DANIEL G. LILLEY LAW OFFICES, P.A.
39 PORTLAND PIER, P.O. BOX 4803, PORTLAND, MAINE 04112-4803

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May 26, 2009

Christopher Hanson
Code Officer/Plan Reviewer
City of Portland
389 Congress Street, Room 115
Portland, ME 04101

030 H 008

RE: Re: 39 Portland Pier: Structural Analysis – Plan of Action

Dear Mr. Hanson:

First, let me thank you for extending time for me to review the structural analysis and safety issues at 39 Portland Pier. As I told you, I was diagnosed with colon cancer last year which required several extensive surgeries which prevented me from working most of the year; many of my court trials got backed up and clustered into March through May of this year. Your kind extension of time for me to address these issues is appreciated.

I now have consulted with my engineer at Baker Design Consultants and with Bob Morin in detail of CRM Construction Services today; in fact we went to the site this morning. I know the city is rightly concerned with safety issues as we are. Thankfully, the building and the pier as they stand are safe—according to the Backer Report and CRM Construction. .

As you know, we have spent in the $100,000 neighborhood over the last few years on periodic maintenance on the building and over that amount on the pier reconstruction and on the foundation of this building, mostly with replacement of the pier (Cianbro) and methodical replacement of pilings, joists and cross member supports (CRM). When we completed the last round on the building foundation a couple of years ago, Bob Morin of CRM said the building was good *and safe* for at least 18 to 20 years.

A careful reading of Baker Design Consultants report concludes that the building is safe for its current use as an office. The foundation grid as originally built and maintained from about 1850 for the storage of heavy sails and other "working waterfront conditions" and not as an office with a very light load. In fact, under "structural analysis"

the report concludes on page 5, Appendix B, that the 14 piles are "structurally adequate."

Timber, joist, and decking were described as checked by the computer model and "found to be sufficient." Piles/post system was adequate for current usage. "Original timber pile caps were found to have been replaced, strengthened, and sistered." The report stated as to pile caps that they were "more than adequate to resist the applied loading (read: office building weight)."

The following is quoted directly from the report; it summarizes, mathematically, the current state of the safety of the building: **"Calculations show that the pier will tolerate a significant degree of deterioration and have an acceptable 'Factor of Safety' for the current use as office space." Baker Report, p6.**

The report went on to talk about a "Rehabilitation Program" it would recommend. I take no issue its recommendations. But that will have to be done in the future; not in the present economic climate. I am sure that the economy will recover and at that time I will tackle the rehabilitation, but as long as safety is not in any way compromised I want to delay that for now and revisit it next spring.

My plan is to rehabilitate the first 7 pilings referenced in table 1 (red); the remaining piles would be replaced the following year (table 1-green).

I of course will continue regular maintenance as the record shows I have in the past 20 years and strictly follow the recommendations to inspect the pier for damage after a storm (the property is situated in such a way to be well protected and has never been damaged and hurricanes in the last 20 years) and evacuate the building in the event of a severe storm or hurricane. I have been doing that for years.

I hope this satisfies your inquiry. If you have any questions or need further information, please contact me and I will make myself available and my engineer and/or construction consultant.

Thank you for your attention to this matter.

Very truly yours,

Daniel G. Lilley

DGL/amt
Cc: Baker Design Consultants
Mr. Bob Morin, CRM Construction Services

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I hope this satisfies your inquiry. If you have any questions or need further information, please contact me and I will make myself available and my engineer and/or construction consultant.

Thank you for your attention to this matter.

Very truly yours,

Daniel G. Lilley

DGL/amt
Cc: Baker Design Consultants
Mr. Bob Morin, CRM Construction Services

January 21, 2009

Substructure Survey

39 Portland Pier

Portland, Maine

Client:
Daniel G. Lilley Law Offices
39 Portland Pier
P.O. Box 4803
Portland, ME 04112

BAKER DESIGN CONSULTANTS
Civil, Marine and Structural Engineering
11 Stony Brook Lane, Yarmouth, ME 04096

Baker Design Consultants
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Yarmouth, Maine 04096
207 846 9724
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TABLE OF CONTENTS

Executive Summary

Baker Design Consultants was retained to complete a substructure investigation of the timber pier that supports the law offices of Daniel G. Lilley at 39 Portland Pier. The City of Portland requested this inspection be undertaken as a condition of approval for rehabilitation work to the timber support system that was recently completed. Refer to the correspondence outlined below and located in Appendix A.

- Undated Memo from Jeanie Bourke- Inspection Services Director to Daniel G Lilley. See Appendix A. This document referenced Permit No. 08-1075 and the requirement for a full structural analysis of existing Piles and Bents.
- Building Use Permit #08-1075 dated 08/27/2008.

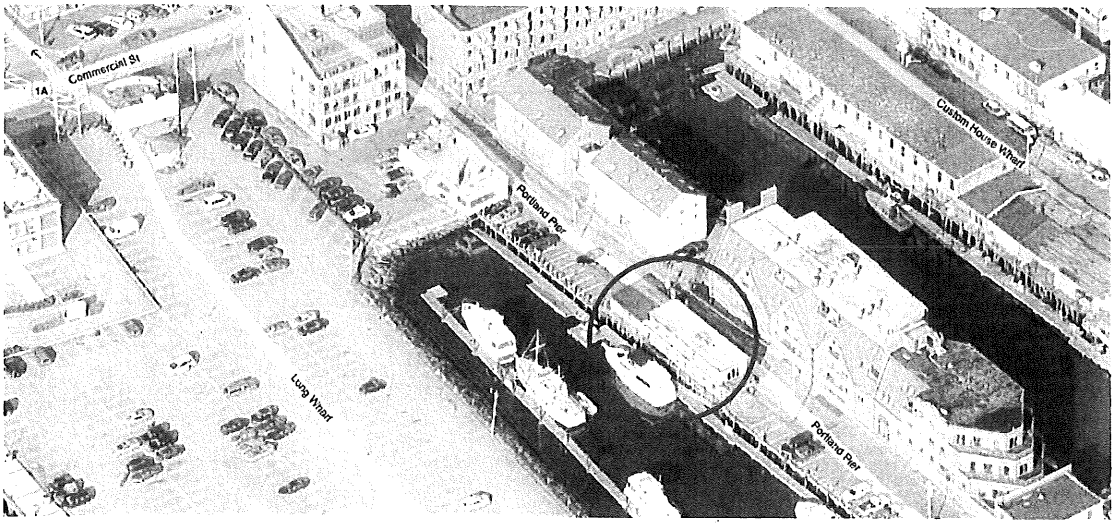
The 39 Portland Pier building is located on a pile supported timber pier. Note new road/sidewalk construction.

Portland Pier dates back to at least the 1850's when Commercial Street was constructed along the waterfront. It is believed that the stone filled sections of the pier were constructed at this time.

The pile supported timber structures in place today (including the subject property) will have been reconstructed and replaced several times since the 1850's, although it is possible that sections of the original timber piles are intact and preserved below the existing mudline.

Today, 39 Portland Pier is a pile/post supported timber structure that spans a filled slope that extends from the central pier roadway (Portland Street) to the shared channel with Long Wharf. Refer to Sheet 1 *Pier Structure Plan* and Sheet 2 *Typical Section* located in APPENDIX D. It is reported that the existing law offices were originally a sail repair business with an open plan upper floor area. Adjacent sections of the pier are used for parking.

The section of the timber pier that supports the building shows signs of several generations of rehabilitation and strengthening with timber, steel and concrete. There is a lot of debris on the mudline. Most recently a program of pile and bracing replacement has occurred.



Refer to the Aerial Map above for property location on Portland's waterfront.

This report provides an assessment of the structural integrity of the pier based on a low tide site survey, discussions with the marine contractor that has undertaken recent repairs and structural calculations to determine the capacity and redundancy of structural members that make up the support system for the pier. These key findings of this work are indicated below:

- Given the pile grid density, size of the timber pile cap beams and joists, this pier at one time served 'working waterfront' prior to conversion as office space with waterside dockage. Office loading is small in comparison to marine commercial loading. Calculations show that the pier will tolerate a significant degree of deterioration and still have an acceptable "Factor of Safety" for its current use as office space.
- The pier condition is acceptable for its current use as office space with linear slips for recreational boats in a protected channel.
- No immediate repairs are required, although a list of structural improvements to be undertaken in the near term is provided. The list includes a continuation of the pile replacement program, removal of debris from the pier area and continuous monitoring of the facility.

Structural Analysis

This report provides an assessment of the structural integrity of the pier based on a low tide site survey, discussions with the marine contractor that has undertaken recent repairs and structural calculations to determine the capacity and redundancy of structural members that make up the support system for the pier. The following tasks were completed to obtain the necessary data to complete the structural survey.

1. Record plans were prepared for the structure. A sketch was obtained from CPM Construction Services, Inc. that provided dimensions and the location of major pier structural components. This sketch and additional site measurements are the basis for the Plans provided in Appendix D.
    - Sheet 1 -*Pier Structure Plan*
    - Sheet 2 -*Typical Section*
2. An assessment of the condition for each structural component was made in the field, tabulated and documented with pictures (See Appendix B Tabulated Summary and Appendix C Photographs). A recording of 100% indicates full capacity. This % was conservatively reduced with the presence of any rot or section loss. This field assessment noted several general observations regarding the structural components of the pier:
    - *Building*- The building is timber frame with one and two story offices that almost entirely cover the pier footprint. A detailed investigation of the building framing was not undertaken. Load transfer to the pier below was conservatively estimated to be as a uniformly distributed load (pile cap and joist analysis) or as point loads applied to vertical piles and posts.
    - *Timber Joists and Decking*- Decking and joists are protected from rot and exposure by the building above. These members are largely obscured by insulation. The general capacity of these elements were checked in a computer model (© *Woodworks*) and found to be sufficient.
    - *Pile/Post system*- The grid spacing of these elements imply original use of the structure for working waterfront conditions where the applied loading was greater than that which currently occurs with office loading today.
    - *Diagonal bracing* -Diagonal bracing of the original pile configuration is minimal. This can be attributed to the fact that the piles are so short and significant lateral stability is gained from continuity with the driven section. As these piles are replaced with posts pinned to the original pile section that extends below the surface, the behavior changes. Lateral load and uplift capacity are reduced and must be compensated with the addition of lateral bracing. Refer to Sheet 2 –*Typical Section*.
    - *Pile Caps*- The original timber pile caps have been replaced, strengthened and sistered with timber and steel to accommodate applied loading and degradation. Subsequent calculations show these members are more than adequate to resist the applied loading.

- *Fender piles*- These elements do not contribute to the stability of the pier but effectively tether the dock system and prevent foreign objects from getting underneath the pier and doing damage.

3. The applied loading on each structural member was determined based on the current use of the wharf. This included three (3) broad categories of applied load.
   - Dead Loads- Weight of the structure supported. This accounts for walkway sections and one and two-story sections of the building.
   - Building Live Loads- This includes building occupancy and snow loading.
   - Lateral Loads- The pier is located on a very sheltered channel. Fender piles and a linear float system buffer the structure from high impact loads. The construction of the pier on a slope reduces wave reflection. Short piles absorb lateral loads.
4. Calculations were undertaken to determine capacity of individual structural members.
   - Table 1- Pier Support Evaluation conservatively calculates an axial load Factor of Safety for each pile or post support based on dimensions, tributary load area and member condition. Refer to APPENDIX B. The Table indicates 14 piles that are 'structurally adequate', but below a threshold factor of Safety of 2 under service conditions.
   - © *Woodworks* Software was used to analyze superstructure decking and support framing (Cap beams and joists)
   - © *Beam Check* Software was used to evaluate the steel members that have been used to sister and replace pile cap elements
   - A Factor of Safety (FOS) for each member was calculated based on the ratio of the member capacity to the applied loading. A FOS < 2 would indicate a need to replace the member or make structural improvements in the near future.
5. As a measure of the redundancy of the structural support system, Table 1 records the theoretical decrease in Factor of Safety that would result if an adjacent pile or post were to fail and load were transferred to surrounding members. A Redundancy FOS less than 1.0 is an indication that the member should be scheduled for replacement to reduce the risk of progressive failure if one pile/post were damaged.

Recommended Rehabilitation Program

Based on the work completed, this report concludes the following with respect to the pier structure:

General Condition

This is not a new pier, but the condition is acceptable for its current use as office space with linear slips for recreational boats in a protected channel.

Given the pile grid density, size of the timber pile cap beams and joists, this pier at one time served 'working waterfront' prior to conversion as office space with waterside dockage. Office loading is small in comparison to marine commercial loading. Calculations show that the pier will tolerate a significant degree of deterioration and still have an acceptable "Factor of Safety" for its current use as office space.

