APPENDIX B

STUDY TEAM

VITAES

APPENDIX A

CONTRACT

SCOPE OF WORK

WORK ORDER NUMBER GS-3

MEMORANDUM OF AGREEMENT (MOA) BETWEEN THE PANAMA CANAL COMMISSION AND THE DEPARTMENT OF THE ARMY OF THE UNITED STATES OF AMERICA

ISA NUMBER SSC- 97003

1. Reference enclosed scope of work statement for a Concepts Only Study for Third Lock Alternatives which shall be performed under this Work Order and MOA 97-003.

2. Schedule: See Scope of Work.

3. The total effort will require $158.000 . The budget estimate is attached. The PCC will provide an Interagency Service Agreement indicating the funding level that the USACE can bill against . (ISA)

4. **All funds shall be provided to the Pittsburgh District for distribution as required. Mail funding document to Commander, U.S. Army Corps Of Engineers, Pittsburgh District, ATTN: CEORP-ED-D (J. Gribar), 1000 Liberty Ave., Pittsburgh, PA 15222-4186.**

5. The principle representatives for execution of the Work Order are as listed below and in the Scope of Work.

a. The Administrative principal representative for the MOA and Work Order are:

Mobile District: Daniel Prine (334) 690-2312. Alternate: Walter Ennaco (334) 694-4459

Panama Canal Commission: Mr. Henry J. Stec (507) 272-4075

b. The Technical principal representatives for the W.O. are:

Panama Canal Commission: Richard A. Wainio tel. (507) 272-7961.

Pittsburgh District: John C. Gribar tel. (412) 6821.

6. Any communications which change the terms of this Work Order shall be routed through the Mobile District Administrative principal representative (these are generally things dealing with budget, schedule or additional effort). Communications dealing with the technical aspects of the project shall be addressed to the Pittsburgh District Technical Principal Representative.

7. The work/services provided under this Work Order shall be provided by a combination of USACE in-house labor and contracted for personnel.

WORK ORDER NUMBER GS-003
SCOPE OF WORK
FOR A
CONCEPTS ONLY STUDY
THIRD LOCKS AND LOCK ALTERNATIVES
PANAMA CANAL COMMISSION
ISA NO. SSC-97003

1.0 BACKGROUND.

The Panama Canal has been in operation for over 82 years, during which time there has been tremendous growth in the number and size of ships that transit the waterway. Today the Canal operates at or near capacity, while the number of PANAMAX ships, the maximum size that can use the Canal, continues to increase. In the past, Canal locks limitations have determined, to a large extent, the composition of the world's oceangoing fleet. Technological changes to ship design and transportation systems are now driving the development of alternatives that threaten the Canal's future viability. Improvements to the current Canal and, perhaps, the construction of other transportation systems in Panama, such as a larger lock-type Canal, need to be planned to ensure Panama continues to serve world shipping efficiently in the 21st century.

2.0 GENERAL.

A study was undertaken several years ago to look at the feasibility of building a larger set of locks; locks that would be wider, deeper and longer. These locks would allow the world's shipping industry to explore options that would permit better economies in shipping cargo and would allow the Commission to provide better service to its customers. These studies estimated that the high-rise locks alternative would cost approximately $6.86 billion in 1990 dollars It is unlikely that an investment of this magnitude would be cost effective.

Further studies are needed to identify innovative and non-tradition design and construction techniques and lock sitings and combinations that would provide substantial cost reductions from previous locks concepts. It is also necessary to identify potential methodologies and lock alternatives that would achieve the same objectives while reducing implementation costs and providing at least the same level of service to the Panama Canal's customers 50 years into the future.

3.0 DESCRIPTION OF WORK TO BE PERFORMED.

This Statement of Work (SOW) will be inclusive of all tasks necessary for U.S. Army Corps of Engineers (USACE) to assemble a broad-based multi-specialized team and perform a Concepts Only Study that will address the transportation of cargo across the isthmus of Panama. It will identify potentially economical third locks designs and lock alternative initiatives that could be used for 50 years or more into the future. The Panama Canal Commission (PCC) will separately update long-term traffic projections and provide them to the team for use in this study.

The Concepts Only Study would identify potential techniques, methodologies and alternatives for water, land, rail and air borne shipment of cargo across the isthmus (canal) that could be used for further development as cost savings initiatives. The study concepts should be realistic and visionary and present futuristic concepts of cargo transportation. It will define in schematic diagrammatic, photo and written form the general methods and concepts that could be implemented. This Study will be conducted by an eight member team with expertise in the areas of innovative and non-traditional lock design and construction, transportation systems, container ports, rail systems, traffic projections and economic analysis. Other individuals may participate as specialists as the need arises. Team members will be from the USACE, private practices and the academic arena. The PCC will provide two to four members from their staff, full or part-time, who are knowledgeable of the Canal, Canal economics, lock design and past studies. Other staff may be requested to participate as needed by the study team.

4.0 **PRINCIPAL REPRESENTATIVE.**

Mr. John C. Gribar, USACE, Pittsburgh District, phone number 412-395-7256, is designated as the principal representative to serve as the point of contact for all technical matters relating to this work order. He will also serve as Team Leader for the Study. His mailing address is:

USACE, Pittsburgh District
1000 Liberty Ave, Rm. 1934
Pittsburgh, PA 15222

The E-mail address is: jgribar@smtp.orp.usace.army.mil

Mr. Richard A. Wainio is the designated principal representative for the Panama Canal Commission. His phone number is 011-507-272-7961 and the mailing address is:

Panama Canal Commission
Unit 2300
APO AA 34011-2300

The E-mail address is: pcc.ep@pananet.com

5.0 **REQUIREMENTS.**

5.1 **USACE Furnished Items.**

- All labor, materials and travel as required to perform and complete the scope of services covered under this W.O.

- Formulation of the team and contracting for the non-government team members.

