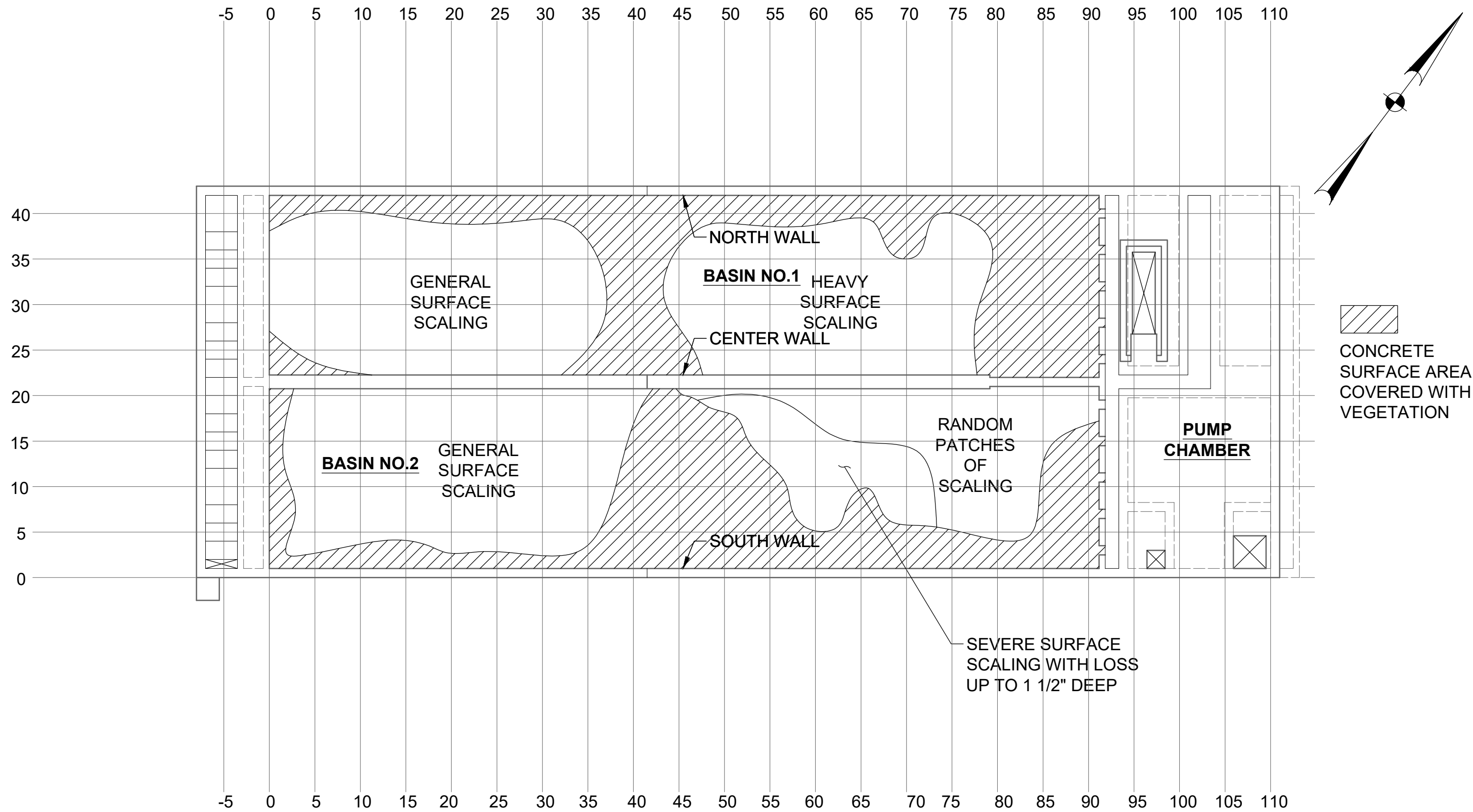
Sincerely,

SILVA ENGINEERING, LLC

James L. Silva, P. E.  
Principal

Enclosure:  
Sketches SK-01 through SK-07  
Photographs





# SLAB GENERAL CONDITION PLAN

SCALE: 3/32" = 1'-0"

## STRUCTURAL ASSESSMENT OF CLARIFIER

SIMSBURY WATER POLLUTION CONTROL AUTHORITY

36 DRAKE HILL RD

SIMSBURY, CT

DRAWN BY: PF

NOVEMBER 16, 2020

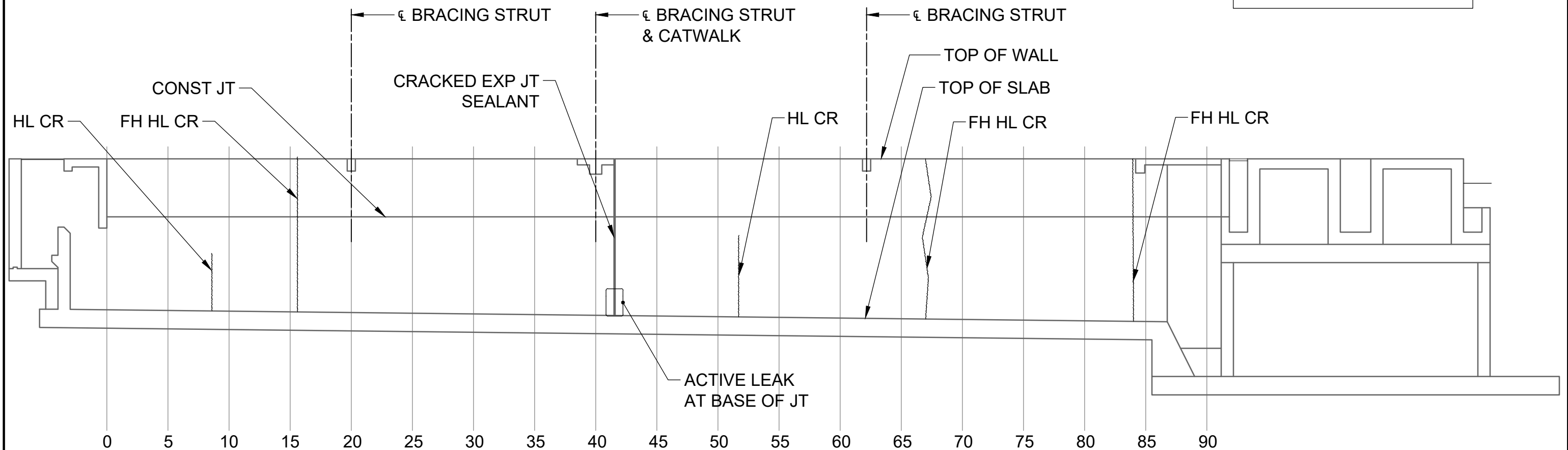
SKETCH SK-02



#### ABBREVIATIONS

CONST:  
CONSTRUCTION  
CR: CRACK  
EXP: EXPANSION  
FH: HULL HEIGHT  
HL: HAIRLINE  
JT: JOINT  
VF: VERY FINE

#### PHOTOGRAPHIC DEPICTION OF WALL



### BASIN NO. 1 - NORTH WALL ELEVATION

SCALE: 1/8" = 1'-0"