Immediate Action Requirements

The pier is not in any danger of collapse or failure under an acceptable range of applied loading. Therefore no immediate action is required other than an effective response to significant storm events that may put the structure in danger from wave action, flooding, debris and or ice contact.

1. Inspect the pier for damage following storm events.
2. Evacuate the building in advance of a hurricane or flood event.

Near Term Recommendations for Rehabilitation

Significant upgrades to the pier structure have been completed in recent years. This has included replacement of pile supports in the intertidal zone where rot and section loss is most aggressive. The work that has been completed is sound and commendable. This work needs to continue. Priority items are as follows with longer term activities noted in the next section.

3. To reduce the chance of damage caused by floating debris, all obsolete piles and timber elements should be removed below the pier. This would include waterlogged debris that may be shifted by ice.
4. Replace fourteen (14) piles that were previously encapsulated with concrete as noted on Sheet 1 – *Pier Structure Plan* and Sheet 2 -*Typical Section* located in APPENDIX D. The concrete encapsulation is failing, exposing the original timber sections. Cutting the existing pile off at the mudline and pinning an 8-1/2 x 8-1/2 PT post to remaining section is acceptable provided the pile is in good condition below the mudline. Add bracing in accordance with Sheet 2.

Longer Term Monitoring and Maintenance

5. Fender piles and edge beams are tired and should be replaced. These elements protect the pier from waterside impact and restrain the float system.

6. Diagonal bracing of the original pile configuration is minimal. This can be attributed to the fact that the piles are so short and significant lateral stability is gained from continuity with the driven section. As these piles are replaced with posts pinned to the original pile section that extends below the surface, the behavior changes. Lateral load and uplift capacity are reduced and must be compensated by additional lateral bracing.
7. Bracing to vertical piles and posts is vulnerable to damage by floating debris and ice. These elements should be checked annually and replaced on a regular basis.
8. The pier should be inspected annually with deficiencies noted and added to a repair schedule. Between inspections, staff should note any changes in structure behavior such as:
    - A door not closing properly, cracks in interior finishes.
    - Differential movement or vibration in the structure.
    - Settlement in building floor or exterior sidewalk.

Appendicies

APPENDIX A Reference Documents

- Undated Memo from Jeanie Bourke- Inspection Services Director to Daniel G Lilley
- Building Use Permit #08-1075 dated 08/27/2008.

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Director of Planning and Urban Development
Penny St. Louis Littell

Inspection Services, Director
Jeanie Bourke

Daniel G. Lilley. Esq
39 Portland Pier
Portland, Maine 04101

RE: 39 Portland Pier, CBL: 030 H008001, Permit #08-1075

Dear Sir,

As a result of the City's recent sidewalk repairs adjacent to your building at 39 Portland Pier, it has become apparent to the City of Portland Inspections Division that the structural integrity of this building is in question. Several of the pilings and carrying timbers supporting the building are rotted, have not been properly maintained, or were improperly replaced.

On August 27, 2008 Bob Morin applied for a permit in this office to repair 12 pilings on the east side (adjacent to the city ROW) of the building. Approvals were granted on August 28, 2008 to begin repairs. Mr. Morin confirmed, at that time, that he was not aware of any recent structural analysis of the support systems under the building. He offered to contact Wayne Duffet of TEC Associates in order to begin this process.

This letter formalizes the condition of approval noted on permit #08-1075, namely, that a full structural analysis of the existing piles and bents be submitted to this office within 30-45 days of the issuance of the building permit (August 28, 2008). Please note that any structural work requires a permit per Code Sec. 105 of the International Building Code 2003.

I am happy to answer any questions about this matter.

I can be reached at 207-874-8715.

City of Portland, Maine - Building or Use Permit
389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

Permit No:	Date Applied For:	CBL:
08-1075	08/27/2008	030 H008001

Location of Construction:	Owner Name:	Owner Address:	Phone:
39 PORTLAND PIER	LILLEY DANIEL G	39 PORTLAND PIER	
Business Name:	**Contractor Name:**	**Contractor Address:**	**Phone**
	CRM Construction, Services, Inc.	94 Washington Street Auburn	(207) 650-7860
Lessee/Buyer's Name	**Phone:**	**Permit Type:**	
		Alterations - Commercial	

Proposed Use:	Proposed Project Description:
Law Offices/pile repair on road side supporting 12 bents using pin and splice fastening to existing underground piling	Pile repair on road side supporting 12 bents using pin and splice fastening to existing underground piling

Dept: Zoning **Status:** Approved with Conditions **Reviewer:** Jeanine Bourke **Approval Date:** 08/28/2008

Note: **Ok to Issue:** ☑

1) All work being performed shall be in the existing footprint
2) This permit is being approved on the basis of plans submitted. Any deviations shall require a separate approval before starting that work.

Dept: Building **Status:** Approved with Conditions **Reviewer:** Jeanine Bourke **Approval Date:** 08/27/2008

Note: **Ok to Issue:** ☑

1) This permit is approved with the agreement that a full structural analysis of the existing piles and bents is submitted within 30-45 days and a separate application for permit is required for the associated work.
2) Permit approved based on the plans submitted and reviewed w/owner/contractor, with additional information as agreed on and as noted on plans.

Comments:
8/27/2008-jmb: Bob Leeman came in with contractor Bob Morin to expedite the work to repair the piles while the road work the city is doing has allowed greater access to the effected area. Bob M. Verified that he is not aware of an engineers assessment of the pilings at the middle beam and water side

APPENDIX B Tabulated Summary

Baker Design Consultants
207 846 9724

Key		Factor of Safety < 2 (Applied Loading Combination)
		Factor of Safety < 1.5 (Redundant Condition)

Notes: 1. See "Load Calculation" Sheet for Dead, Live & Snow loading considered.
2. Redundancy Condition determines load increase with increase in tributary area due to failure of adjacent axial load member.

Pier Support Evaluation

Bent		Length		Support Member Description					Tributary Loading						Axial Load Check (Service Loading)					Redundancy Check		
				Type (Post or Pile)	Mudline Dim (in)		Area	P-Pin D-Driven	Width	Length	Applied Load (psf)			Applied Load (lbs)	Condition Notes			Load Capacity	Factor of Safety	Trib Area Multipli	Revised Load Capacity	FOS Rev
		FT	IN		x	y or r	in^2		ft	ft	Dead	Live	Snow		Condition	Bracing	Rating	%*P				
1	A	2	4	Post	8.5	8.5	72.3	1	3	4	44.4	40	50	1613	PT Good	Yes	95%	69063	42.8	2	3506	19.7
	B	4		Post	8.5	8.5	72.3	1	3.1	8	44.4	40	50	3360	PT Good	Yes	95%	68253	20.3	2	7304	9.3
	C	9	2	Post	8.5	8.5	72.3	1	3.25	4	44.4	40	50	1747	PT Good	Yes	95%	61702	35.3	2	3798	16.2
2	A	2	4	Post	8.5	8.5	72.3	1	6.25	4	44.4	40	50	3360	PT Good	Yes	95%	69063	20.6	2	7304	9.5
	B	4		Post	8.5	8.5	72.3	1	6.1	8	44.4	40	50	6586	PT Good	Yes	95%	68253	10.4	2	14317	4.8
	C	9	2	Post	8.5	8.5	72.3	1	6	4	44.4	40	50	3226	PT Good	Yes	95%	61702	19.1	2	7012	8.8
3	A	2	4	Post	8.5	8.5	72.3	P	6	4	44.4	40	50	3226	PT Good	Yes	95%	69208	21.5	2	7012	9.9
	B	4		Post	8.5	8.5	72.3	P	5.8	8	44.4	40	50	6274	PT Good	Yes	95%	68253	10.9	2	13639	5.0
	C	9	2	Post	8.5	8.5	72.3	P	5.67	4	44.4	40	50	3048	PT Good	Yes	95%	61702	20.2	2	6627	9.3
4	A	2	4	Post	8.5	8.5	72.3	P	6	4	44.4	40	50	3226	PT Good	Yes	95%	69063	21.4	2	7012	9.8
	B	5	3	Post	8.5	8.5	72.3	P	5.8	8	44.4	40	50	6182	PT Good	Yes	95%	67304	10.9	2	13440	5.0
	C	9		Post	8.5	8.5	72.3	P	5.5	4	44.4	40	50	2957	PT Good	Yes	95%	62042	21.0	2	6428	9.7
5	A	2	4	Post	8.5	8.5	72.3	P	6	4	44.4	40	50	3226	PT Good	Yes	95%	69063	21.4	2	7012	9.8
	B	5	3	Post	8.5	8.5	72.3	P	6.1	8	44.4	40	50	6543	PT Good	Yes	95%	67304	10.3	2	14223	4.7
	C	9		Post	8.5	8.5	72.3	P	6.17	4	44.4	40	50	3317	PT Good	Yes	95%	62042	18.7	2	7211	8.6
6	A	2	4	Post	8.5	8.5	72.3	P	5.75	4	44.4	40	50	3091	PT Good	Yes	95%	69063	22.3	2	6720	10.3
	B	5	10	Post	8.5	8.5	72.3	P	6.0	8	44.4	40	50	6451	PT Good	Yes	95%	66744	10.3	2	14024	4.8
	C	9	3	Post	8.5	8.5	72.3	P	6.25	4	44.4	40	50	3360	PT Good	Yes	95%	61528	18.3	2	7304	8.4
7	A	2	4	Post	8.5	8.5	72.3	P	6.17	4	44.4	40	50	3317	PT Good	Yes	95%	69063	20.8	2	7211	9.6
	B	6	6	Post	8.5	8.5	72.3	P	6.5	8	44.4	40	50	6946	PT Good	Yes	95%	66002	9.5	2	15100	4.4
	C	10	6	Post	8.5	8.5	72.3	P	6.75	4	44.4	40	50	3629	PT Good	Yes	95%	58599	16.1	2	7889	7.4
8	A	2	4	Post	8.5	8.5	72.3	P	5.5	4	73	70	50	4246	PT Good	na	95%	69063	16.3	2	9230	7.5
	B	6		Pile		8	50.2	D	6.0	8	73	70	50	9264	Encapsulated	Twin Pil	30%	14526	1.6	2	20139	0.7
	C	10	6	Post	8.5	8.5	72.3	P	6.5	4	73	70	50	5018	PT Good	na	95%	58599	11.7	2	10909	5.4
9	A	2	4	Post	8.5	8.5	72.3	P	6	4	73	70	50	4632	PT Good	na	95%	69063	14.9	2	10070	6.9
	B	6		Post	8.5	8.5	72.3	P	5.4	8	44.4	40	50	5779	PT Good	na	95%	66570	11.5	2	12563	5.3
	C	10	6	Post	8.5	8.5	72.3	P	4.75	4	73	70	50	3667	PT Good	na	95%	58599	16.0	2	7972	7.4
10	A	2	6	Post	8.5	8.5	72.3	P	6	4	73	70	50	4632	PT Good	na	95%	69003	14.9	2	10070	6.9
	B	6		Pile		8	50.2	D	6.0	8	73	70	50	9264	Encapsulated	na	30%	14526	1.6	2	20139	0.7
	C	10		Pile		8	50.2	D	6	4	73	70	50	4632	Old Twin	na	30%	12796	2.8	2	10070	1.3
11	A	2	4	Post	8.5	8.5	72.3	P	7.17	4	73	70	50	5535	Recent	na	95%	69063	12.5	2	12033	5.7
	B	6		Pile		8	50.2	D	7.3	8	73	70	50	11325	Encapsulated	na	30%	14526	1.3	2	24620	0.6
	C	10	6	Pile		8	50.2	D	7.5	4	73	70	50	5790	Encapsulated	na	30%	12477	2.2	2	12587	1.0

Baker Design Consultants
207 846 9724

Key		Factor of Safety < 2 (Applied Loading Combination)
		Factor of Safety < 1.5 (Redundant Condition)