- Travel and per diem for the team members.

- Preparation of the Study report and submission in the required number of copies.

5.2 **PCC Furnished Items.**

- Updated traffic projections and possible trade scenarios for 50 years into the future.

- Past traffic projections.

- Copies of the Canal Alternatives Study (CAS Report).

- Meeting facilities, orientations and briefings as necessary and logistical support.

- Staff participation on the team and access to other specialized knowledge of key personnel.

- Pertinent mapping of the Canal area including hydrosurvey mapping.

6.0 **DELIVERABLES.**

The study will result in a draft (8 copies) and final report (15 copies), according to the dates noted in Section 7.0, SCHEDULE. The Concepts Only Report for Third Locks and Lock Alternatives will present in diagrammatic, photo and written form or a combination thereof, the alternatives developed by the Study Team. Each alternative will be accompanied with pros and cons, considerations or rationale for development of the alternative. The use of traffic projections will be stated and, if appropriate, movement from one alternative to another indicated at various traffic projection levels.

7.0 **SCHEDULE.**

1997

MAY	Home Office Orientation
1 JUNE	Receive current traffic projections from PCC.
19-27 JUNE	Panama - Orientation, work meeting and report preparation planning.
31 JULY	Submit Draft Report (near final form).
12 AUGUST	Receive PCC comments on draft report.
29 AUGUST	Submit Final Report.

8. The following reports shall be provided by Pittsburgh District to the PCC with a copy furnished to Mobile District.

a. Monthly billing with funds status.

b. Monthly progress reports.

9. Intellectual property rights: None.

10. Pittsburgh District shall be responsible for contracting for and contract administration of any necessary contracts, records maintenance and contract audit.

11. Amending or modifying this Work Order: Any modification or amendments to this work order shall be mutually agreed upon between the PCC, Mobile District and the Pittsburgh District in advance of any work being executed. No work dealing with the modification/amendment shall be executed until both PCC and Mobile have signed the modification/amendment to the work order.

12. Additional coordinating details and responsibilities are as noted in the Scope of Work.

For the Panama Canal Commission

Henry F. Sicc
Chief, Contracting Officer
General Services Bureau

5-16-97
Date

For the Department of the Army

William S. Vogel
Colonel, Corps of Engineers
District Engineer

22 May 97
Date

VITAE

NAME: John C. Gribar

PERSONAL:

Date of Birth: 05 October 1942
Citizenship: U.S.A.
Home: Murrysville, PA
Marital Status: Married

EDUCATION:

Master of Science, course work 1965-1968
University of Pittsburgh, Pittsburgh, PA

Bachelor of Science, Civil Engineering (Structures) 1964
University of Pittsburgh, Pittsburgh, PA

ACADEMIC AND PROFESSIONAL HONORS:

Chi Epsilon Civil Engineering Honorary Fraternity
Registered Professional Engineer, Pennsylvania
Presidential Management Award Nominee (1972)
Engineering News-Record, Construction Man-of-the-year Nominee (1992) - Point Marion Lock Project
Society of American Military Engineers; Goethals Medal Award Recipient for Engineering Excellence (1997) - Panama Canal Operation' s and Maintenance Study

PROFESSIONAL EXPERIENCE:

From May 1964 to the present, has served in various ascending positions of development and responsibility for the Pittsburgh District, U.S. Army Corps of Engineers. Currently serves as Chief, Design Branch, supervising approximately 55 employees with full responsibility for the design of the District' s projects. The Pittsburgh District has 23 Locks and dams and 16 flood control reservoirs. It also has maintenance responsibility for 2 of the 48 local flood control projects it has designed and had constructed. His experience includes all aspects of planning, designing, constructing, operating and maintaining the District' s projects. Included in this experience is developing innovative concepts for repair of existing projects and construction of new projects to achieve extended life and cost reductions.

SIGNIFICANT ASSIGNMENTS AND ACCOMPLISHMENTS:

1968-1973	Development and Implementation of the District' s Dam Safety Inspection Program.
1971-1972	Preparation of the "Floodproofing for Structures" Manual
1975-1981	Project Manager for the design and construction of the Bureau of Mines/Dept. of Energy project for Hydraulic Transportation of Coal and Mine Surface Test Facility.
1981-1986	Project manager for the design and construction of the Stonewall Jackson Flood Control Dam.
1982-1983	Project manager for the repair of the Kinzua Dam Stilling Basin. Largest use of silica-fume concrete in a project.
1987-1990	Project manager responsible for the design and preparation of plans and specifications for the construction of Point Marion Lock. Rock anchors used to permit the use of the existing lock wall as the major portion of the cofferdam.
1988-1990	Technical project manager responsible for the design and preparation of plans and specifications for the construction of Grays Landing Lock and Dam.
1995-1997	Study team leader for the Panama Canal Operation and Maintenance Study.
1993-pres	Engineering team leader for the Ohio River Main Stem Study.

BIOGRAPHICAL SKETCH
CARL D. MARTLAND
SENIOR RESEARCH ASSOCIATE
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Carl D. Martland graduated from MIT with a BS in Mathematics in 1968, an MS in Civil Engineering and the Civil Engineer degree in 1972. As a senior research associate in the MIT Department of Civil and Environmental Engineering, he has been actively engaged in transportation research since 1971. He is the director of the Civil Engineering Rail Group as well as the Program Manager of the Association of American Railroad' s Affiliated Research Laboratory at MIT. His current research addresses railroad reliability, rail equipment reliability, applications of new technology to railroad operations, and track maintenance planning and costing. As a specialist in rail transportation, he has dealt with many aspects of rail freight management and operations, including service planning, costing and control, equipment utilization, preventive maintenance, terminal operations, intermodal transportation, productivity, and technology assessment in studies conducted for the Association of American Railroads, the Federal Railroad Administration, the New England Transportation Consortium, and many individual railroads. He has participated in studies of rail operations in Spain, Columbia, Brazil, Egypt, China, and Japan.