#### STRUCTURAL ASSESSMENT OF CLARIFIER

SIMSBURY WATER POLLUTION CONTROL AUTHORITY  
36 DRAKE HILL RD  
SIMSBURY, CT

DRAWN BY: PF

NOVEMBER 16, 2020

SKETCH SK-03



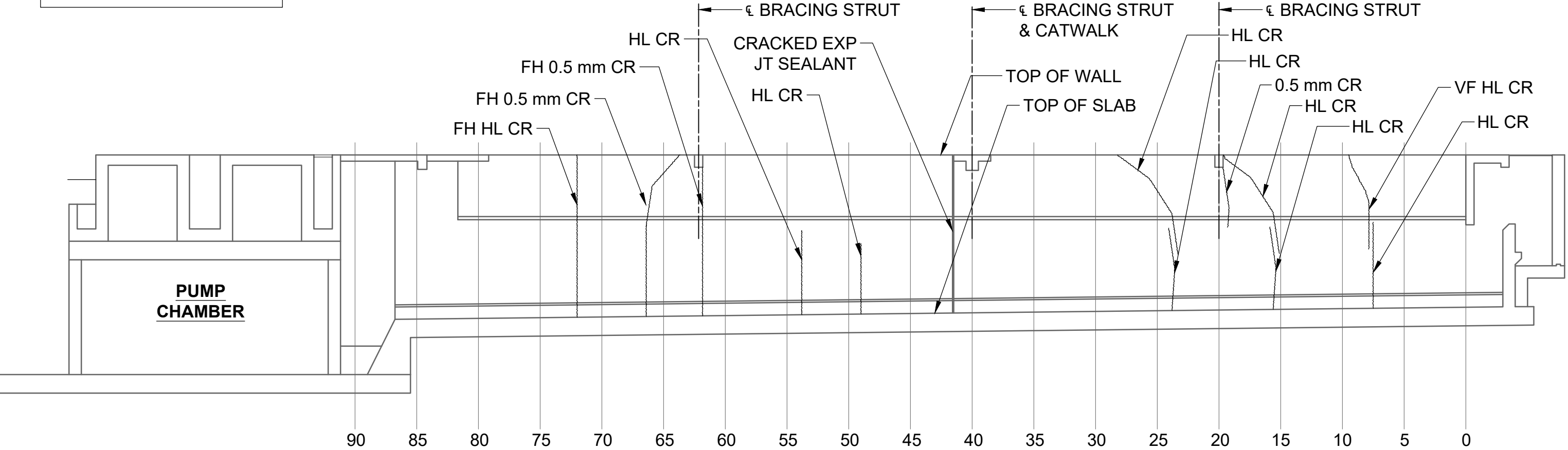


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**PHOTOGRAPHIC DEPICTION OF WALL**



NOTE:  
EXPOSED FOR TIES ARE PRESENT THROUGHOUT

**BASIN NO. 1 - CENTER WALL ELEVATION**

SCALE: 1/8" = 1'-0"

**STRUCTURAL ASSESSMENT OF CLARIFIER**

SIMSBURY WATER POLLUTION CONTROL AUTHORITY  
36 DRAKE HILL RD  
SIMSBURY, CT

DRAWN BY: PF

NOVEMBER 16, 2020

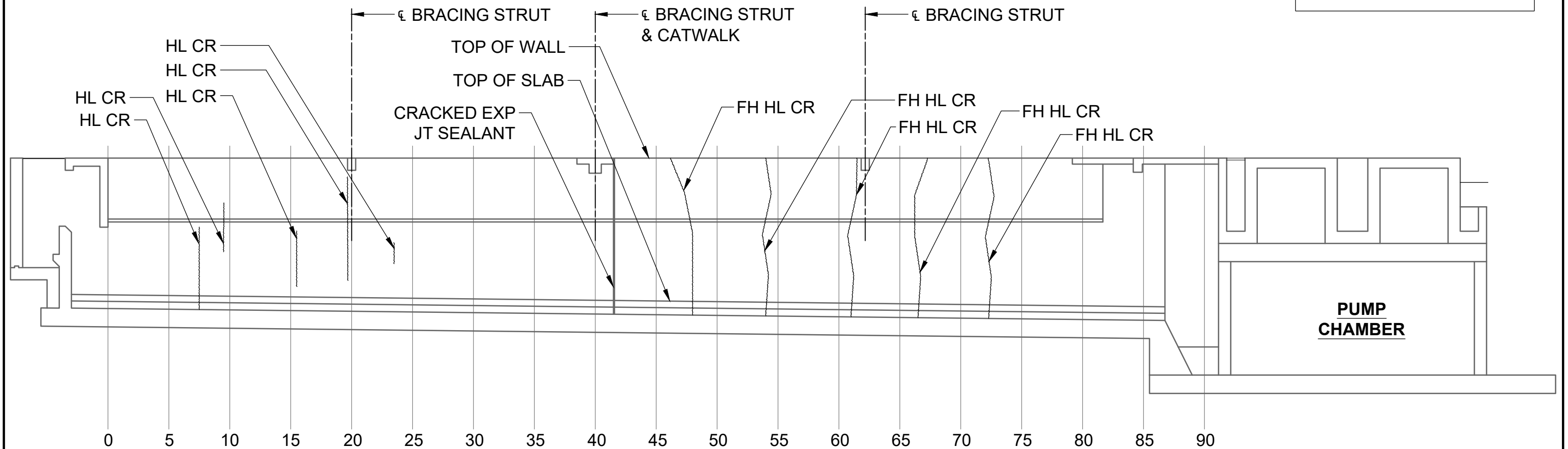
SKETCH SK-04





**PHOTOGRAPHIC DEPICTION OF WALL**

ABBREVIATIONS	
CONST:	CONSTRUCTION
CR:	CRACK
EXP:	EXPANSION
FH:	HULL HEIGHT
HL:	HAIRLINE
JT:	JOINT
VF:	VERY FINE



# **BASIN NO. 2 - CENTER WALL ELEVATION**

SCALE: 1/8" = 1'-0"

## **STRUCTURAL ASSESSMENT OF CLARIFIER**

SIMSBURY WATER POLLUTION CONTROL AUTHORITY  
36 DRAKE HILL RD  
SIMSBURY, CT

DRAWN BY: PF

NOVEMBER 16, 2020

SKETCH SK-05

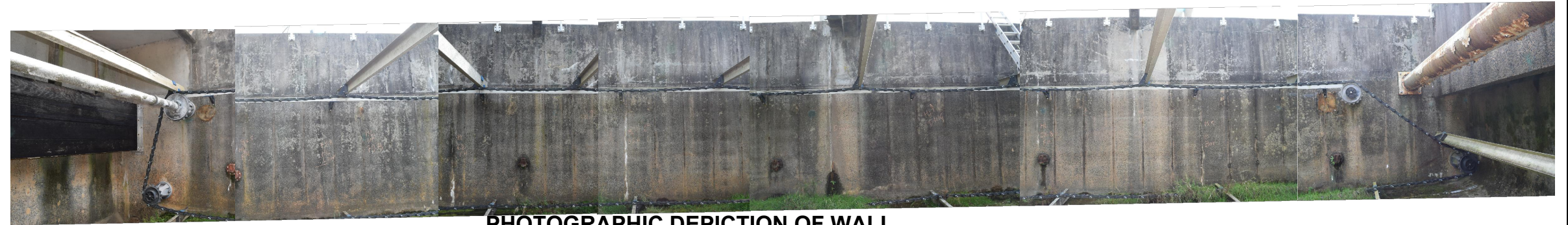
**SILVA ENGINEERING, LLC**  
Civil & Structural Engineering Services

90 Quarry Street, Lower Level, Willimantic, CT 06226  
Phone: (860) 423-4506 Fax: (860) 423-1875  
www.silvaengineering.com