Notes:
1. See "Load Calculation" Sheet for Dead, Live & Snow loading considered.
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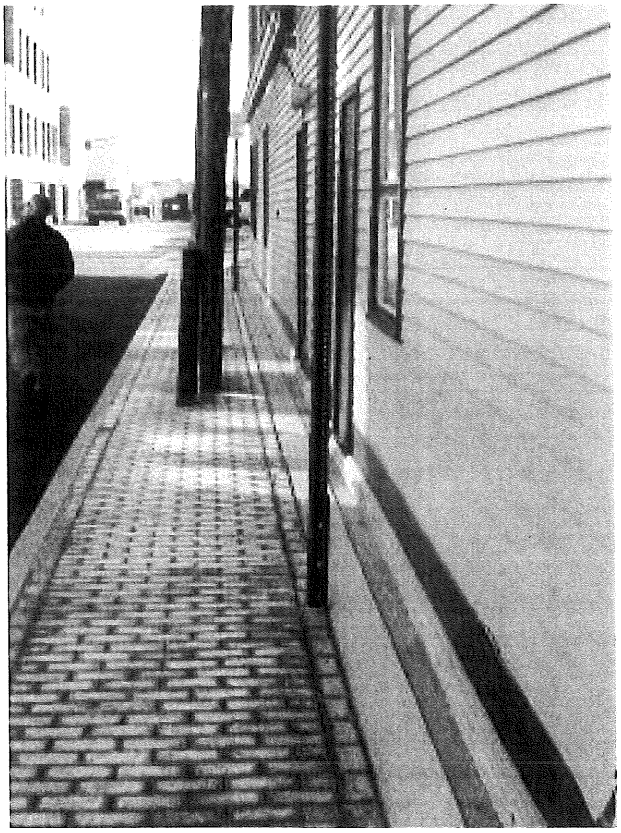
Pier Support Evaluation

Bent		Length		Support Member Description					Tributary Loading						Axial Load Check (Service Loading)					Redundancy Check		
				Type (Post or Pile)	Mudline Dim (in)		Area	P-Pin D-Driven	Width	Length	Applied Load (psf)			Applied Load (lbs)	Condition Notes			Load Capacity	Factor of Safety	Trib Area Multipli	Revised Load Capacity	FOS Rev
		FT	IN		x	y or r	in^2		ft	ft	Dead	Live	Snow		Condition	Bracing	Rating	%*P				
12	A	4		Pile		8	50.2	D	7	4	73	70	50	5404	Fair (driven)		40%	19935	3.7	2	11748	1.7
	B	6	3	Pile		8	50.2	D	7.4	8	73	70	50	11387	Encapsulated	na	30%	14456	1.3	2	24754	0.6
	C	11		Pile		8	50.2	D	7.75	4	73	70	50	5983	Fair	na	30%	12137	2.0	2	13007	0.9
13	A	2	8	Post	8.5	8.5	72.3	P	8.33	4	73	70	50	6431	PT Good	na	95%	68939	10.7	2	13980	4.9
	B	7		Pile		8	50.2	D	7.9	8	73	70	50	12221	Poor	na	30%	14219	1.2	2	26567	0.5
	C	11		Pile		8	50.2	D	7.5	4	73	70	50	5790	Poor	na	30%	12137	2.1	2	12587	1.0
14	A	2	8	Post	8.5	8.5	72.3	P	7.25	4	73	70	50	5597	PT Good	na	95%	68939	12.3	2	12167	5.7
	B	7		Post	8.5	8.5	72.3	P	6.4	8	73	70	50	9843	PT Good	na	95%	65367	6.6	2	21398	3.1
	C	11		Post	8.5	8.5	72.3	P	5.5	4	73	70	50	4246	PT Good	na	95%	57259	13.5	2	9230	6.2
15	A	2	8	Pile		8	50.2	D	6	4	73	70	50	4632	Encapsulated	na	30%	15123	3.3	2	10070	1.5
	B	7		Pile		8	50.2	D	7.0	8	73	70	50	10808	Encapsulated	na	30%	14219	1.3	2	23496	0.6
	C	11		Post	8.5	8.5	72.3	P	8	4	73	70	50	6176	PT Good	na	95%	57259	9.3	2	13426	4.3
16	A	2	8	Post	8.5	8.5	72.3	P	6.33	4	73	70	50	4887	PT Good	na	95%	68939	14.1	2	10623	6.5
	B	7		Pile		8	50.2	D	7.2	8	73	70	50	11063	Encapsulated	na	30%	14219	1.3	2	24049	0.6
	C	11		Pile		8	50.2	D	8	4	73	70	50	6176	poor,Top deteriorated		50%	20228	3.3	2	13426	1.5
17.1	A	3							4.75	8	73	70	50	7334	RC Footing	na				2	15943	
	C	12		Pile		10	78.5	D	4.75	8	73	70	50	7334	PT Good	na	100%	67886	9.3	2	15943	4.3
17.2	A	3							4.75	8	73	70	50	7334	RC Footing	na				2	15943	
	C	12		Pile		10	78.5	D	4.75	8	73	70	50	7334	PT Good	na	90%	61097	8.3	2	15943	3.8