Mr. Martland has worked extensively in the general area of railroad operations and economics. He supervised a series of studies of freight service and equipment utilization for the Boston & Maine railroad that led to annual savings of more than $3 million that were instrumental in allowing the railroad to emerge from bankruptcy. The Service Planning Model, which was developed in that study, remains the most widely used model for service planning in North America. He supervised a 3-year study of railroad productivity for the Association of American Railroads that addressed productivity measurement, investigated historical trends in productivity in the United States, and developed strategies for improving productivity. He also supervised the development of TRACS – the Total Right-of-way Analysis and Costing System that is used by many railroads for maintenance planning and costing. In recent years, he has conducted many studies concerning the potential benefits of advanced technologies, including automatic equipment identification, advanced train control systems, robotics and automation, expert systems, and information technologies. Finally, he has written extensively on railroad operations and economics; in 1989, 1990, 1991, 1993 and 1994 he won the Conrail Award for the Best Paper on Railroads presented to the Transportation Research Forum.

Mr. Martland teaches the Freight Transportation Management course at MIT and has offered special courses on railroad operations and economics as part of MIT' s summer session. He has arranged special courses on railroad management for the World Bank/Chinese Railways, the India Railways, the Association of American Railroads, and for individual railroads.

Mr. Martland is a Past President of the Transportation Research Forum; in 1991, he received the Herbert O. Whitten award for lifetime service to TRF. He is a member of the Transportation Research Board' s Committee on Intermodal Freight Terminal Design and the American Railway Engineering Association' s Committee 16 – Economics of Plant, Equipment, and Operations.

MICHAEL S. BRONZINI, Ph.D., P.E.
DIRECTOR
CENTER FOR TRANSPORTATION ANALYSIS
OAK RIDGE NATIONAL LABORATORY
OAK RIDGE, TENNESSEE USA

Dr. Bronzini has been conducting research on transportation systems since 1970. His current research interests include intelligent transportation systems, national transportation networks and intermodal systems, inland waterways, transportation cost and performance models, and alternative transportation fuels. He has produced more than 120 papers, reports, and presentations about his research. He is presently Director of the Center for Transportation Analysis at Oak Ridge National Laboratory in Oak Ridge, Tennessee. The Center conducts research in transportation energy policy, highway and intermodal planning, and defense transportation systems, and has an annual program level of $12.5 million. He is also Adjunct Professor of Civil Engineering at the University of Tennessee.

From 1986 to 1990, Dr. Bronzini was Professor and Head of Civil Engineering at Penn State University. Dr. Bronzini went to Penn State from The University of Tennessee, where he was Director of the Transportation Center and Professor of Civil Engineering. Prior to that he was manager of the Transportation Analysis Group at CACI, Inc., a management consulting firm in Arlington, Virginia. Earlier positions were Assistant Professor of Civil Engineering at the Georgia Institute of Technology, and Research Assistant at The Pennsylvania State University.

Dr. Bronzini holds the M.S. and Ph.D. degrees from Penn State and a B.S. degree from Stanford University, all in Civil Engineering. He is a registered professional engineer and is a member of the Transportation Research Board, American Society of Civil Engineers, Institute of Transportation Engineers, and several other societies. In 1982 he was the national president of the Transportation Research Forum.

JAMES D. PUGH, CTL
Black & Veatch Special Projects Corp.
Director of Marketing – Maritime Services

SPECIALIZATION:

Port master planning and management; Project management; Economic and feasibility studies; Terminal operations analysis; Market analysis.

BACKGROUND:

Mr. Pugh' s principal areas of competence are port master planning, port operations analysis, and market assessments. He has extensive experience in all facets of international transportation and logistics, and is a recognized leader in the worldwide port industry. His general management background in shipping adds market expertise to projects having strategic components in international trade and commerce.

PROJECT EXPERIENCE:

1997 – Panama Canal Alternatives Study, U.S. Army Corps of Engineers, Panama City, Panama - Consultant

Responsibilities: Study of alternatives for development of the Panama Canal and complimentary transportation systems which would improve the capacity and throughput of the canal and trans-isthmus cargo movements.

1995 - MSC Organizational Restructuring, U.S. Navy, Dept of Defense, Washington, DC - Program Manager

Responsibilities: Lead effort to reorganize and restructure the Military Sealift Command including the re-engineering of business processes and contracting practices.

1993 - Start-up of Scheduled Container Service, Americas Marine Express, Inc., Memphis, TN – President

Responsibilities: Started new container shipping service in US/Central America trade lane for the Kirby Corporation including administration, marketing and operations activities.

1993 - Shipping Market Feasibility Study, Dixie Carriers, Inc. Houston, TX – Consultant

Responsibilities: Analyze market potential and operating costs for shipping service in U.S. Gulf.

1993 - Recovery Process Engineering, Complex Metals, Inc.
Houston, TX – Consultant

Responsibilities: Design and cost precious metals recovery process from electronic scrap material for international non-ferrous metals trading.

1993 - Warehouse Design & Layout, NBM Associates, Inc.
Houston, TX – Consultant

Responsibilities: Design building modifications for metals storage and processing operations.

1993 - Organizational Audit, National Bronze & Metals, Inc.
Houston, TX – Consultant

Responsibilities: Analyze and evaluate staffing and organizational structure, work flow analysis, and development of personnel management system for metals distributor.

1992 - General Cargo Terminal RFP, Port of Pensacola
Pensacola, FL – Consultant

Responsibilities: Development and preparation of Request For Proposal for new general cargo terminal at the Port of Pensacola in coordination with master planning project.

1992 - Dry Bulk Terminal Design, Port of Penang
Penang, Malasia – Consultant

Responsibilities: Development and design of prototype bulk grain terminal for importing grains.