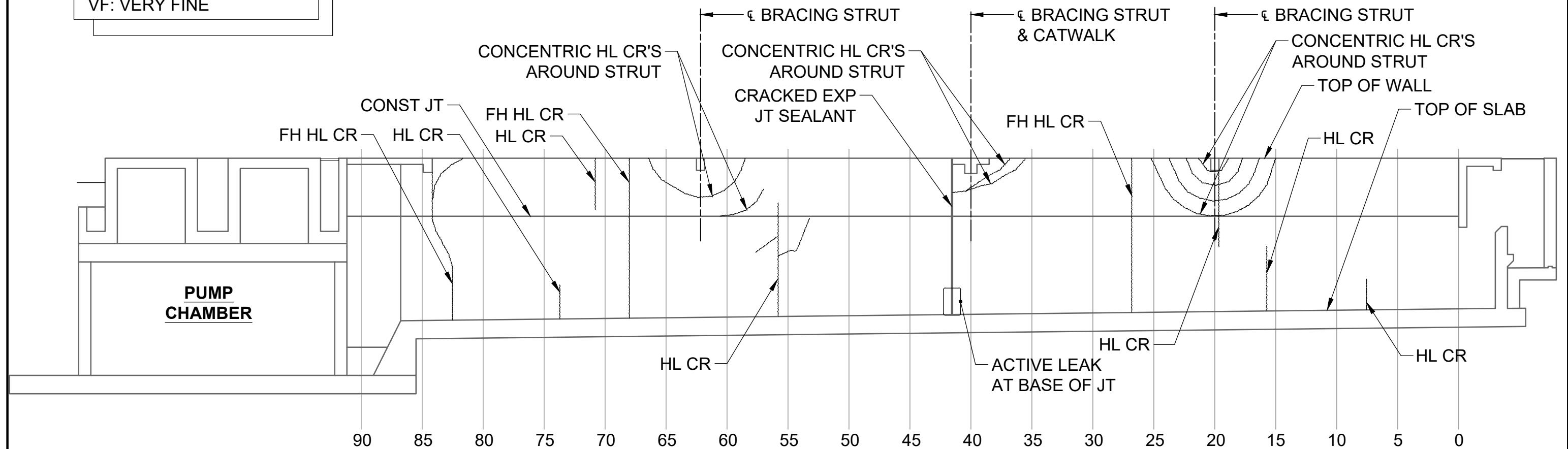


### ABBREVIATIONS

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EXP: EXPANSION  
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VF: VERY FINE



**PHOTOGRAPHIC DEPICTION OF WALL**



## **BASIN NO. 2 - SOUTH WALL ELEVATION**

SCALE: 1/8" = 1'-0"

### STRUCTURAL ASSESSMENT OF CLARIFIER

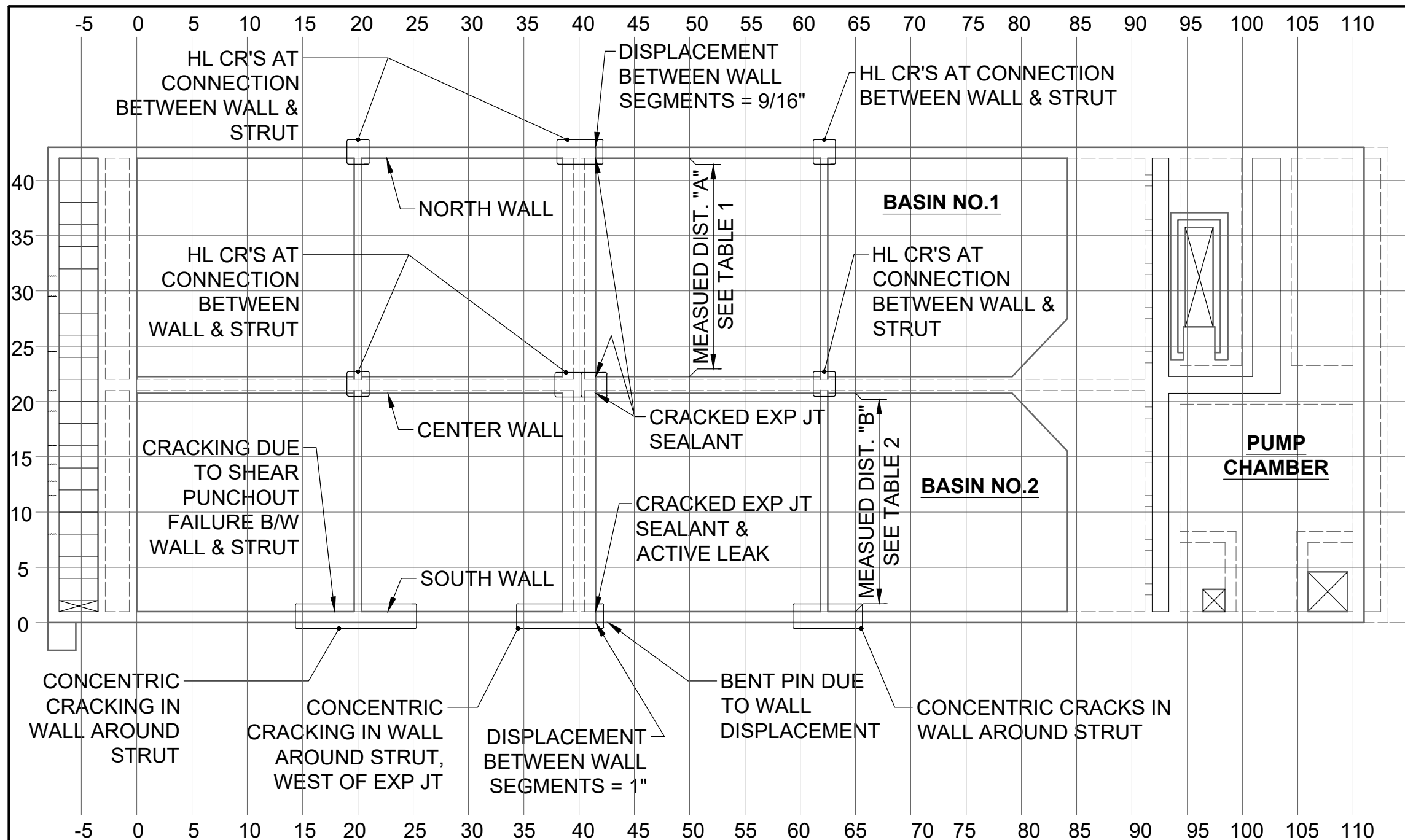
SIMSBURY WATER POLLUTION CONTROL AUTHORITY  
36 DRAKE HILL RD  
SIMSBURY, CT

DRAWN BY: PF

NOVEMBER 16, 2020

SKETCH SK-06

  
**SILVA ENGINEERING, LLC**  
Civil & Structural Engineering Services  
90 Quarry Street, Lower Level, Willimantic, CT 06226  
Phone: (860) 423-4506 Fax: (860) 423-1875  
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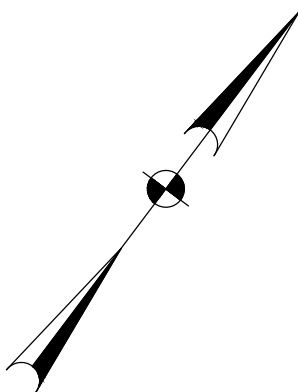


## STRUCTURAL DEFICIENCY PLAN

SCALE: 3/32" = 1'-0"

### ABBREVIATIONS

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EXP: EXPANSION  
FH: HULL HEIGHT  
HL: HAIRLINE  
JT: JOINT  
VF: VERY FINE



### NOTE

TABLES 1 & 2 SHOW MEASURED HORIZONTAL DISTANCE FROM CENTER WALL TO NORTH AND SOUTH WALLS, RESPECTIVELY. DISTANCES ARE SHOWN AT 5 FT INCREMENTS ALONG TOP OF WALL. TABULATED DEVIATION IS THE DIFFERENCE BETWEEN THE MEASURED DISTANCE AND THE DESIGN DISTANCE OF 19.75 FT.