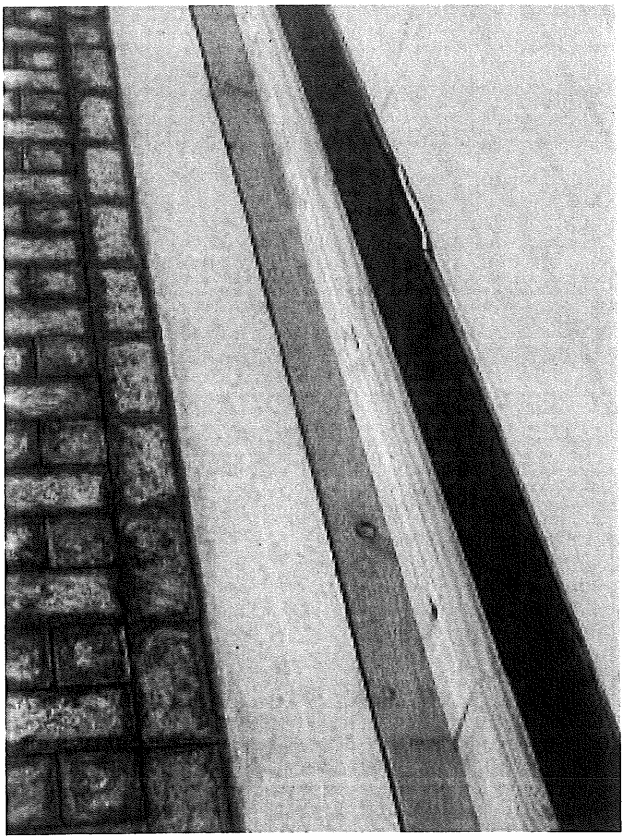
APPENDIX C Condition Photographs

08046 Lilley Pier
1/21/09

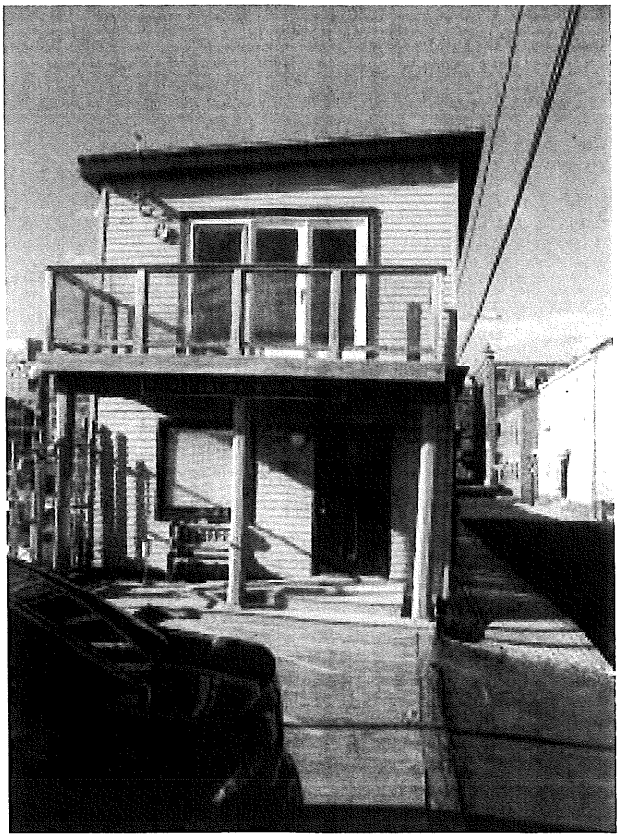
Bldg1.jpg



Bldg4.jpg



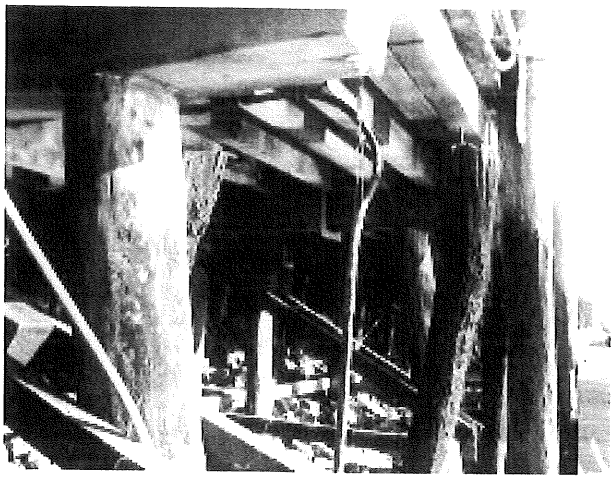
Bldg5.jpg



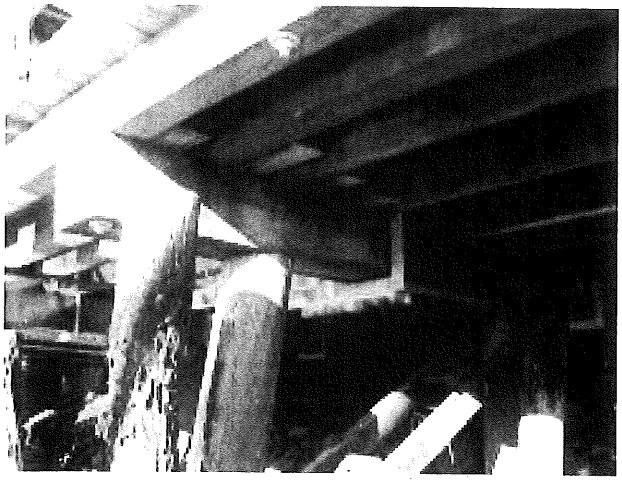
Bldg6.jpg

08046 Lilley Pier
1/21/09

PierFace 1.jpg



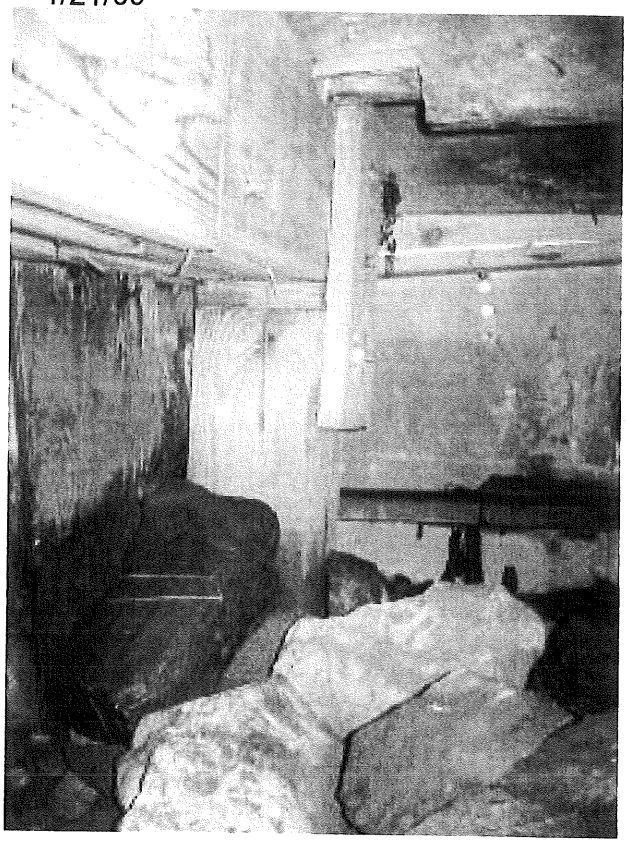
Pier Face 2.jpg



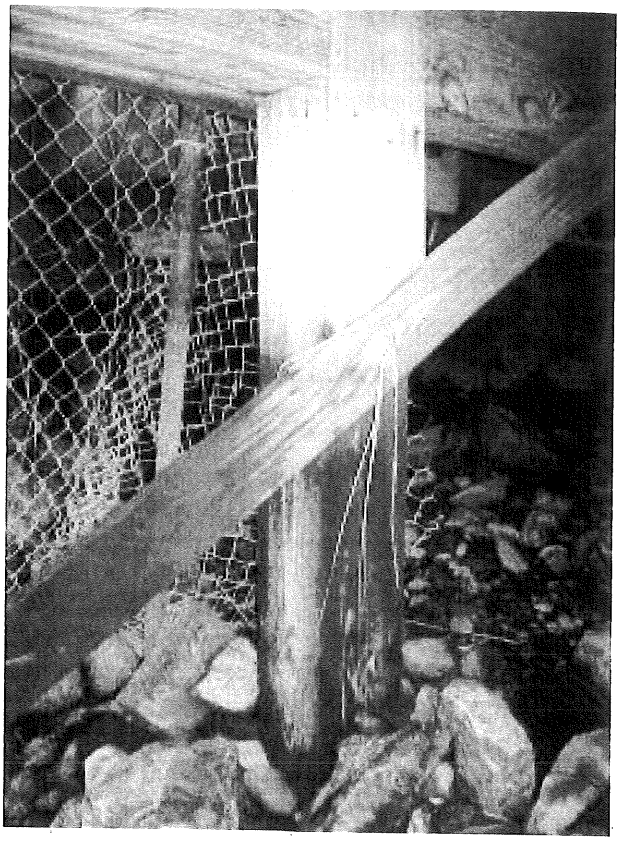
Pier Face 3.jpg

Pier Face 4.jpg

08046 Lilley Pier
1/21/09



1A.jpg

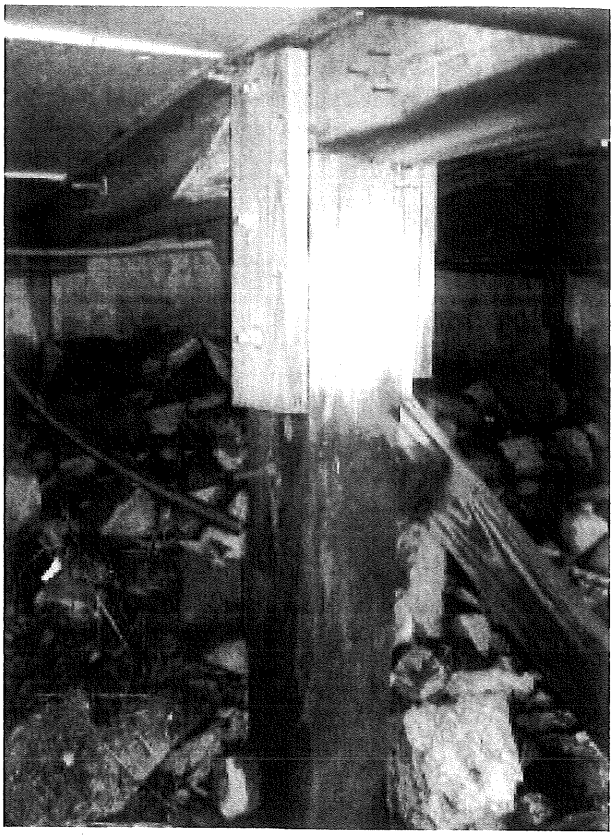


1B.jpg

1C.jpg

08046 Lilley Pier
1/21/09

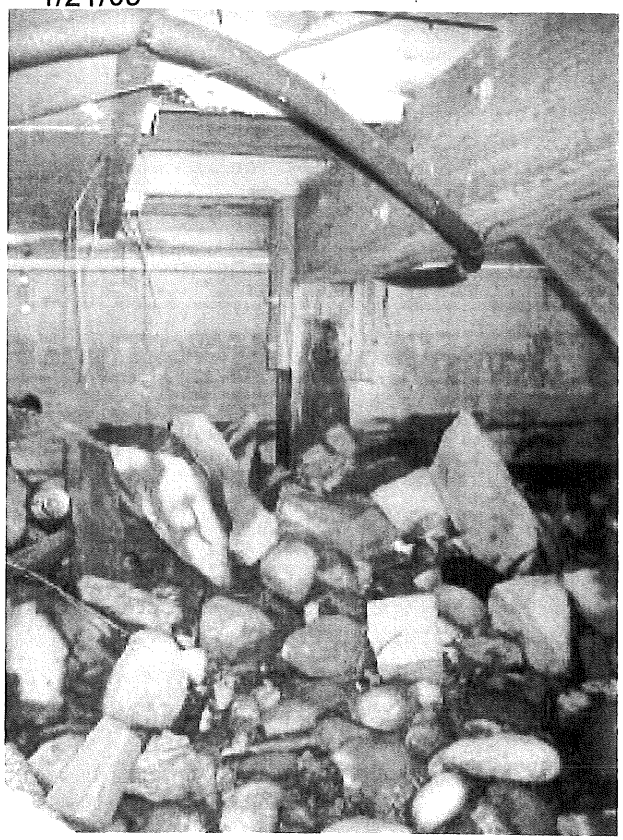
2A.jpg



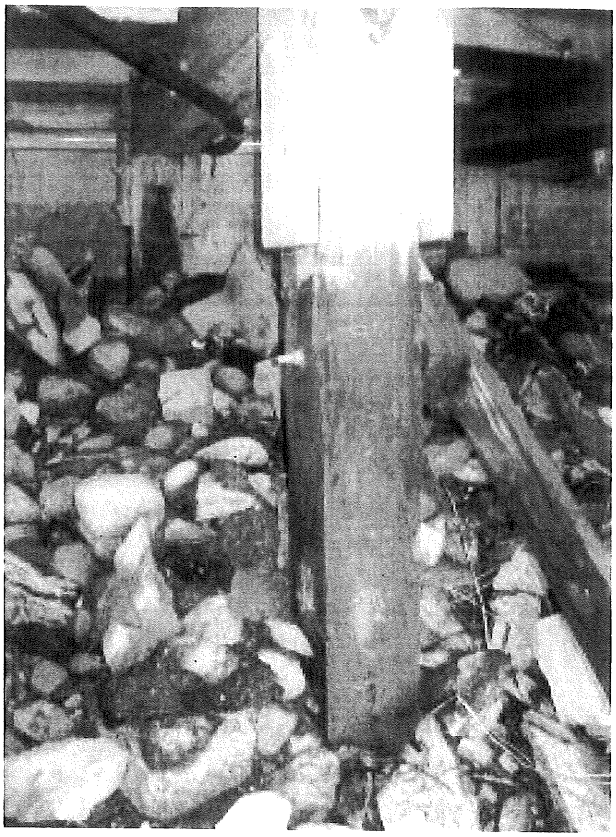
2B.jpg

2C.jpg

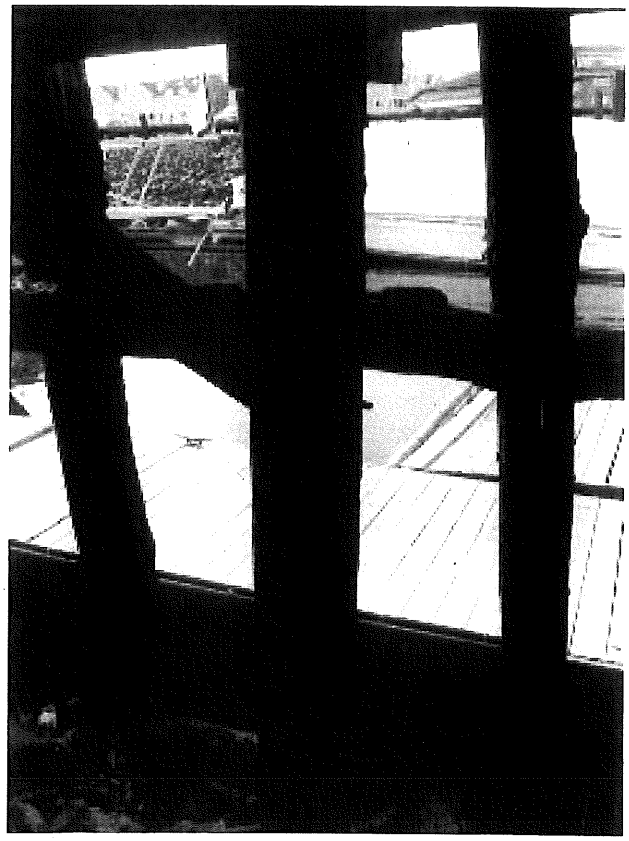
08046 Lilley Pier
1/21/09



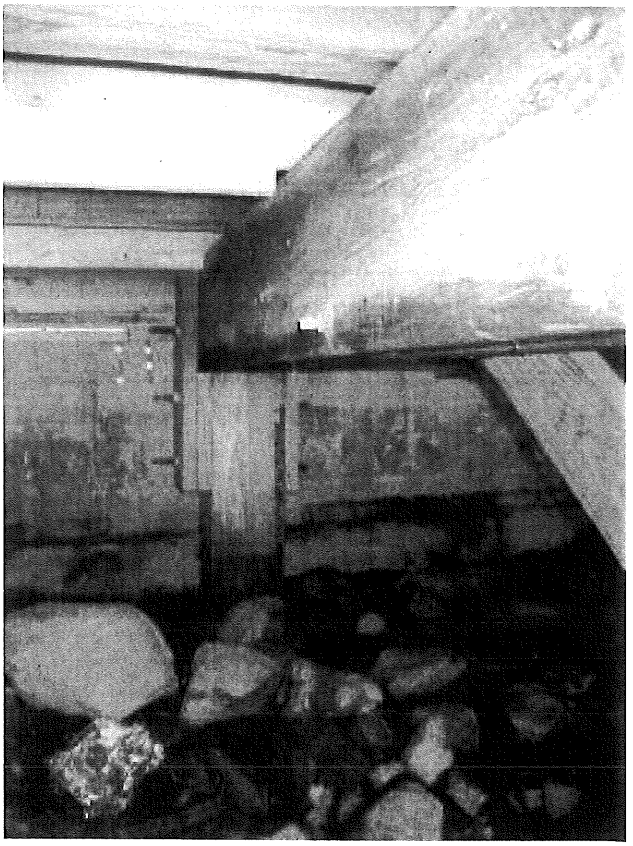
3A.jpg



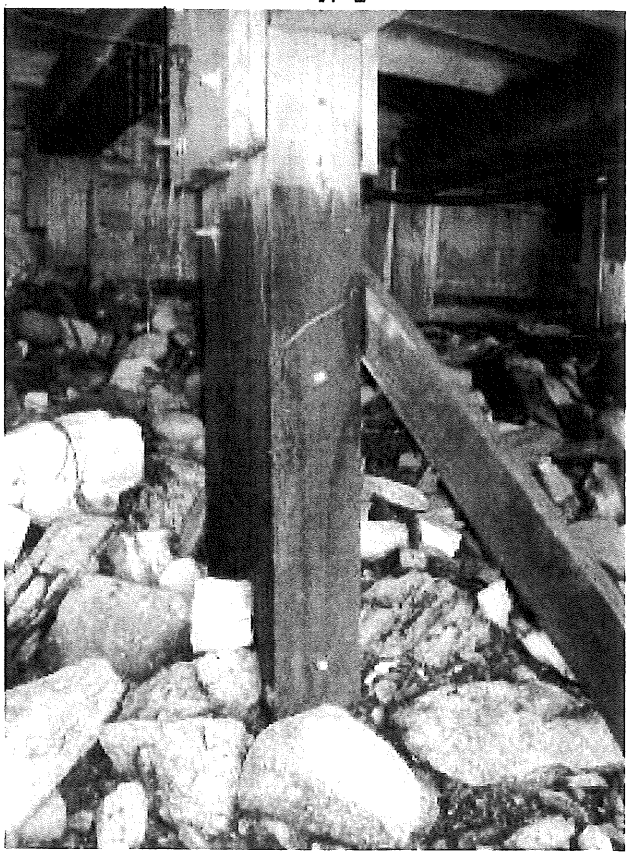
3B.jpg



3C.jpg

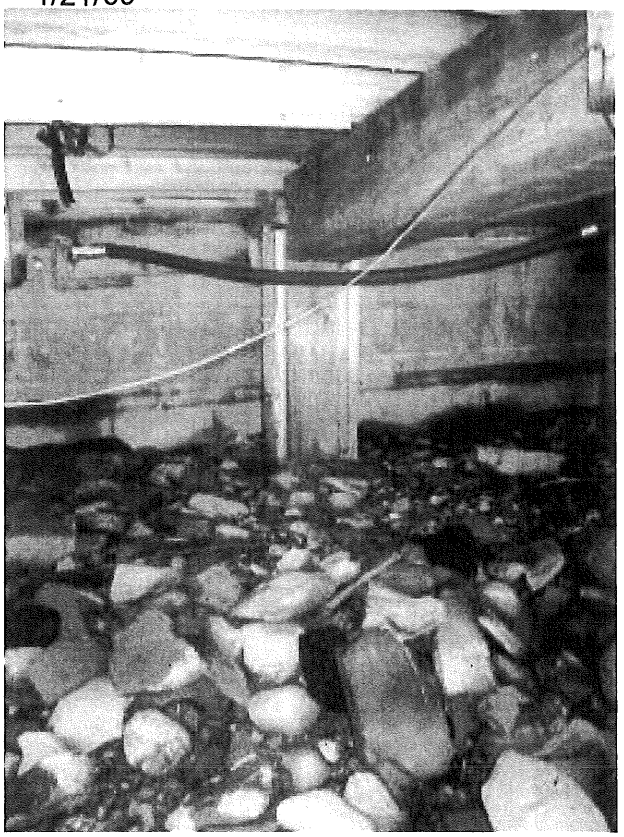