1992 - Southeast Asia Shipping Survey, U.S. Feed Grains Council,
Washington, DC – Consultant

Responsibilities: Market and shipping survey for exporting grains to Southeast Asia.

1992 - Liner Service Business Plan, Gulf-Americas Maritime,
Houston, TX – Consultant

Responsibilities: Market analysis and business plan development for new containership service.

1992 - Barter Trade Market Study, EXIMTRADE, Inc.
Chicago, IL – Consultant

Responsibilities: Market analysis for barter trade in commodities and bridge financing methods.

QUALIFICATIONS:

EXPERIENCE:

President, Transmark International, 1991-1995
Executive Director & CEO, Port of Houston Authority. 1984-1991
Executive Director, Indiana Port Commission, 1980-1984
Director of Marketing, J.E. Bernard & Company, 1976-1980
Corporate Transportation Manager, American Hospital Supply Corp., 1975-1976

EDUCATION:

Seatrade Academy, Cambridge University, 1991
Port Executive Management, University of Tennessee, 1980
Transportation Marketing, Northwestern University, 1977
B.S. Business, Indiana University, 1972

PROFESSIONAL REGISTRATION:

Registered Practitioner, Federal Maritime Commission
Certified Member, American Society of Transportation and Logistics

PROFESSIONAL ASSOCIATIONS:

American Association of Port Authorities
Inland Rivers, Ports and Terminals
Permanent International Association of Navigation Congresses
Gulf Ports Association
National Defense Transportation Association

Year Joined Black & Veatch: 1996

Total Years of Experience: 25

Citizenship: U.S.A.

M. JOHN VICKERMAN
VICE PRESIDENT
CIVIL ENGINEER
ARCHITECT
Vickerman-Zachary-Miller/TranSystems

M. John Vickerman is a Principal of Vickerman-Zachary-Miller (VZM)/TranSystems, an engineering architectural firm, which specializes in the planning and design of marine and intermodal rail transportation facilities. Under his leadership, VZM has become a nationally and internationally recognized firm known for providing innovative solutions to the many operational, planning and design issues which currently confront the transportation industry.

Since January, 1991, Mr. Vickerman has served on the Committee for a Study of Landside Access to U.S. General Cargo Ports and is now chairperson for the Intermodal Freight Terminal Design and Operations Committee (A2M03). Both appointments are under the purview of the United States Transportation Research Board of the National Research Council. From August of 1995 to March of 1997, he has been selected to serve as a member of the Steering Committee for the Conference on Setting an Intermodal Transportation Research Framework, also under the purview of the TRB.

EDUCATION:

B.S., Architectural Engineering, California Polytechnic State University, San Luis Obispo, 1971

M.S., Structural Engineering, University of California, Berkeley, 1976

REGISTRATIONS:

California Civil Engineer, 1975
Washington Civil Engineer, 1980
California Architect, 1980
Maryland Architect, 1987
Hawaii Architect, 1990
New Jersey Architect, 1991
Pennsylvania Architect, 1991
Virginia Architect, 1993
Florida Engineer, 1993
Massachusetts Architect, 1993
New York Architect, 1993
Mississippi Architect, 1996
Texas Architect, 1996
Indiana Architect, 1996
Virginia Engineer, In Progress
Maryland Engineer, In Progress
NCARB #32456
NCEE #11840

PROFESSIONAL EXPERIENCE:

Officer-in-Charge and Principal Investigator to develop a course on intermodalism for the United States Federal Highway Administration and the National Highway Institute titled "Landside Access for Intermodal Facilities."

Officer-in-Charge of a project commissioned by Sandia National Laboratories to explore advanced technologies for intermodal international ports of entry. Researched the available and emerging technologies and information systems for use in the intermodal freight transportation industry and presented a representative list of companies and products available.

Officer-in-Charge of the Intermodal Rail Facilities Master Plan, Port of Long Beach.

Officer-in-Charge of design for an on-dock intermodal facility for Maersk Line at Pier J, Port of Long Beach.

Officer-in-Charge of planning and designing a 100-acre Regional Rail Transfer Facility, Delaware River Port Authority.

Officer-in-Charge of planning, design and construction management services for the $8.5 million ExpressRail Intermodal Transfer Facility at the Port of New York and New Jersey.

Officer-in-Charge of the marine terminal operations and physical planning analysis on a study to enhance the port-rail interface at the Ports of New York/New Jersey.

Project Manager for conceptual study of the on-dock intermodal rail facilities for Maersk Terminals/Sea-Land site at the Port Authority of New York and New Jersey.

Officer-in-Charge of the Chatham Intermodal Freight Study, State of Georgia/ Department of Transportation.

Officer-in-Charge of strategic and master site development plan for inter-modal cargo facilities, including break-bulk and dry bulk, container storage, rail, truck and ship operations at the Mississippi State Port at Gulfport.

Officer-in-Charge of Master Planning Services for the Port of Miami, focusing on intermodal facility improvements that would more efficiently accommodate existing cargo while preparing for increased cargo throughput capabilities.

Officer-in-Charge of a rail transfer facility demonstration project, Port of Oakland.

Officer-in-Charge for port development and intermodal rail feasibility study at Subic Bay Freeport, a former U.S. Naval Base located in the Philippines.

Officer-in-Charge of the VZM team to create conceptual designs to be used as the basis for project funding and future design phases at three Sea-Land intermodal port and rail facilities in Russia and in the Republic of Georgia.

Officer-in-Charge of a project to review and provide a second opinion for the Port of Rotterdam' s existing Master Plan Report, "Rail Container Transport til the year 2000."