TABLE 1 - MEASURED DISTANCE "A" BETWEEN WALLS - BASIN NO. 1

LOCATION	MEASUREMENT	DEVIATION
0'	19.794'	0.528"
5'	19.828'	0.936"
10'	19.854'	1.248"
15'	19.844'	1.128"
20'	19.852'	1.224"
25'	19.831'	0.972"
30'	19.862'	1.344"
35'	19.859'	1.308"
STRUT - WEST	19.854'	1.248"
STRUT - EAST	19.742'	-0.096"
45'	19.737'	-0.156"
50'	19.755'	0.060"
55'	19.758'	0.096"
60'	19.781'	0.372"
65'	19.794'	0.528"
70'	19.779'	0.348"
75'	19.792'	0.504"
80'	19.794'	0.528"

TABLE 2 - MEASURED DISTANCE "B" BETWEEN WALLS - BASIN NO. 2

LOCATION	MEASUREMENT	DEVIATION
0'	19.823'	0.876"
5'	19.797'	0.564"
10'	19.786'	0.432"
15'	19.747'	-0.036"
20'	19.805'	0.660"
25'	19.740'	-0.120"
30'	19.729'	-0.252"
35'	19.714'	-0.432"
STRUT - WEST	19.734'	-0.192"
STRUT - EAST	19.677'	-0.876"
45'	19.695'	-0.660"
50'	19.698'	-0.624"
55'	19.727'	-0.276"
60'	19.750'	0"
65'	19.781'	0.372"
70'	19.740'	-0.120"
75'	19.740'	-0.120"
80'	19.674'	-0.912"

## STRUCTURAL ASSESSMENT OF CLARIFIER

SIMSBURY WATER POLLUTION CONTROL AUTHORITY

36 DRAKE HILL RD

SIMSBURY, CT

DRAWN BY: PF

NOVEMBER 16, 2020

SKETCH SK-07



## SITE INVESTIGATION PHOTOGRAPHS

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### EXTERIOR PHOTOS



#### Photo 1– General View

General view of the clarifier looking towards the east from the northwest corner.



## SITE INVESTIGATION PHOTOGRAPHS

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**Photo 2 – Cracked Joint Sealant**

View of cracked joint sealant between the clarifier and a concrete pad at the southwest corner of the clarifier.

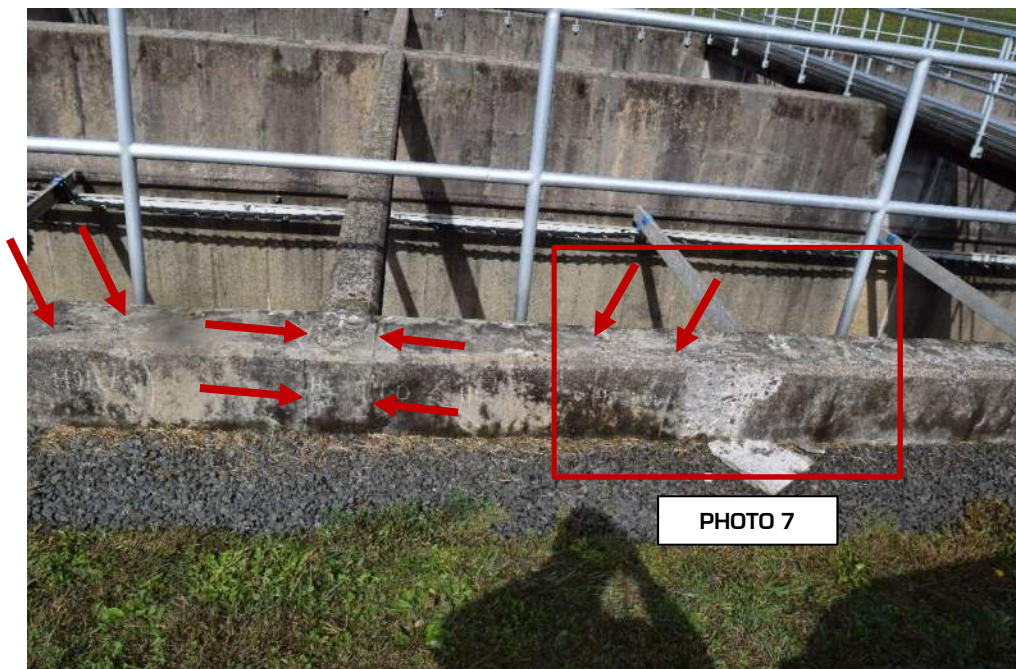
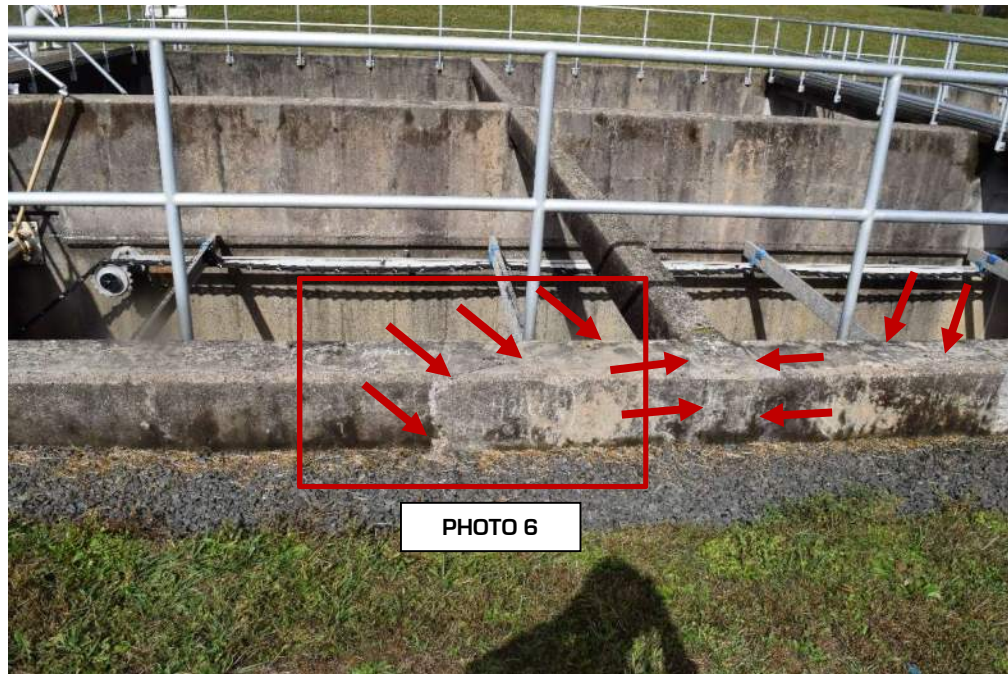


**Photo 3 – Clarifier Top Slab – West End (Looking North)**

View of the top of the top slab on the west end of the clarifier. Top of slab includes surface scaling with shallow patches and map cracks.