4A.jpg

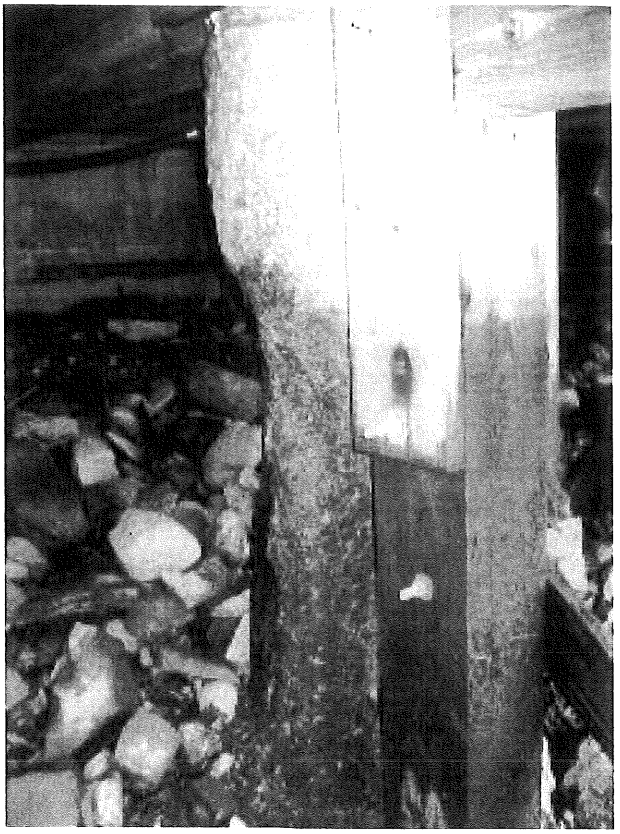


4B.jpg

08046 Lilley Pier
1/21/09

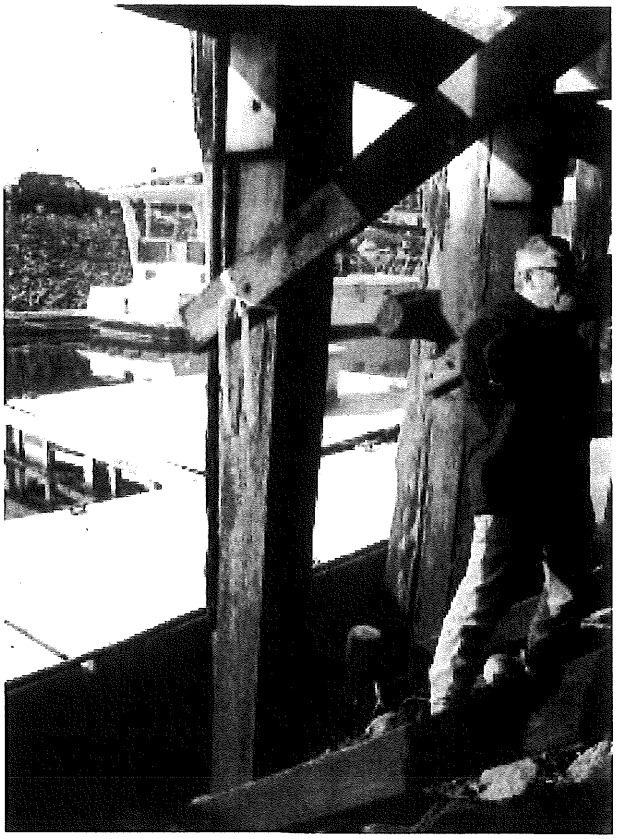


5A.jpg



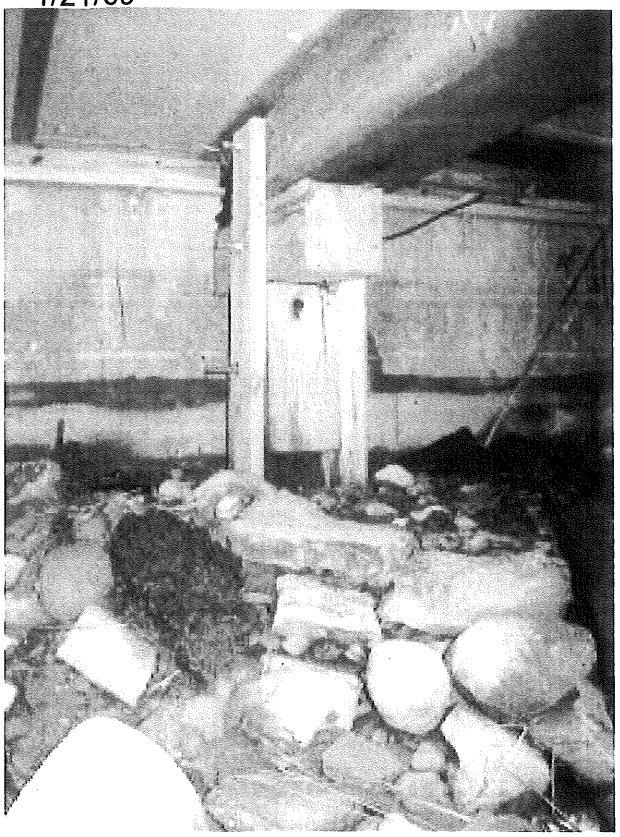
5B.jpg

5BC3.jpg

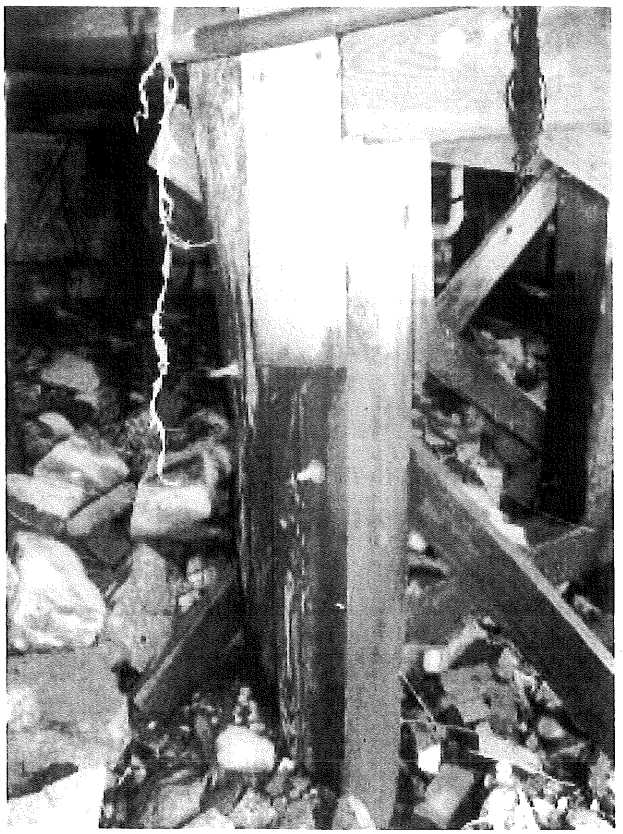


5C.jpg

08046 Lilley Pier
1/21/09

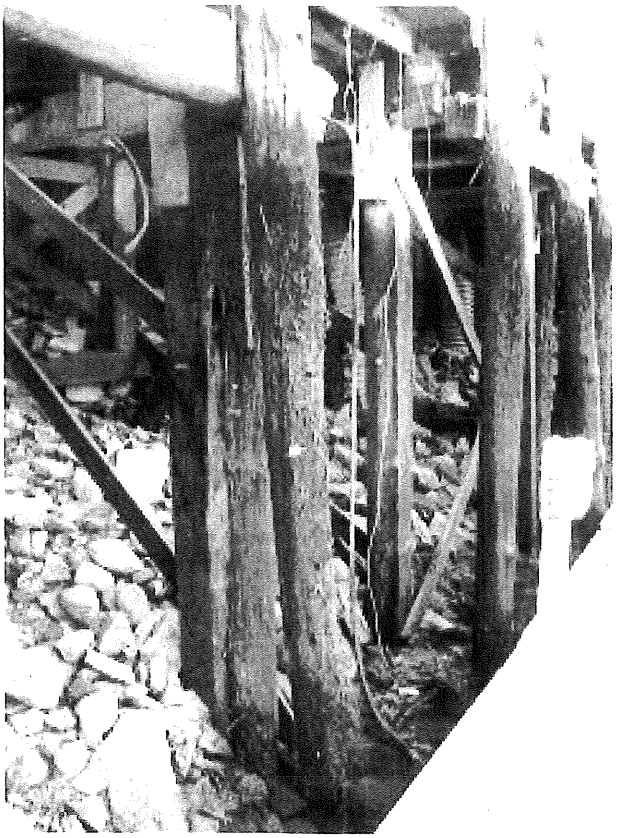


6A.jpg

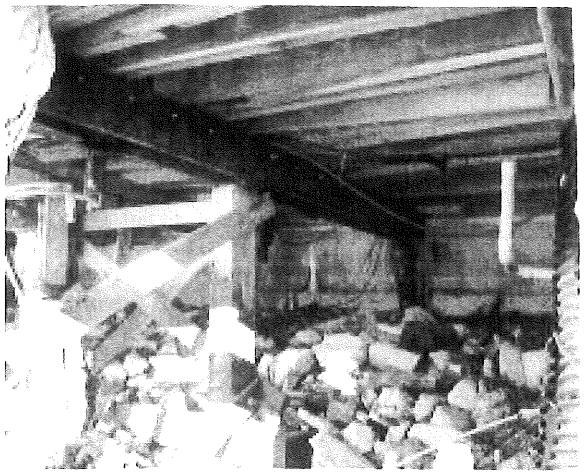


6B.jpg

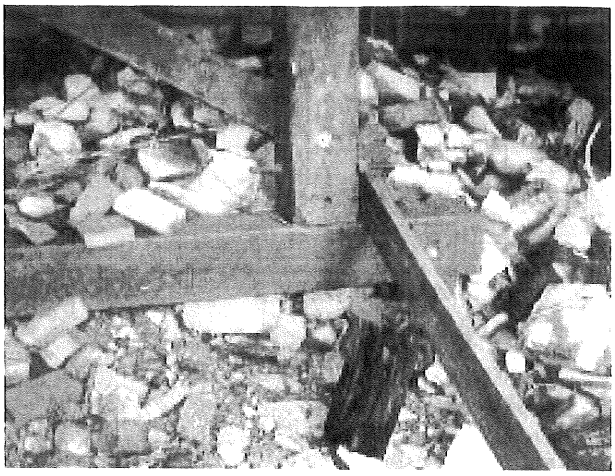
6C1.jpg



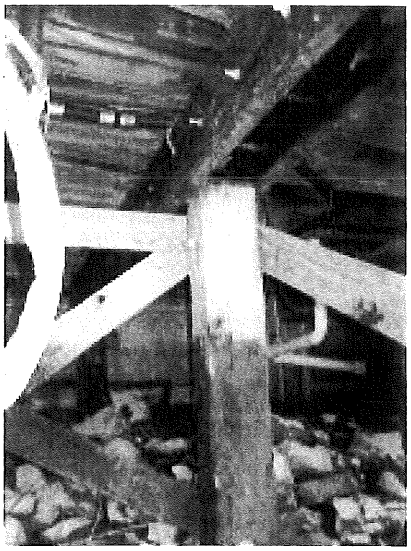
6C2.jpg



7AB.jpg

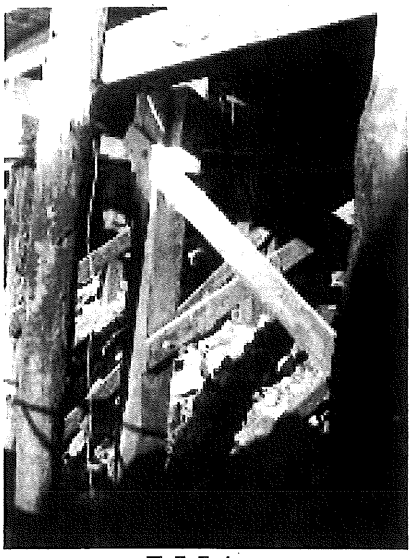


7B1.jpg

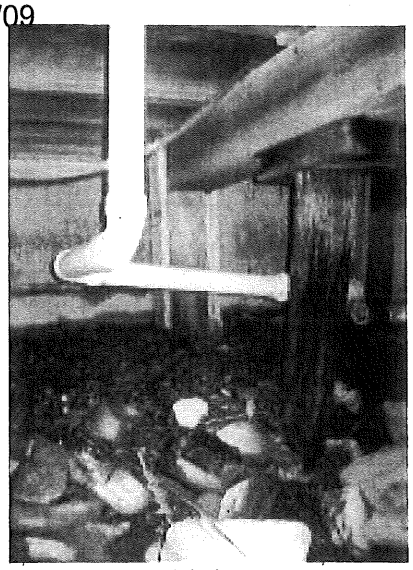


7B2.jpg

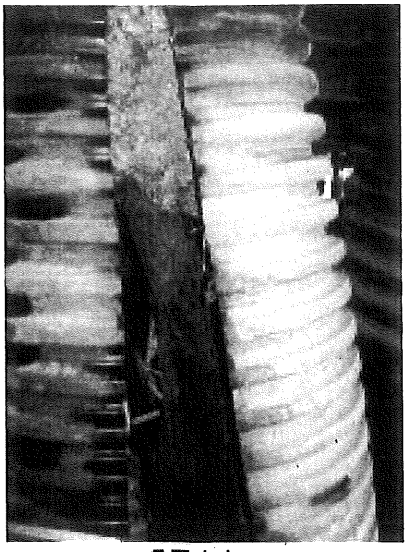
7C.jpg



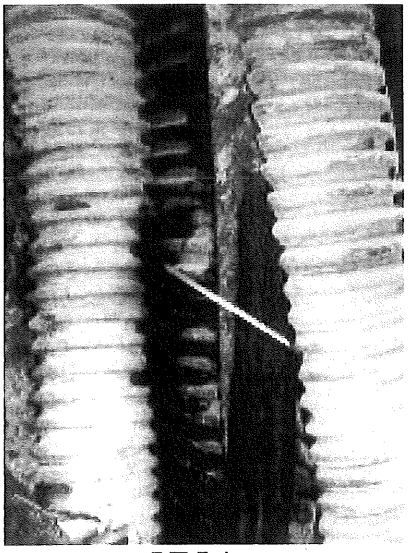
7C2.jpg



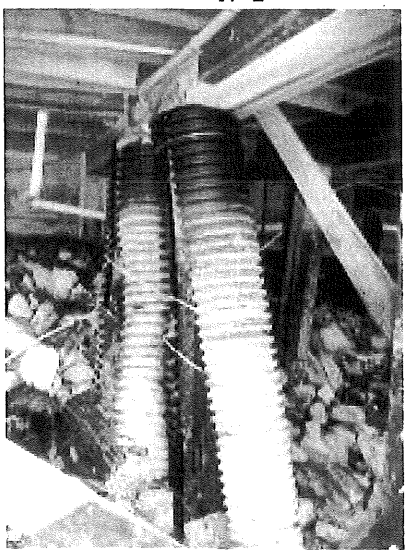
8A.jpg



8B1.jpg

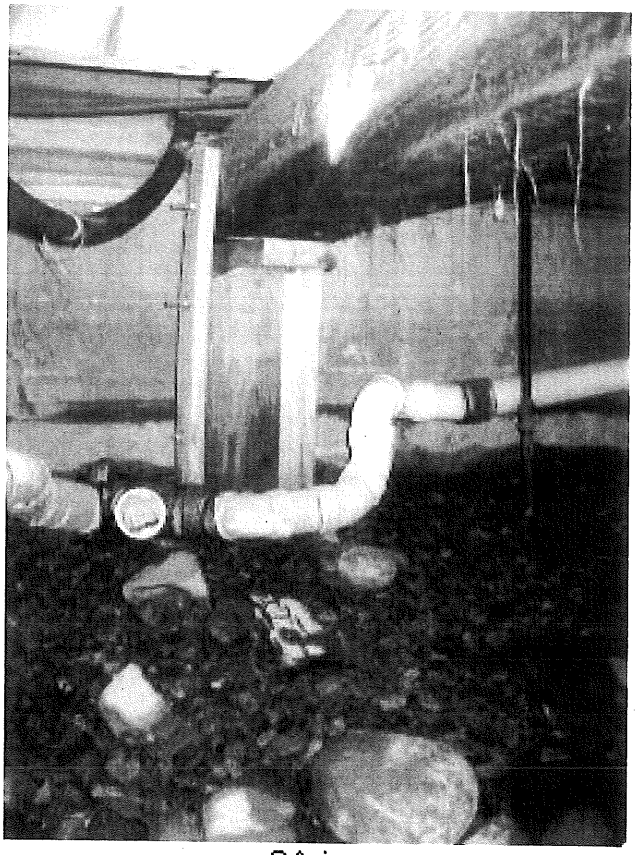


8B2.jpg

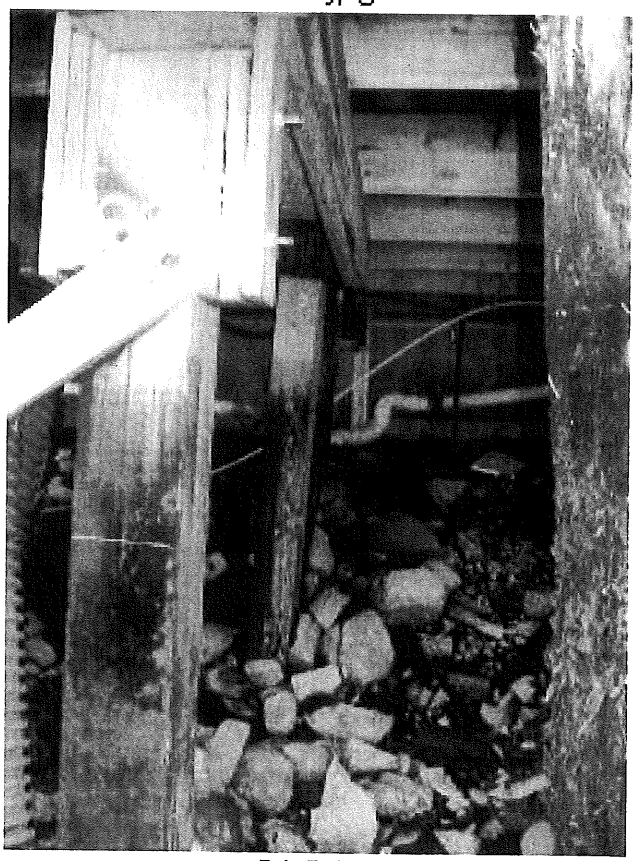


8B3.jpg

8C2.jpg