VITAE

NAME: Byron K. McClellan

PERSONAL:

Date of Birth: 21 November 1947
Citizenship: U.S.A.
Home: Salem, Indiana
Marital Status: Married

EDUCATION:

Master of Science, Civil Engineering (Structures), 1976
University of Louisville, Louisville, Kentucky

Bachelor of Science, Civil Engineering, 1970
Purdue University, Lafayette, Indiana

ACADEMIC AND PROFESSIONAL HONORS:

Chi Epsilon Civil Engineering Honorary Fraternity
1995 Researcher of the Year Award, U.S. Army Corps of Engineers;
Louisville District Award and Ohio River Division Award
Registered Professional Engineer; Indiana and Kentucky

PROFESSIONAL EXPERIENCE:

February 1970 to present - US Army Corps of Engineers, Louisville District, currently Chief, Design Branch, Engineering Division. Experience includes structural engineering planning, design and construction associated with major Ohio River navigation structures including McAlpine Locks and Dam, Cannelton Locks and Dam, Newburgh Locks and Dam, Uniontown Locks and Dam, Smithland Locks and Dam, Lock and Dam 53 and Olmsted Locks and Dam. This has included developing innovative solutions for locks and dam construction including in-the-wet construction, floated-in construction, thin-wall, roller-compacted concrete and grouted rockfill lock wall construction. Experience includes involvement in the design of innovative lock filling and emptying systems and the construction of "temporary" cellular sheet-pile lock structures.

Mr. McClellan also served on a Design and Construction Innovations for Locks and Dams Task Force, formed by the Director of Civil Works.

SIGNIFICANT REPORTS AND DESIGN GUIDANCE DOCUMENTS
(Contributing-Author):

- USACE, Report of the Task Force on Design and Construction Innovations for Locks and Dams, Phase I Feasibility, EP 1110-1-14, dated 31 October 1993.
- USACE Engineering Manual, EM 1110-2-2607, Planning and Design of Navigation Dams, dated 31 July 1995.
- USACE Technical Letter, ETL 1110-2-342, Engineering and Design, Seismic Analysis and Design of Reinforced Concrete Locks, 30 November 1995.
- USACE Regulation, ER 1110-2-1806, Engineering and Design, Earthquake Design and Evaluation for Civil Works Projects, 31 July 1995.
- The Composites Institute paper, "Composite Wicket Gate Development, Olmsted Prototype Dam," January 1997.

PATENTS: (Assigned to U.S.A., Secretary of the Army)

Patent No. 5,277,517, titled "Mobile Cofferdam"
Patent No. 5,199,812, titled "Hydraulic Fixed Strut Gate"
Patent No. 5,211,700, titled "Movable Dam Gate for Regulating Water in a Navigable Pass"

VITAE

NAME: David A. Weekly

PERSONAL:

Date of Birth: 06 April 1952
Citizenship: U.S.A.
Home: Ona, WV
Marital Status: Married

EDUCATION:

Master of Science, Engineering Management, 1993
West Virginia Graduate College, Institute, WV

Bachelor of Science, Agricultural Engineering, 1974
West Virginia University, Morgantown, WV

ACADEMIC AND PROFESSIONAL HONORS:

Alpha Epsilon, Agricultural Engineering Honor Society
EIT, WV
Planning Excellence Award, 1985
Ohio River Division Engineering Excellence Award, 1993
Department of the Army Certificate of Appreciation for Patriotic Civilian Service, Participation in Process Action Team between the Navigation Industry and the Corps, 1997

PROFESSIONAL EXPERIENCE:

From July 1974 to present, has served in various ascending positions of development and responsibility for the Louisville District, Waterways Experiment Station and the Huntington District, U.S. Army Corps of Engineers. Currently serves as Chief, Great Lakes and Ohio River Division Navigation Planning Center, supervising 18 employees in accomplishing highly complex navigation system studies. The objective of these studies is to determine the need for navigation improvements throughout the Ohio River Basin and the proper size, timing and transportation benefits for the considered improvements. Analyses must support recommendations that typically involve multi-million dollar investments. Responsible for directing all facets of the navigation system studies, including study management, programming and budgeting, selection and application of appropriate navigation models, data development, model execution, interpretation of outputs, and report preparation. Mr. Weekly is the senior navigation modeling specialist and personally directs the more difficult and technically demanding studies.

SIGNIFICANT ASSIGNMENTS AND ACCOMPLISHMENTS:

1976-1980 Responsible for adapting a computer model (Tow Cost Model) and supporting databases for measuring the incremental system (congestion) impacts of larger locks at Galipolis (now named R.C. Byrd) on the entire inland waterway system. Designed and wrote significant portions of the Gallipolis Locks Replacement Feasibility Report.

1981-1982 While on staff at the Waterways Experiment Station, directed a major modification of one of the Corps' Inland Navigation Systems Analysis (INSA) computer models called the Waterway Analysis Model (WAM). The model was redesigned to simulate traffic movements through an interconnected series of locks and bendways on the Lower Tombigbee River. Model output on lock and bendway transit times and capacity values was used directly by the Tow Cost Model to calculate the navigation benefits associated with improving the locks and bendways.

1983-1986 Primary contributor to the benefit evaluation methodology on Winfield Locks and Dam modernization. The study involved the addition a larger (110' x800') lock at the existing site to operate in conjunction with the existing twin 56-foot by 360-foot locks. Directed the lock capacity studies for the existing locks, nonstructural improvements, and alternatives, including development of future fleet sizes and characteristics.

1987-1991 As the Center study manager for the Lower Tennessee-Cumberland River Study, completed the navigation systems analysis for the Kentucky Lock Addition. This study required the development of a complicated model which would incorporate the economics of alternate waterway shipping routes in assessing the benefits for modernizing the Lower Cumberland-Tennessee River systems. Modified and adapted the Waterway Analysis Model to determine capacities of restrictive bends and locks operating in combination.