## SITE INVESTIGATION PHOTOGRAPHS



**Photo 4 & 5 – South Wall of Basin No. 2 at West Bracing Strut (Looking North)**  
Shear cracks in the South Wall of Basin No. 2 on each side of the West Bracing Strut, and punching shear cracks along the perimeter of the Bracing Strut.



## SITE INVESTIGATION PHOTOGRAPHS

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**Photo 6 – South Wall of Basin No. 2 at West Bracing Strut (Looking East)**

Shear cracks in the South Wall of Basin No. 2 on each side of the West Bracing Strut, and punching shear cracks along the perimeter of the Bracing Strut.



## SITE INVESTIGATION PHOTOGRAPHS

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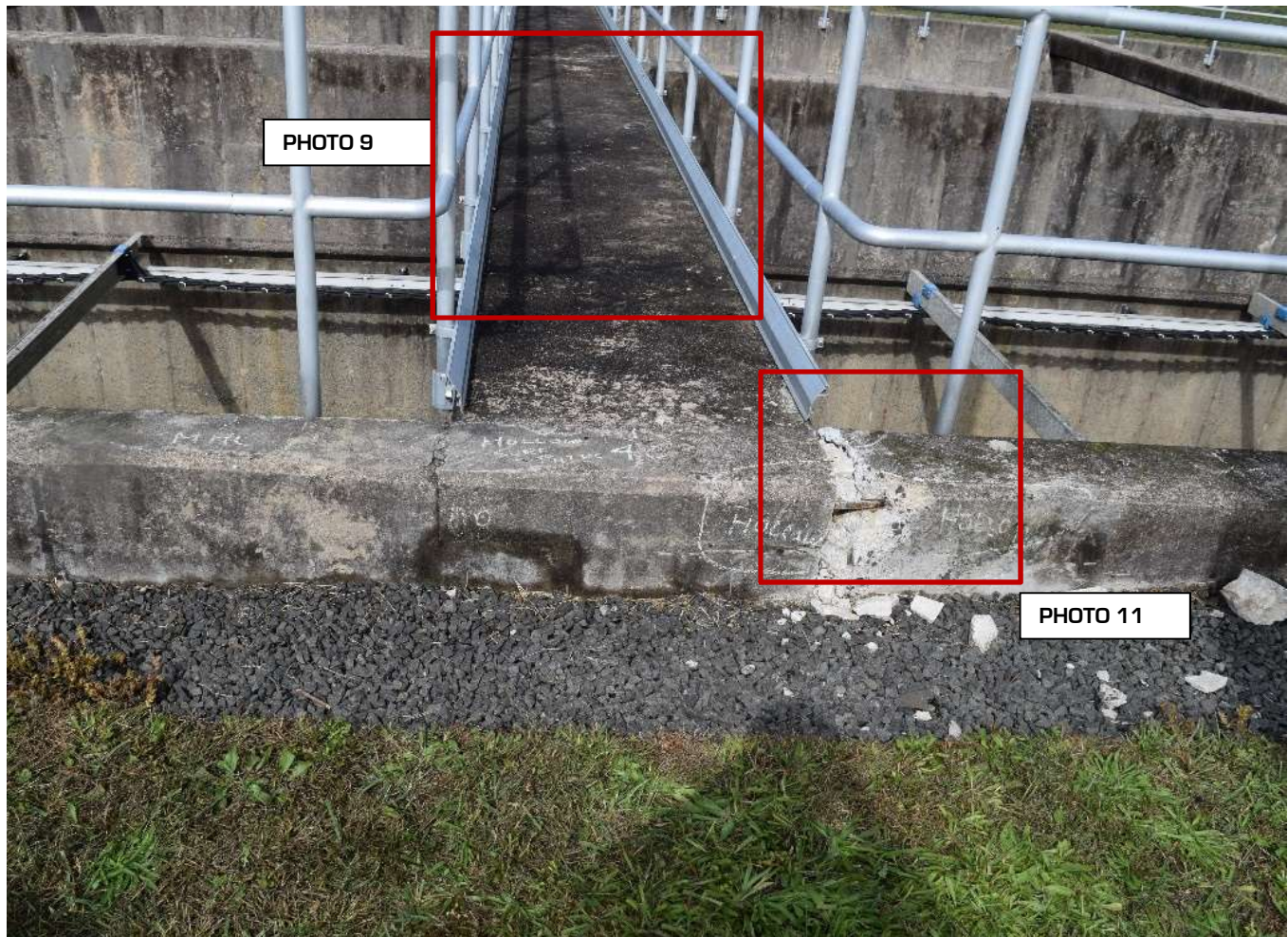


**Photo 7 – South Wall of Basin No. 2 at West Bracing Strut (Looking West)**  
Shear cracks in the South Wall of Basin No. 2 on each side of the West Bracing Strut, and punching shear cracks along the perimeter of the Bracing Strut.



## SITE INVESTIGATION PHOTOGRAPHS

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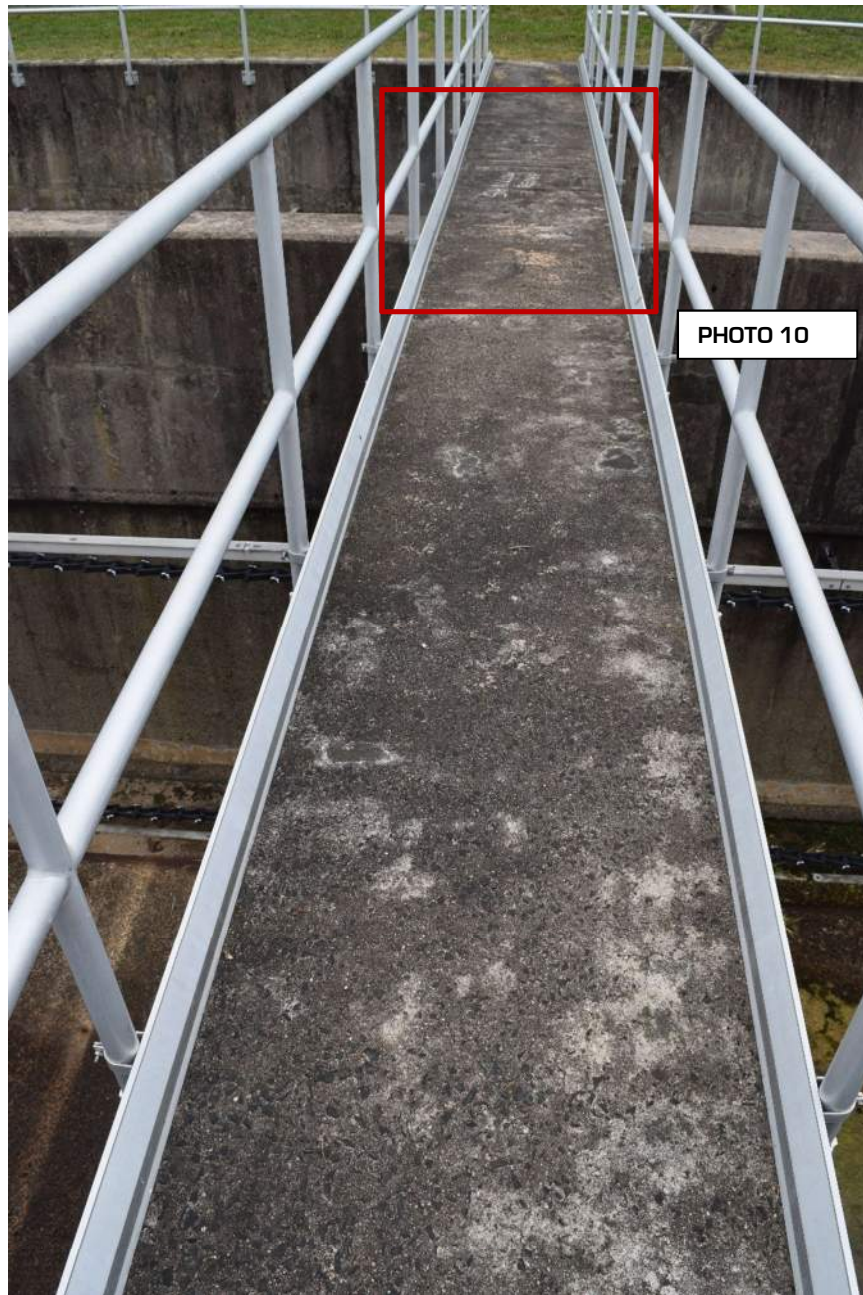