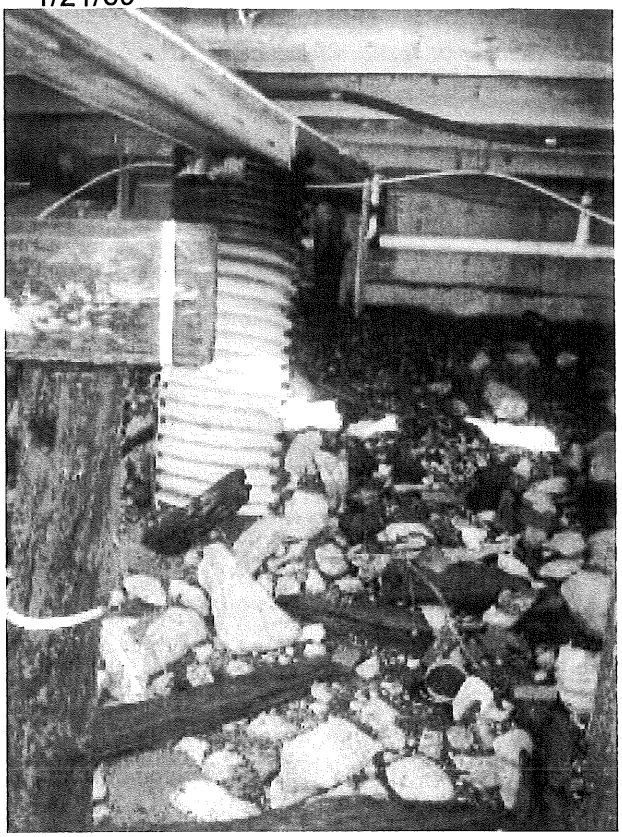


9A.jpg

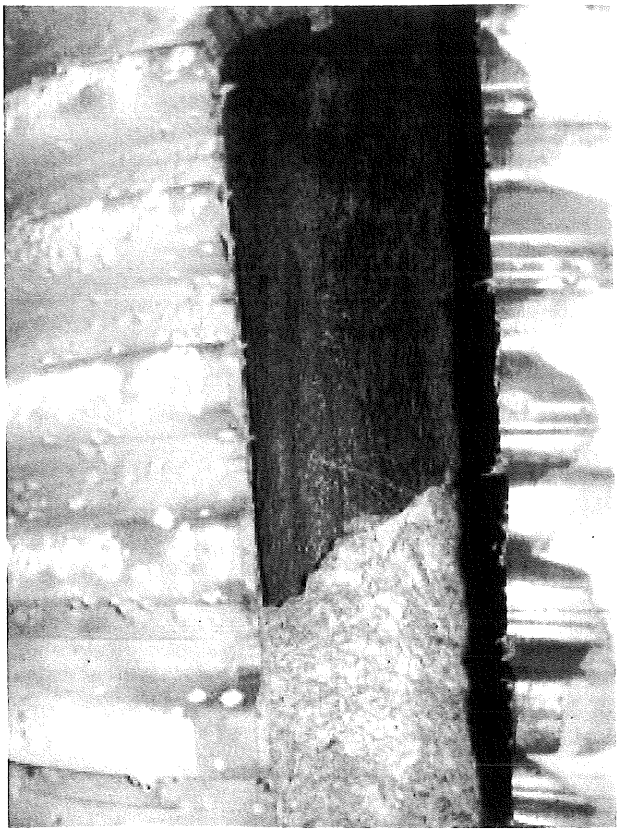


9AC.jpg

08046 Lilley Pier
1/21/09

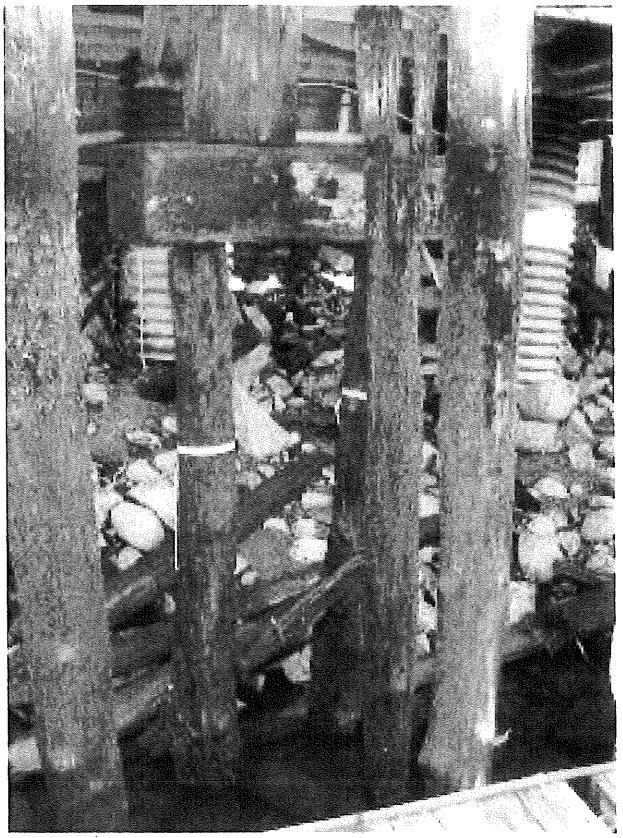


10AB.jpg



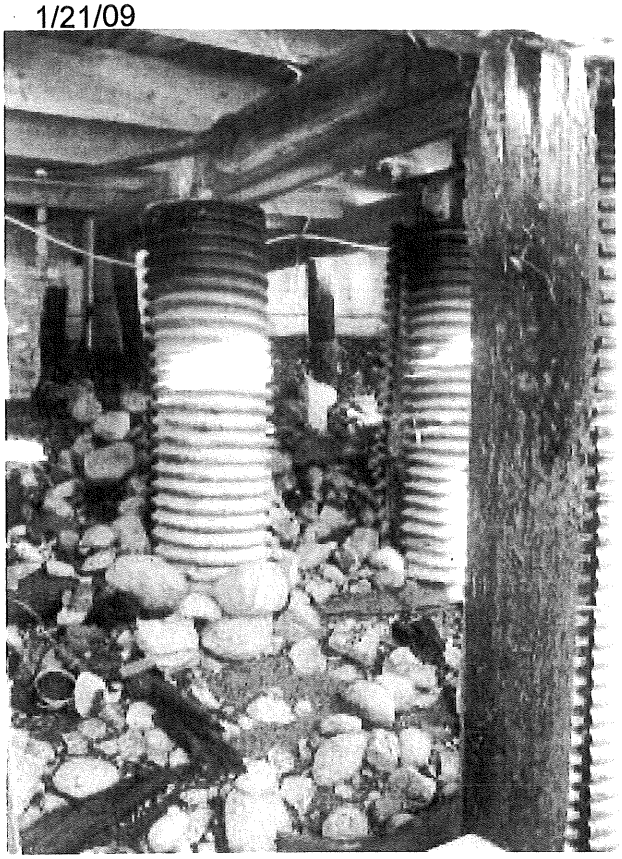
10B1.jpg

10B2.jpg

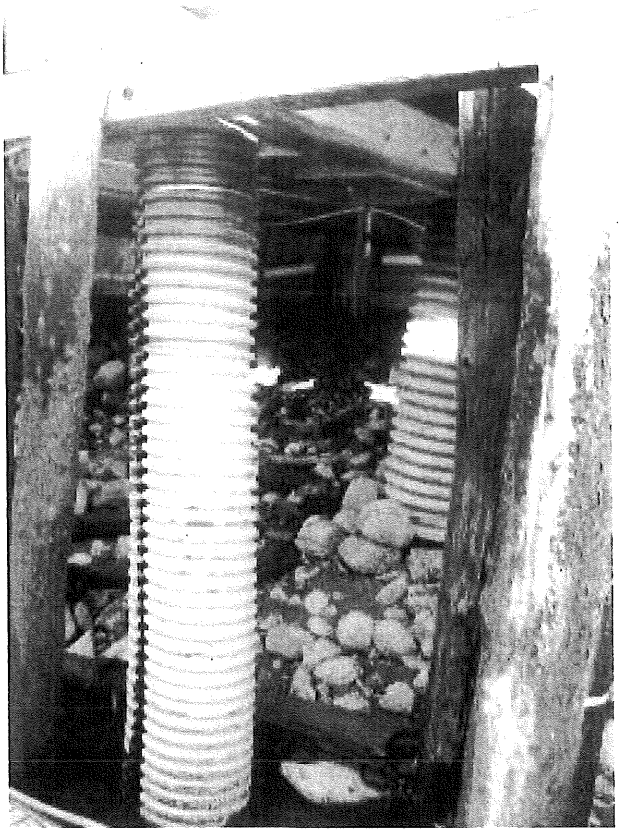


10C.jpg

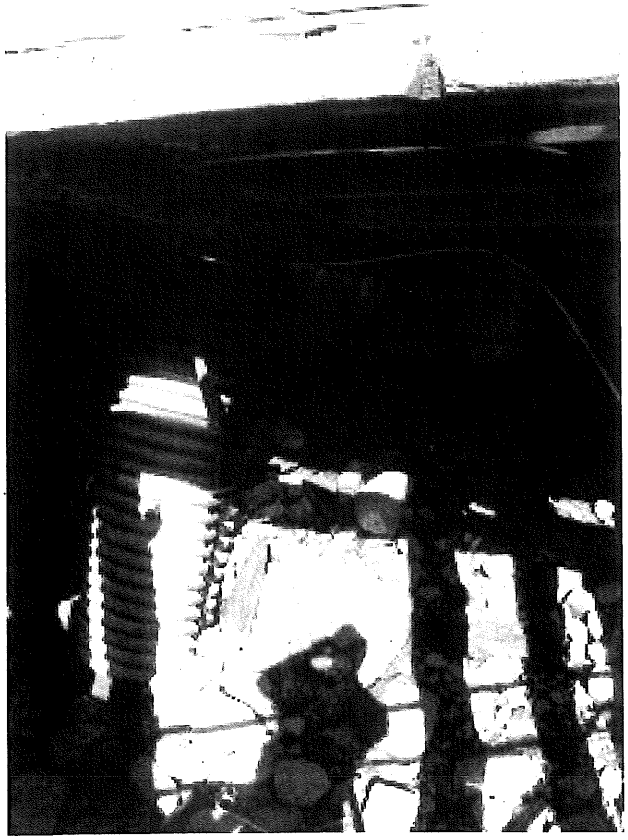
08046 Lilley Pier
1/21/09



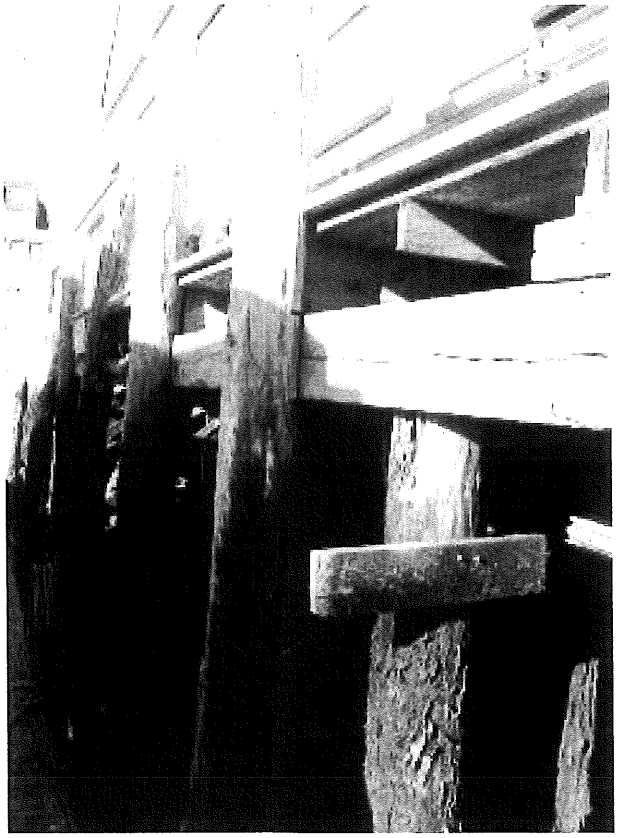
11B.jpg



11C.jpg



12B.jpg

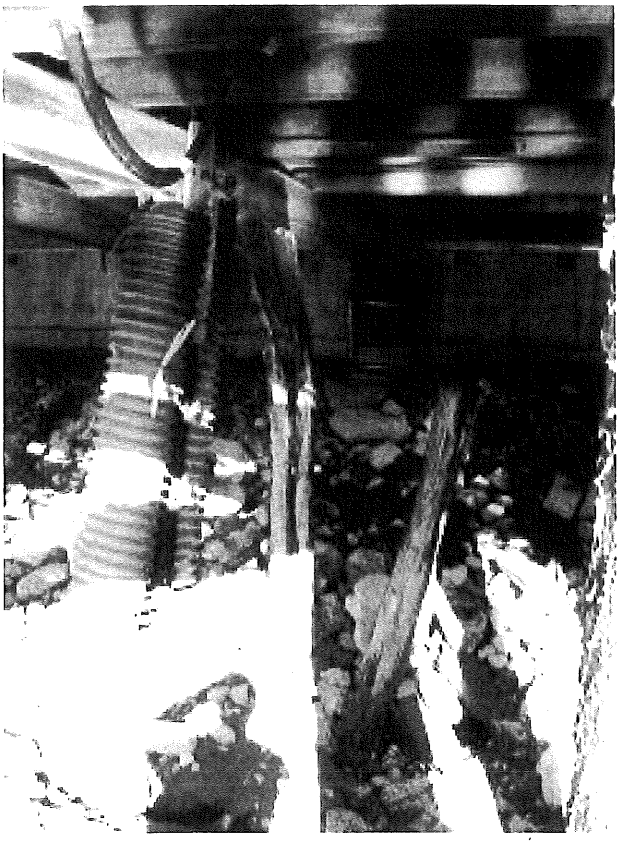


12C.jpg

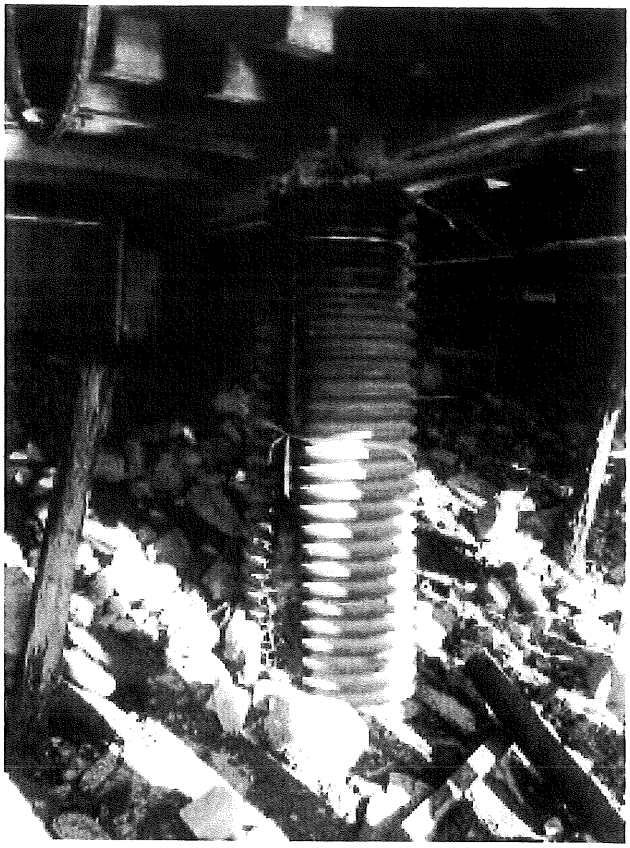
08046 Lilley Pier
1/21/09

13B.jpg

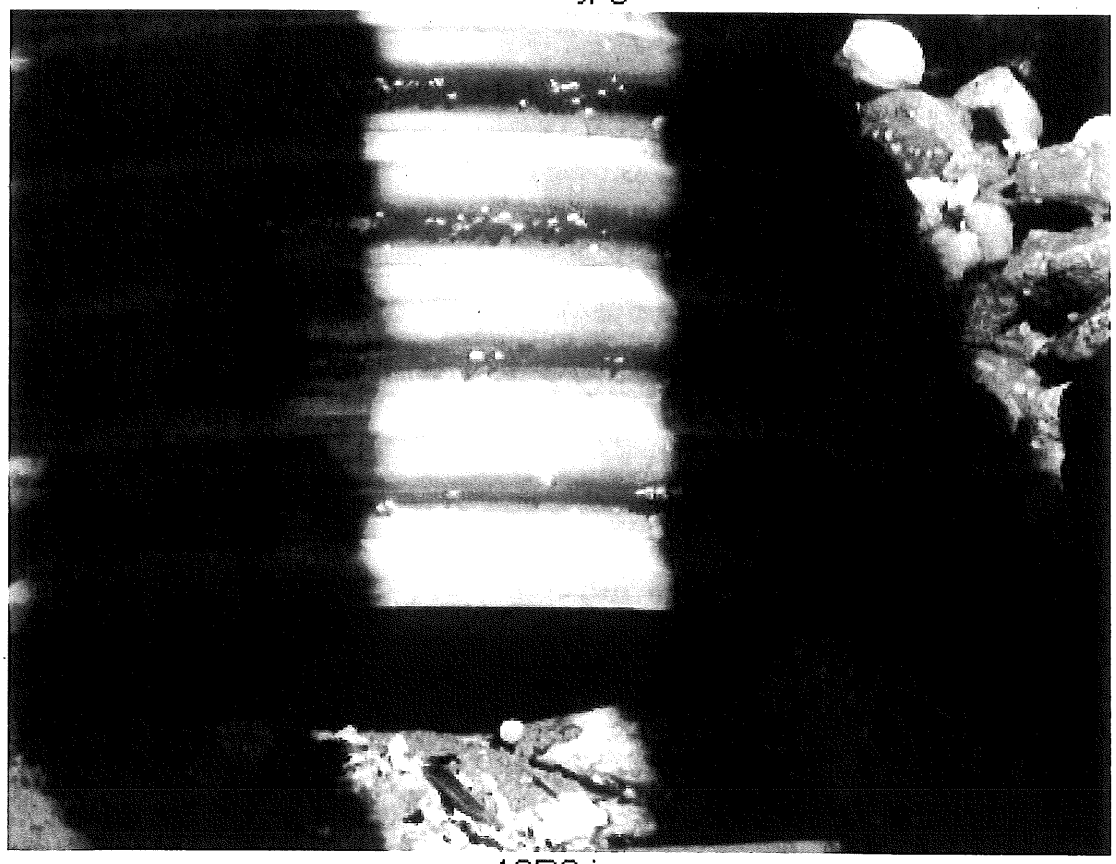
13C.jpg



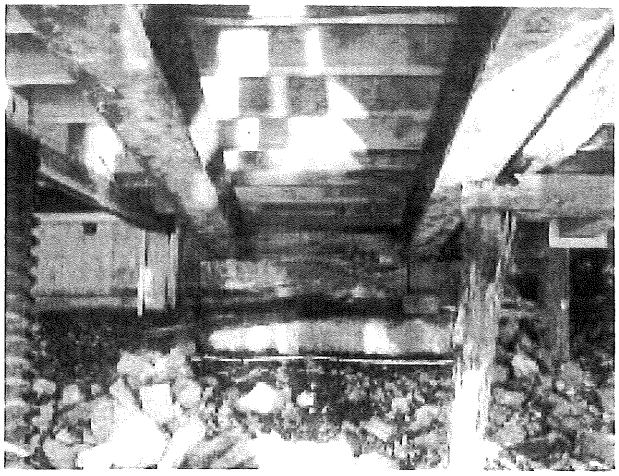
15AB.jpg



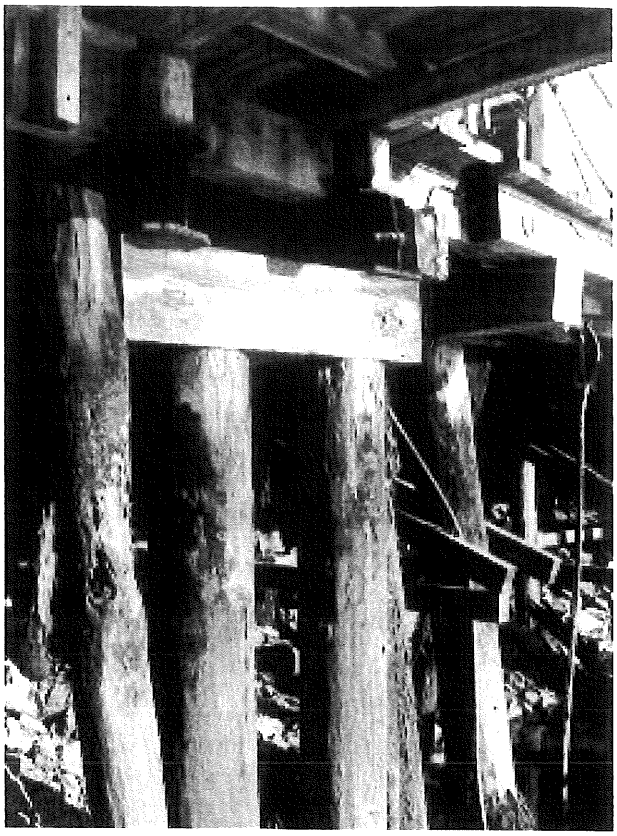
16B.jpg



16B2.jpg



17A.jpg

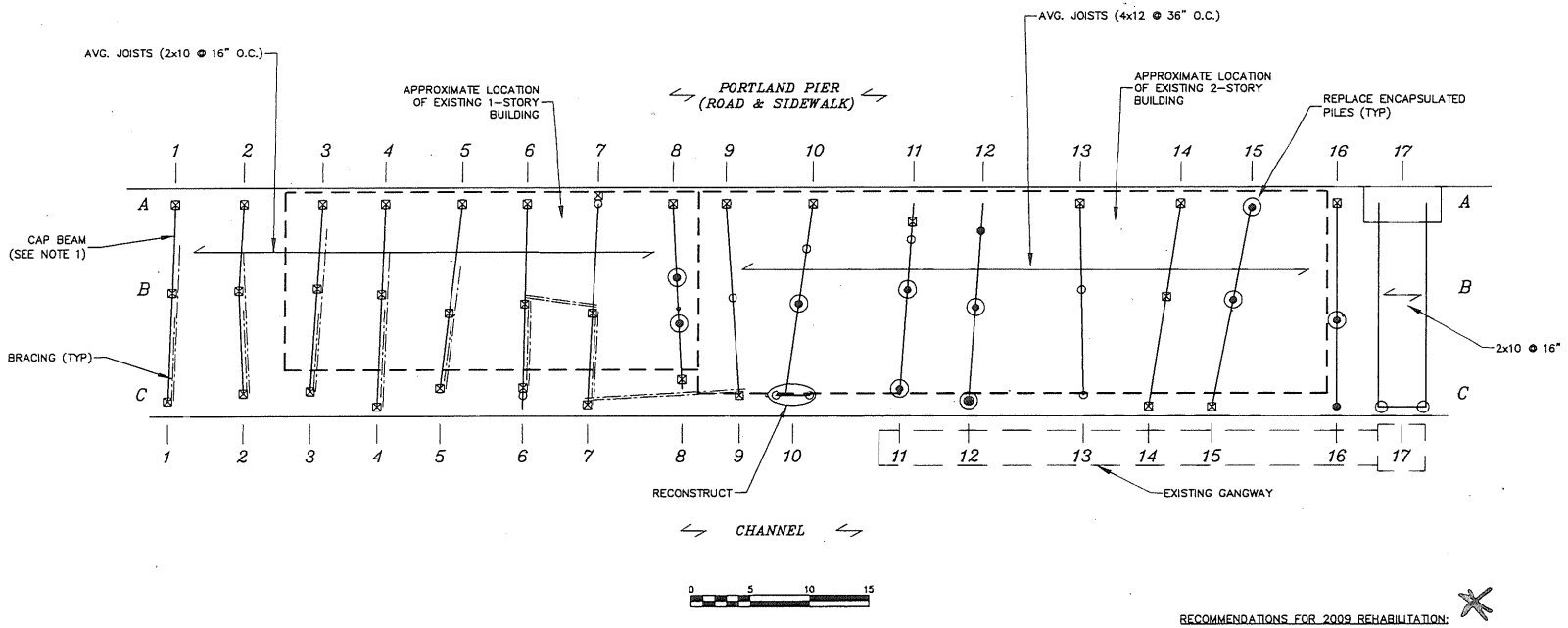


17Clr.jpg

17rB1.jpg

17rB2.jpg

APPENDIX D Plans



RECOMMENDATIONS FOR 2009 REHABILITATION:

- ◎ – REMOVE AND REPLACE ENCAPSULATED PILES WITH PT POST, ADD BRACING.
- ● – REMOVE AND REPLACE DETERIORATED PILE WITH PT POST, ADD BRACING.
- ⬭ – REPLACE EXISTING TWIN PILE SUPPORT WITH NEW PILE SUPPORT WITH PILE(S) THAT EXTEND FROM MUDLINE TO TRANSVERSE CAP BEAM AT DECK LEVEL.
- – REMOVE DEBRIS FROM SLOPE.

LONGER TERM MONITORING AND MAINTENANCE

- – GRID LINE 'C' REPLACE FENDER PILES AND EDGE BEAM.
- – CHECK BRACING FOR DAMAGE AND REPLACE.
- – CHECK JOISTS AND SISTER AS REQUIRED.
- – INSPECT PIER ON AN ANNUAL BASIS.

NOTES:

1. SEE TYPICAL SECTION ON SHEET 2.
2. RECOMENDATIONS FOR REHABILITATION AND ANNUAL MAINTENANCE BASED ON NOV 2008 SITE INSPECTION AND CONDITION ASSESSMENT REPORT DATED 1/21/09..

BAKER DESIGN CONSULTANTS
Civil, Marine, and Structural Engineering
11 Stacy Brook Lane Yarmouth, Maine 04096 Tel. (207) 846-9224 Fax: (207) 846-1820

NO	DATE	INT
1	12.9.08	B.B
	Structural Assessment SUBMISSION	