1991-1993 For the Operating Characteristics and Capacity Evaluation Study for Panama Canal, modified the inland navigation Waterway Analysis Model (WAM) to simulate the deep draft operations of the existing Panama Canal and improvement alternatives. Completed all of the technical modifications to the model, designed the network to represent the Canal and assisted DOE and TAMS Consultants, Inc. personnel in calibrating and verifying the model. Provided technical assistance with the actual model runs to determine the capacities of the existing Canal locks and study alternatives.

1995-1996 As Assistant Chief of the Center, served as a study team member on the Panama Canal Operations and Maintenance Study. Addressed factors that affect Canal capacity and utilization, including transit rules, existing and future ship mix, arrival patterns, lock maintenance schedules, and availability of key resources, such as locomotives and tugboats. The analysis was part of the larger purpose of optimizing Canal operations in order to meet current and future traffic demands, while satisfying quality of service goals as measured by key operational performance indicators, such as transit time.

1993-pres Served as Economic team leader for the Ohio River Main Stem

Study. This study, began in 1990 and initially focused on the advisability of improving navigation along the lower Ohio River, has reached the feasibility stage as first conceived. As the study progressed, guidance was received to incorporate the entire Ohio River in the study. For this study, new techniques are being developed for risk-based analysis to determine the economic benefits of navigation improvements, such as low-capital-cost lock construction alternatives.

PUBLICATIONS:

Tow Cost Model User' s Manual, 1986.

→Waterway Analysis Model User' s Manual, Deep-Draft Version, 1993.

→Operating Characteristics and Capacity Evaluation for the Panama Canal, (Joint Author with Dr. Mike Bronzini of USDOE and Albert Roselli of TAMS) Permanent International Association of Navigation Congresses (PIANC) Technical Paper Presented at 1994 International Meeting in Seville, Spain.

Simulation of Inland Waterways Traffic Systems as a Line of Communication Component in OCONUS Sustainment Operations, (Joint Author with Dr. Larry Daggett of Waterways Experiment Station), Proceedings of 62nd Military Operations Research Society, 1994, Colorado Springs, CO.

VITAE

NAME: Frank Zovack

PERSONAL:

Date of Birth:	17 Feb 1949
Citizenship:	U.S.A.
Home:	Upper St. Clair, PA
Marital Status:	Married

EDUCATION:

Bachelor of Science, Mechanical Engineering, 1971
West Virginia University, Morgantown, W. VA.

ACADEMIC AND PROFESSIONAL HONORS:

Registered Professional Engineer, Pennsylvania
Commander' s Award for Civilian Service (1997)
Panama Canal Operation' s and Maintenance Study

PROFESSIONAL EXPERIENCE:

From August 1972 to present has served in various ascending positions of development and responsibility as a mechanical engineer for the Pittsburgh District, U.S. Army Corps of Engineers. Currently serves as Chief, Electrical and Mechanical Design Section which has responsibility for electrical and mechanical design for the Pittsburgh District' s 23 Locks and Dams and 16 flood control reservoirs. Significant engineering services were also provided to The Bureau of Mines, The Department of Energy, The Soils Conservation Service, Veterans Administration, The 99th ARCOM, and The Panama Canal Commission. He has championed innovative designs in the navigation field to include application of modern hydraulic systems, thru sill filling and emptying systems, and operations systems automation, in the interest of reducing construction and operations costs and increasing reliability.

SIGNIFICANT ASSIGNMENTS AND ACCOMPLISHMENTS:

1975-1981	Provided mechanical engineering services to the Bureau of Mines for design and construction of a unique lump coal, hydraulic transport facility.
1981-1984	Project Manager for design and construction of the Coal Preparation Laboratory for the Department of Energy.
1981-1986	Provided Engineering services for relocation and updating of a commercial gas compressor station and relocation of approximately 30 miles of interconnecting piping.
1981-1994	Provided Design and start-up for a Station Hydropower Plant at Stonewall Jackson Dam.
1991-1995	Responsible for design and implementation of innovative direct connect hydraulic cylinder operation of miter gates at Lock #4 Allegheny.
1991-Pres	Responsible for design of innovative hydraulic cylinder operated 110' tainter gates for Monongahela River Dam #2.
Present	Developing concepts for through sill filling and emptying system for the new lock at Mon #4.