**Photo 8 – South Wall of Basin No. 2 at Center Bracing Strut/Catwalk (Looking North)**  
General view of the connection between the Center Bracing Strut/Catwalk and the South Wall of Basin No 2. Note cracked concrete patch on east side of the Catwalk at Expansion Joint.



## SITE INVESTIGATION PHOTOGRAPHS

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**Photo 9 – Center Bracing Strut/Catwalk (Looking North)**  
Areas of surface scaling on Catwalk.

## SITE INVESTIGATION PHOTOGRAPHS

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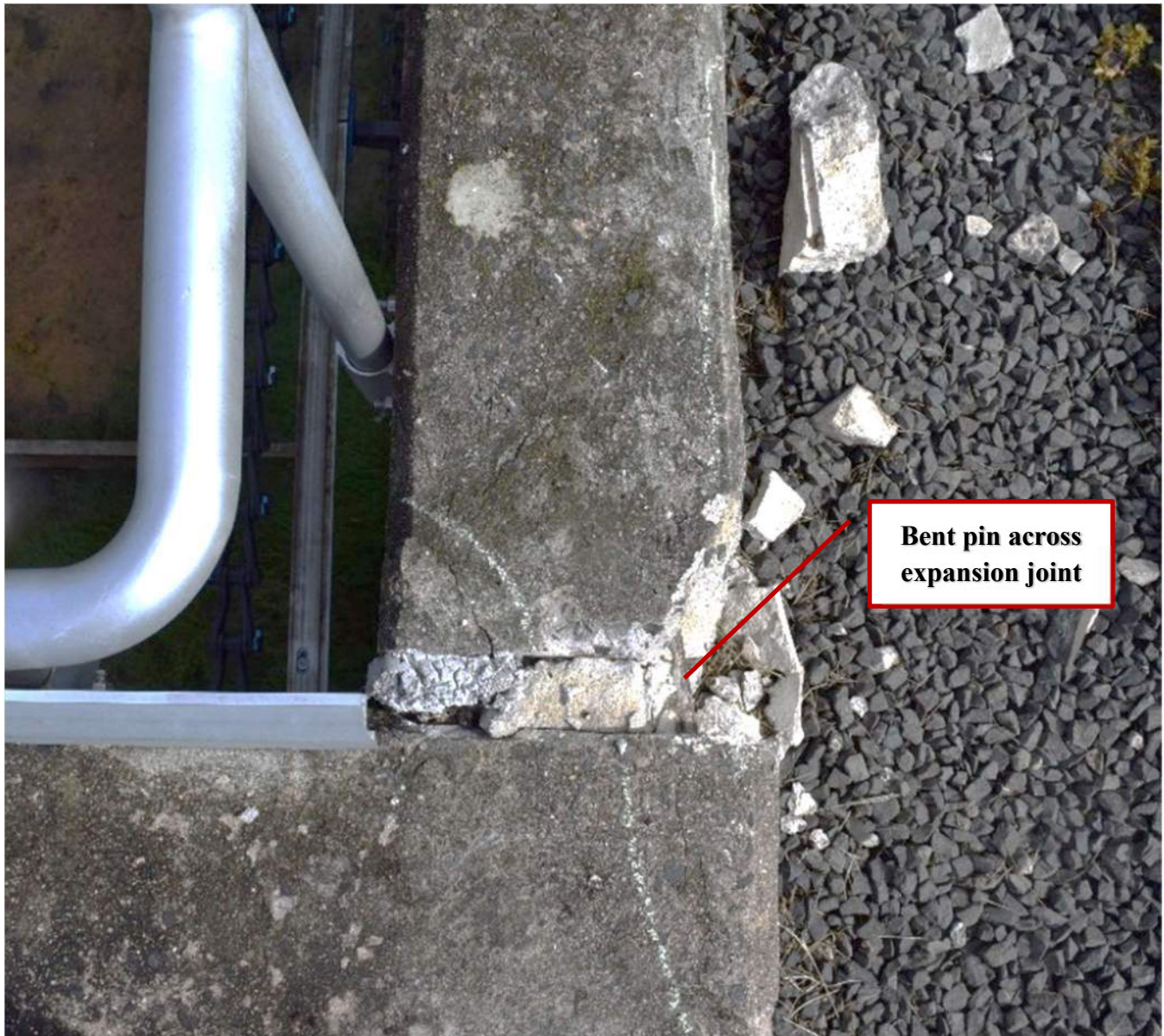


**Photo 10 – Center Bracing Strut/Catwalk (Looking North)**  
View of exposed shallow reinforcement at the top of the Center Bracing Strut/Catwalk.



## SITE INVESTIGATION PHOTOGRAPHS

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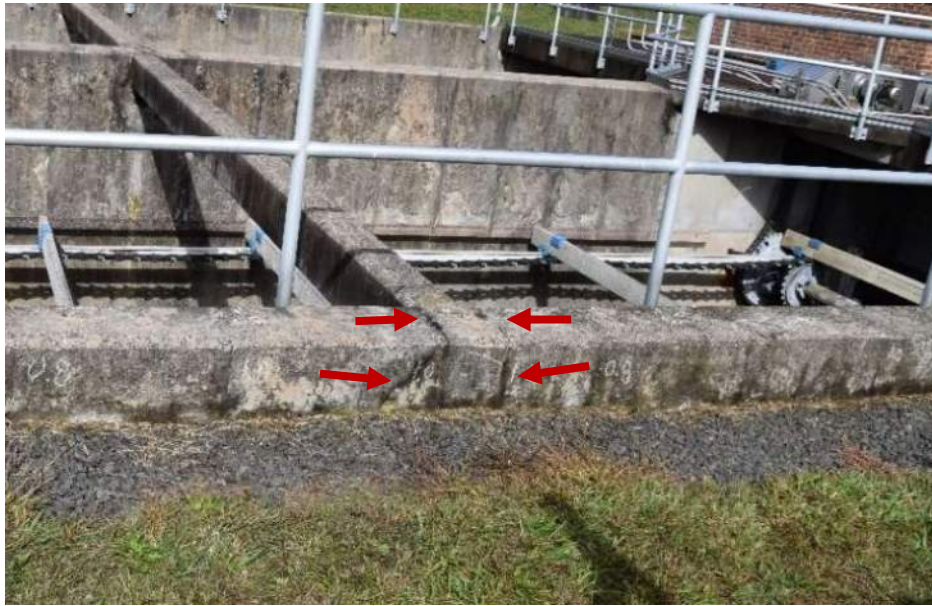
**Photo 11 – South Wall of Basin No. 2 at Expansion Joint**  
(East of Center West Bracing Strut/Catwalk)

Broken concrete patch, hollow areas of concrete, and bent pin at top of South Wall due to lateral displacement of the unbraced portion of South Wall on east side of Expansion Joint.