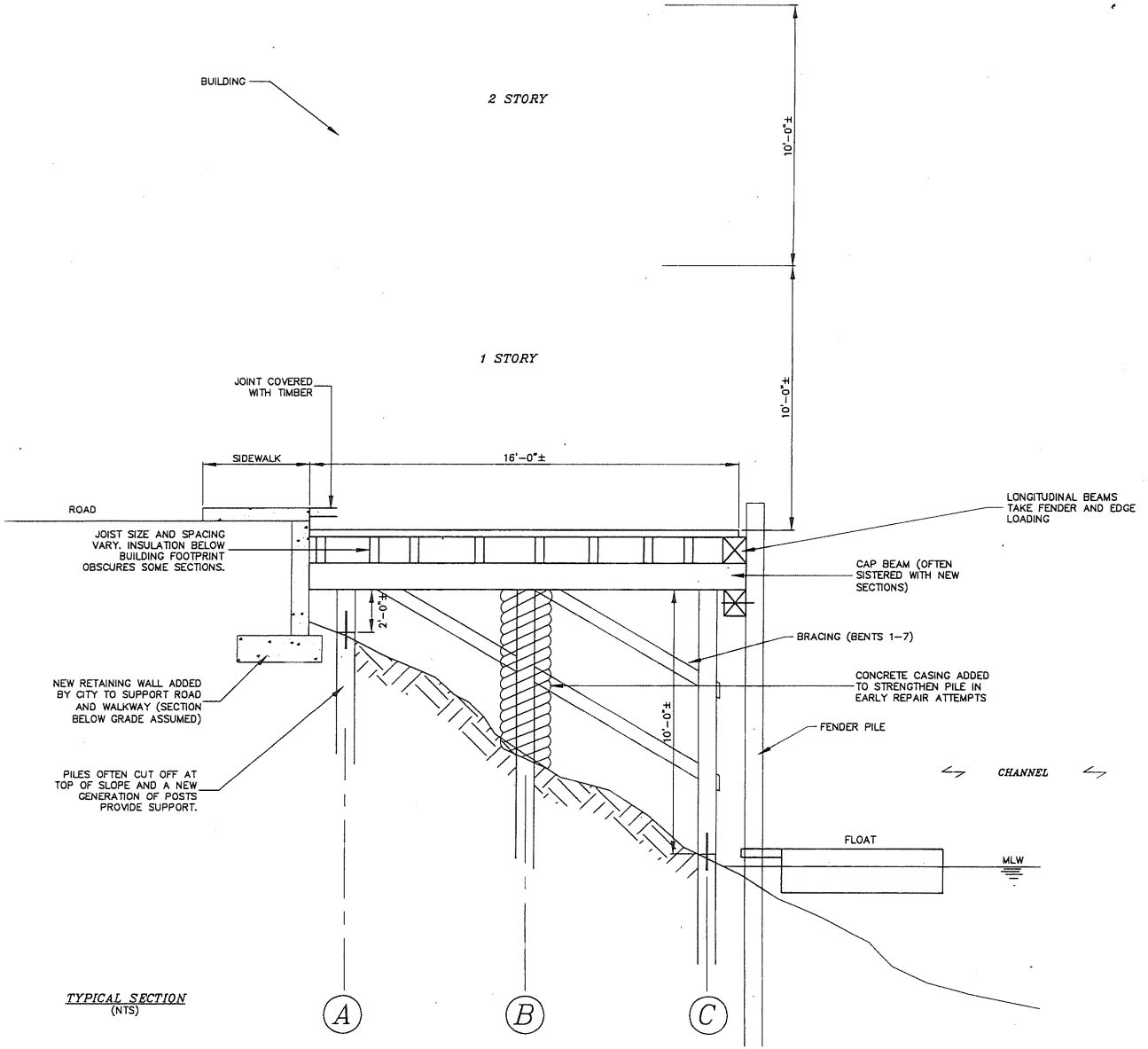
STATE OF MAINE BARNEY L. BAKER No. 5727 LICENSED PROFESSIONAL ENGINEER

DESIGNED BY: B.B
DRAWN BY: MSH
CHECKED BY: B.B
SCALE: AS SHOWN

SHEET TITLE: PIER STRUCTURE PLAN

PROJECT: PIER CONDITION SURVEY
DANIEL G. LULLEY
PORTLAND WHARF, PORTLAND, MAINE

DATE 12-08-08
CONTRACT NO. 08046
SHEET NO. 1 of 2
REV.



TYPICAL SECTION
(NTS)

BAKER DESIGN CONSULTANTS
Civil, Marine, and Structural Engineering
11 Stony Brook Lane Yarmouth, Maine 04096 Tel. (207) 846-9221 Fax (207) 846-9228

NO	DATE	BY
1	12.9.08	BJB
	Structural Assessment SUBMISSION	INT

BARNEY J. BAKER No. 5737 LICENSED PROFESSIONAL ENGINEER STATE OF MAINE

DESIGNED BY: BJB
DRAWN BY: MSH
CHECKED BY: BJB
SCALE: AS SHOWN

SHEET TITLE: TYPICAL PIER SECTION

PROJECT: DANIEL G. LILLEY
PIER CONDITION SURVEY
PORTLAND WHARF, PORTLAND, MAINE

DATE 12-08-08
CONTRACT NO. 08046
SHEET NO. 2 of 2
REV.