APPENDIX C

P H O T O S

Photo No. 1 - MIT Container Terminal

Photo No. 2 - Evergreen Container Terminal

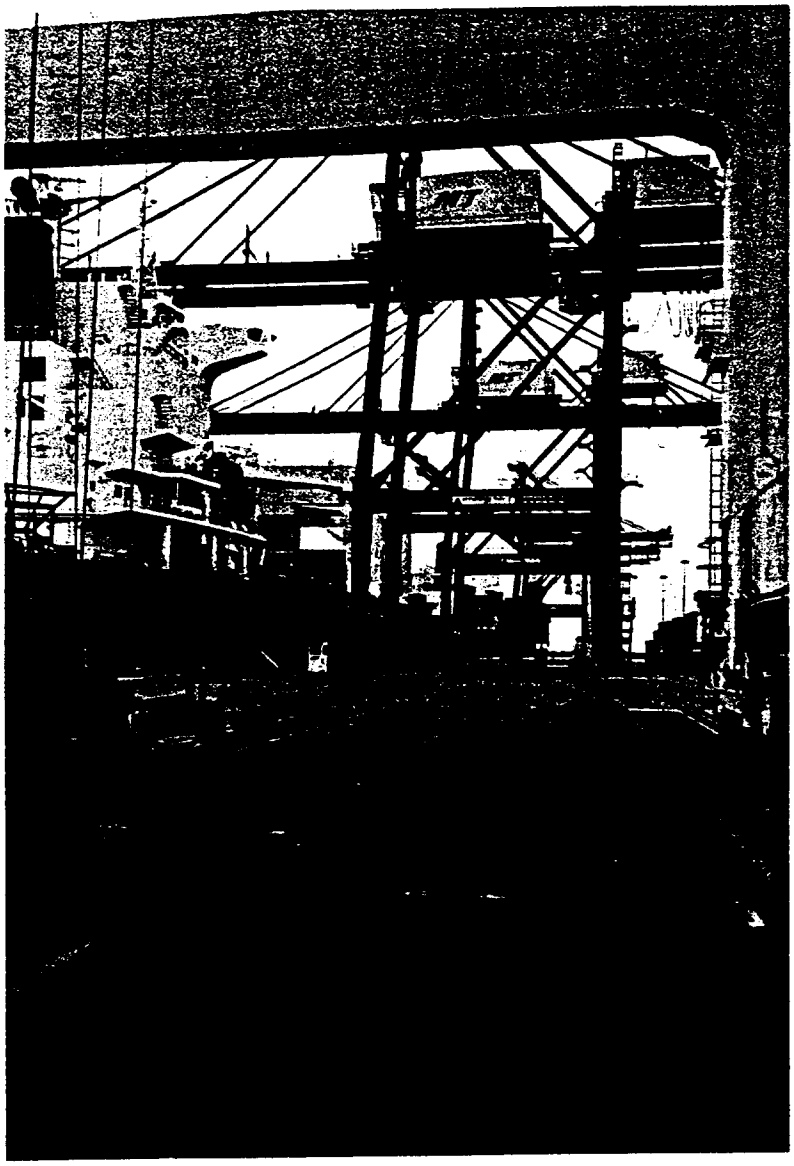


Photo No. 3 - MIT Container Terminal
for Only Truck Operation

Photo No. 4 - Triple Bottom Trailers

Photo No. 5 - Road Train

Photo 6 - Road Train

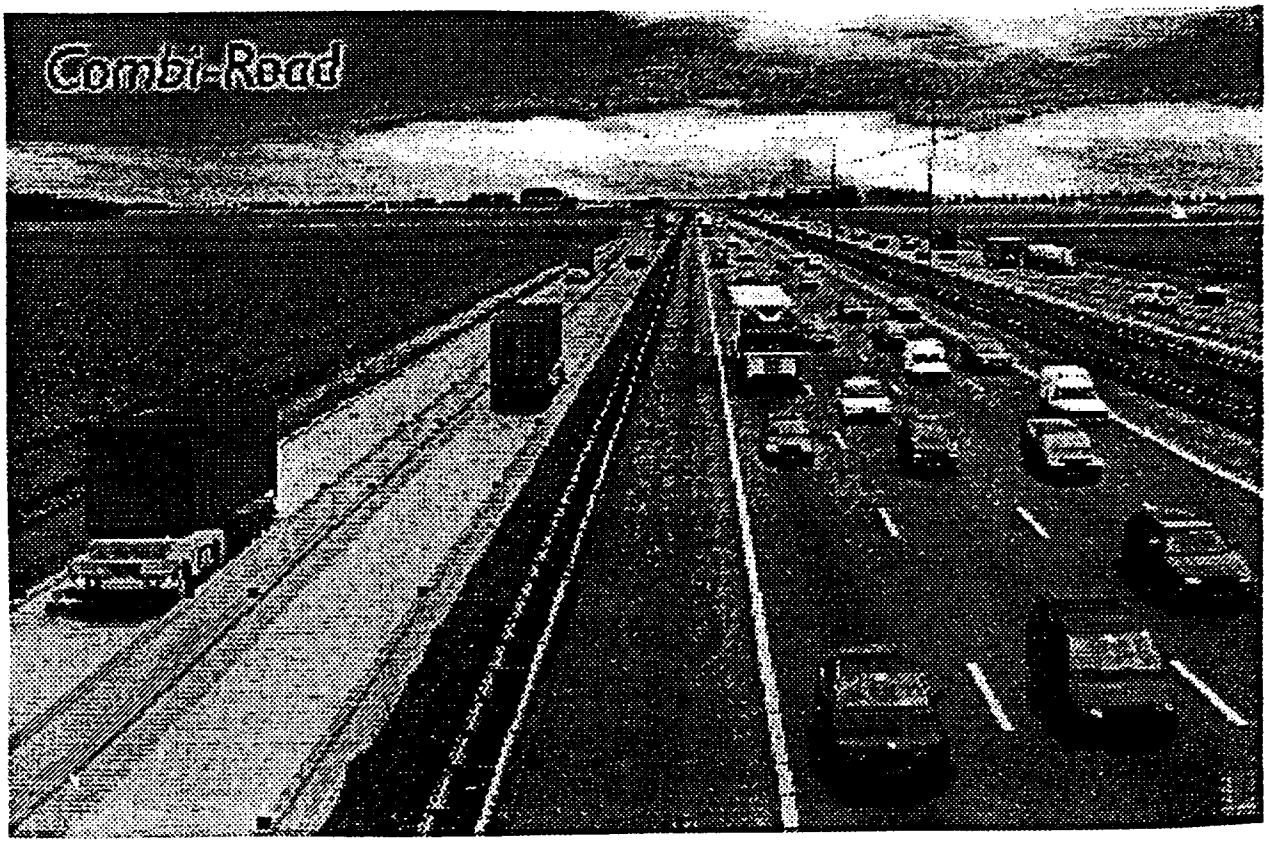