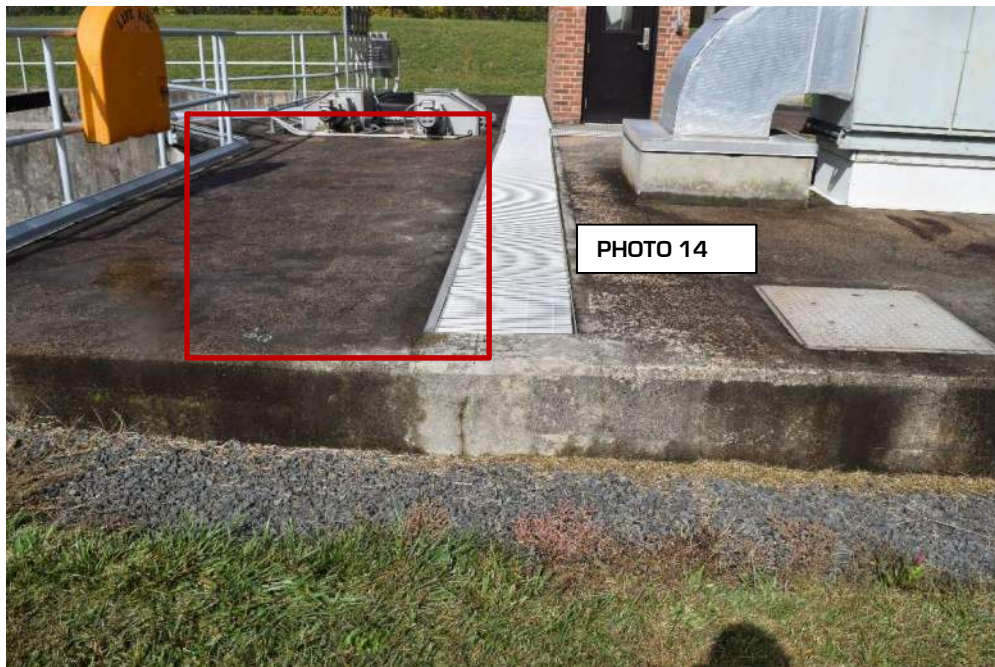


## SITE INVESTIGATION PHOTOGRAPHS

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**Photo 12 – South Wall of Basin No. 2 at East Bracing Strut (Looking North)**  
Punching shear cracks along the perimeter of the Bracing Strut.



**Photo 13 – Clarifier Top Slab – East End (Looking North)**  
General view of the top slab on the east end of the clarifier.

## SITE INVESTIGATION PHOTOGRAPHS

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**Photo 14 – Clarifier Top Slab – East End (Looking North)**

Close-up view of the top slab at the east end of the clarifier. Top of slab includes surface scaling and areas of map cracks.



## SITE INVESTIGATION PHOTOGRAPHS

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**Photo 15 – Clarifier Top Slab – West End (Looking South)**

View of the top of the top slab on the west side end of the clarifier. Top of slab includes surface scaling with shallow patches and map cracks.



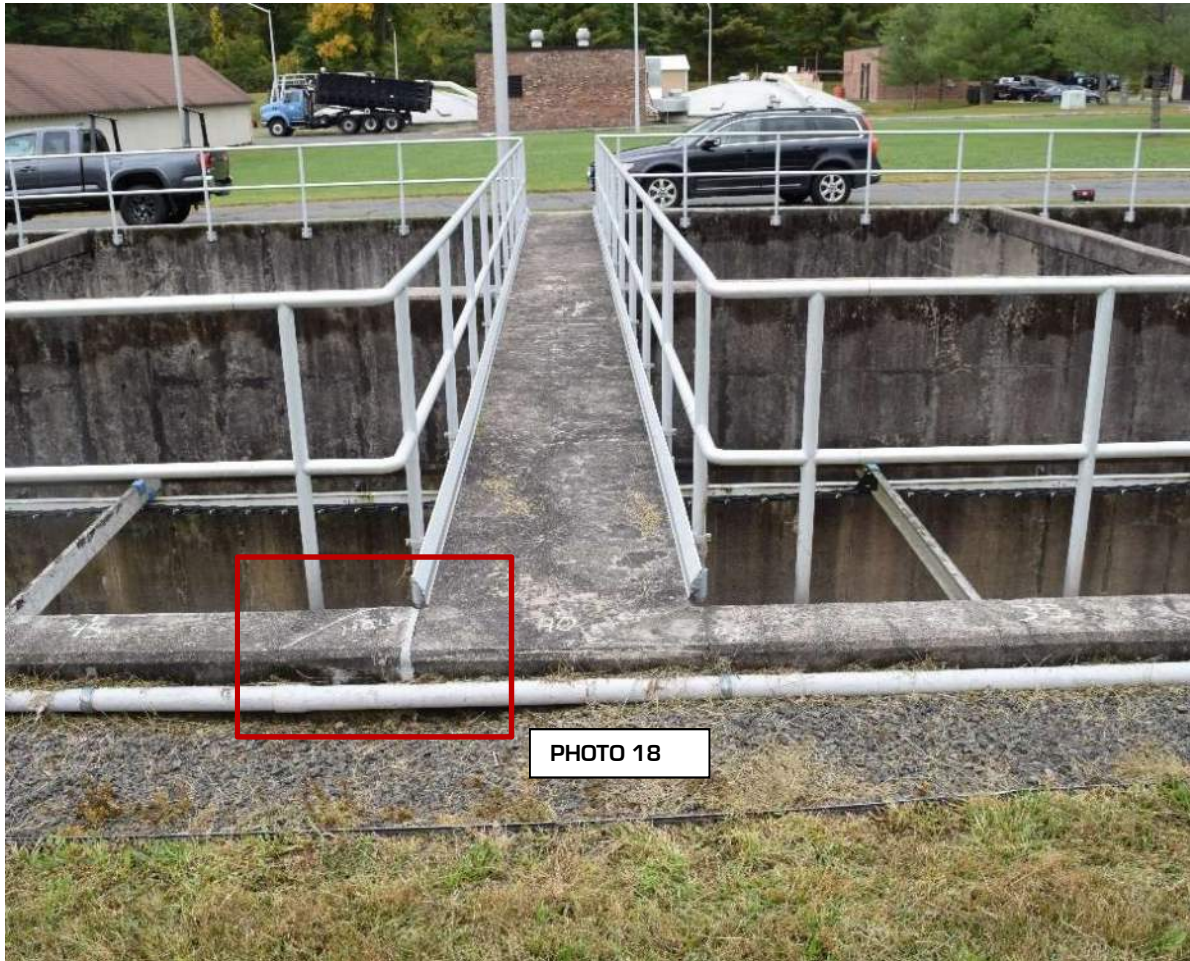
**Photo 16 – North Wall of Basin No. 1 at West Bracing Strut (Looking South)**

Punching shear cracks along the perimeter of the Bracing Strut.



## SITE INVESTIGATION PHOTOGRAPHS

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**Photo 17 – North Wall of Basin No. 1 at Center Bracing Strut/Catwalk (Looking South)**  
General view of the connection between the Center Bracing Strut/Catwalk and the North Wall of Basin No 1. Note hollow area of concrete on east side catwalk at Expansion Joint marked with chalk.



## SITE INVESTIGATION PHOTOGRAPHS

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**Photo 18 – North Wall of Basin No. 1 at Expansion Joint**  
(East of Center West Bracing Strut/Catwalk)

Hollow area of concrete at top of North Wall due to lateral displacement of the unbraced portion of North Wall on east side of Expansion Joint.



## SITE INVESTIGATION PHOTOGRAPHS

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**Photo 19 – North Wall of Basin No. 1 at East Bracing Strut (Looking South)**  
Punching shear cracks along the perimeter of the Bracing Strut.



**Photo 20 – Clarifier Top Slab – East End (Looking South)**  
General view of the top slab on the east end of the clarifier.

## SITE INVESTIGATION PHOTOGRAPHS

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**Photo 21 – Center Wall between Clarifier Basins 1 and 2 (Looking West)**

General view of the Center Wall between Basin No. 1 (to the right) and Basin No. 2 (to the left).

## INTERIOR PHOTOS



**Photo 22 – Clarifier Basin No. 2 Interior (Looking West)**

General view of the interior of Basin No. 2. Areas of heavy scaling and vegetation growth on concrete slab.



## SITE INVESTIGATION PHOTOGRAPHS

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**Photo 23 – South Wall of Basin No. 2 at West Bracing Strut – (Looking South)**

View of the connection of the West Bracing Strut to the South Wall of Basin No. 2. Concentric cracks are visible at the top of the wall surrounding the strut, indicating areas of high stress in the concrete at the top of the wall.



**Photo 24 – South Wall of Basin No. 2 at West Bracing Strut – (Looking West)**

View showing concentric cracking around the West Bracing Strut at the South Wall of Basin No. 2, and of punch-trough failure of the strut at the connection with the wall.

## SITE INVESTIGATION PHOTOGRAPHS



**Photo 25 – South Wall of Basin No. 2 at West Bracing Strut – (Looking South)**  
Punch-trough failure of the strut at the connection with the wall.



**Photo 26 – South Wall of Basin No. 2 at Center Bracing Strut/Catwalk – (Looking South)**  
Connection of the Center Bracing Strut/Catwalk to the South Wall of Basin No. 2. Concentric cracking is visible around the strut on the west side of the Expansion Joint, where the wall is restrained by the strut. On the east side of the Expansion Joint, the wall is unrestrained at the top, and has displaced inward approximately 1 inch.



## SITE INVESTIGATION PHOTOGRAPHS

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**Photo 27 – Expansion Joint at South Wall of Basin No. 2**

View of the Expansion Joint showing failed joint sealant and 1-inch lateral displacement of the unrestrained wall on the east side of the joint.



**Photo 28 – South Wall of Basin No. 2 at East Bracing Strut – (Looking South)**

View of the connection of the East Bracing Strut to the South Wall of Basin No. 2. Concentric cracks are visible at the top of the wall surrounding the strut, indicating areas of high stress in the concrete at the top of the wall.

## SITE INVESTIGATION PHOTOGRAPHS

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**Photo 29 – Center Wall of Basin No. 2 at West Bracing Strut – (Looking North)**  
General view of the connection between the West Strut and the Center Wall of Basin No. 2. Slight cracking was observed at the connection of the strut to the wall.



Expansion  
Joint

**Photo 30 – Center Wall of Basin No. 2 at Center Bracing Strut/Catwalk – (Looking North)**  
General view of the connection between the Center Strut and the Center Wall of Basin No. 2 showing failed Expansion Joint Sealer.



## SITE INVESTIGATION PHOTOGRAPHS

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**Photo 31 – Underside of Center Strut/Catwalk – Basin No. 2 – (At connection with Center Wall)**  
View of exposed reinforcement on the underside of the Center Strut/Catwalk above Basin No. 2.

## SITE INVESTIGATION PHOTOGRAPHS

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**Photo 32 – Center Wall of Basin No. 2 at East Bracing Strut – (Looking North)**  
General view of the connection between the East Strut and the Center Wall of Basin No. 2. Slight cracking was observed at the connection of the strut to the wall.



**Photo 33 – Clarifier Basin No. 1 Interior (Looking West)**  
General view of the interior of Basin No. 1. Areas of heavy surface scaling on concrete slab.



## SITE INVESTIGATION PHOTOGRAPHS

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**Photo 34 – Center Wall of Basin No. 1 at West Bracing Strut – (Looking South)**  
General view of the connection between the West Strut and the Center Wall of Basin No. 1. Slight cracking was observed at the connection of the strut to the wall.



**Photo 35 – Center Wall of Basin No. 1 at Center Bracing Strut/Catwalk – (Looking South)**  
General view of the connection between the Center Strut and the Center Wall of Basin No. 2 showing failed Expansion Joint Sealer.

## SITE INVESTIGATION PHOTOGRAPHS

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**Photo 36 – Center Wall of Basin No. 1 at East Bracing Strut – (Looking South)**  
General view of the connection between the East Strut and the Center Wall of Basin No. 1. Slight cracking was observed at the connection of the strut to the wall.



**Photo 37 – North Wall of Basin No. 1 at West Bracing Strut – (Looking North)**  
General view of the connection of the West Bracing Strut to the North Wall of Basin No. 1.



## SITE INVESTIGATION PHOTOGRAPHS

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**Photo 38 – Connection of North Wall of Basin No. 1 to West Bracing Strut**  
Punching shear cracks along the perimeter of the bracing strut.



**Photo 39 – North Wall of Basin No. 1 at Center Bracing Strut/Catwalk – (Looking North)**  
General view of the connection between the Center Bracing Strut/Catwalk and the North Wall of Basin No. 1.



## SITE INVESTIGATION PHOTOGRAPHS

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**Photo 40 – Underside of Center Strut/Catwalk – Basin No. 1 – (At connection with North Wall)**  
View of exposed reinforcement on the underside of the Center Strut/Catwalk above Basin No. 1.

## SITE INVESTIGATION PHOTOGRAPHS

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**Photo 41– Underside of Center Strut/Catwalk – Basin No. 1** (Looking East at Misdpan of Strut)  
Visible exposed reinforcement with concrete pop-out.



**Photo 42 – North Wall of Basin No. 1 at Center Bracing Strut/Catwalk**  
Connection of the Center Bracing Strut/Catwalk to the North Wall of Basin No. 1. Concentric hairline cracking is visible around the strut on the west side of the Expansion Joint, where the wall is restrained by the strut. On the east side of the Expansion Joint, the wall is unrestrained at the top, and has displaced inward approximately 9/16 inch.

## SITE INVESTIGATION PHOTOGRAPHS

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**Photo 43 – Expansion Joint at North Wall of Basin No. 1**

View of the Expansion Joint showing failed joint sealant and 9/16-inch lateral displacement of the unrestrained wall on the east side of the joint.



## SITE INVESTIGATION PHOTOGRAPHS

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**Photo 44 – Expansion Joint at North Wall of Basin No. 1**

Failed Expansion Joint Sealant with active leakage at the base of the North Wall at Basin No. 1.

## SITE INVESTIGATION PHOTOGRAPHS

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**Photo 45 – North Wall of Basin No. 1 at East Bracing Strut – (Looking North)**  
General view of the connection of the East Bracing Strut to the North Wall of Basin No. 1.



**Photo 46 – Connection of North Wall of Basin No. 1 to East Bracing Strut**  
Punching shear cracks along the perimeter of the bracing strut.