Photo No. 7 - Acombi-road

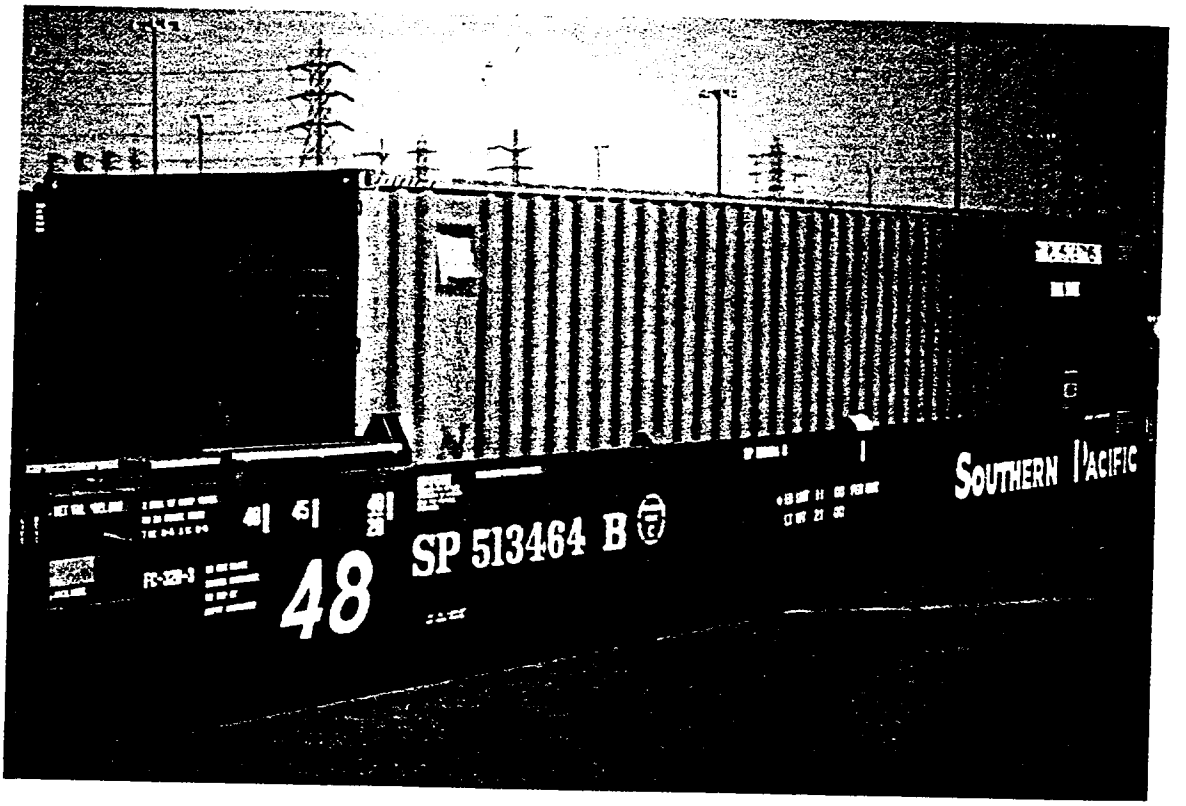


Photo No. 8 - Well Type Rail Car with Container

Photo No. 9 - Double Stack Intermodal Train

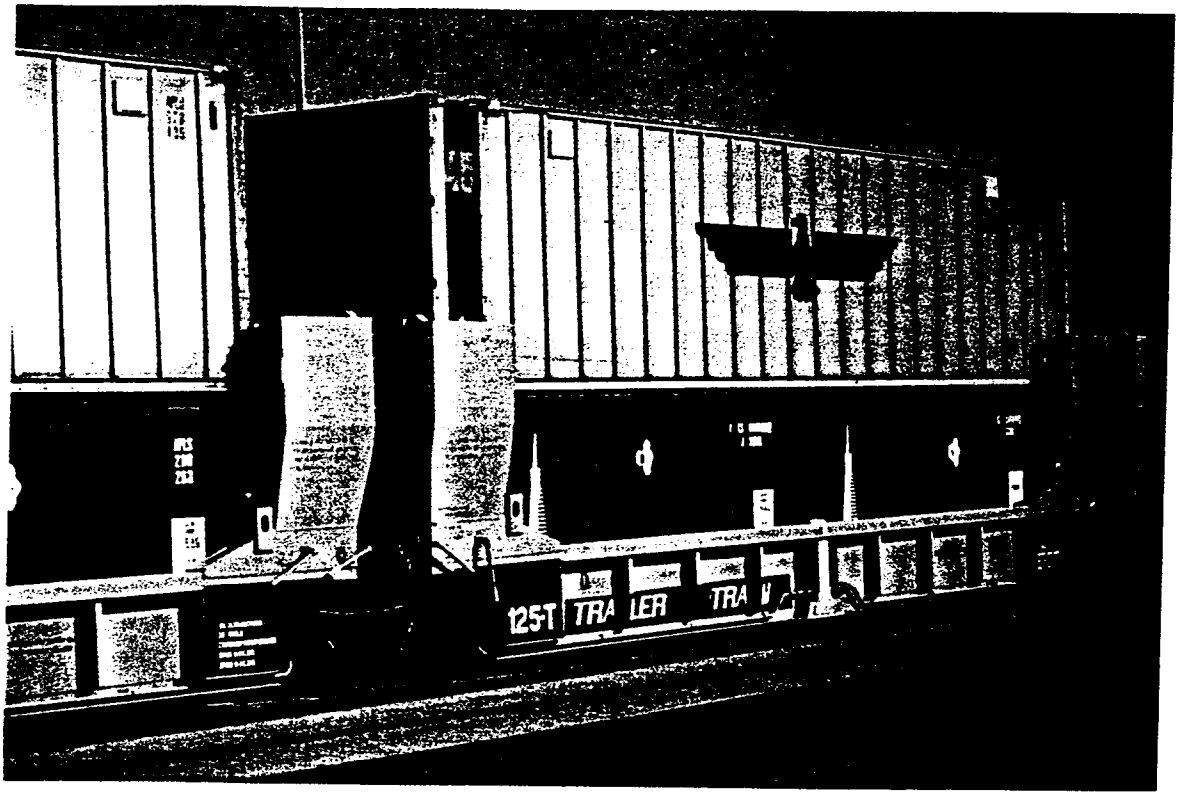


Photo No. 10 - Double Stack Rail Car with Bulkhead

Photo No. 11 - Intermodal Container Transfer Facility Gate Area

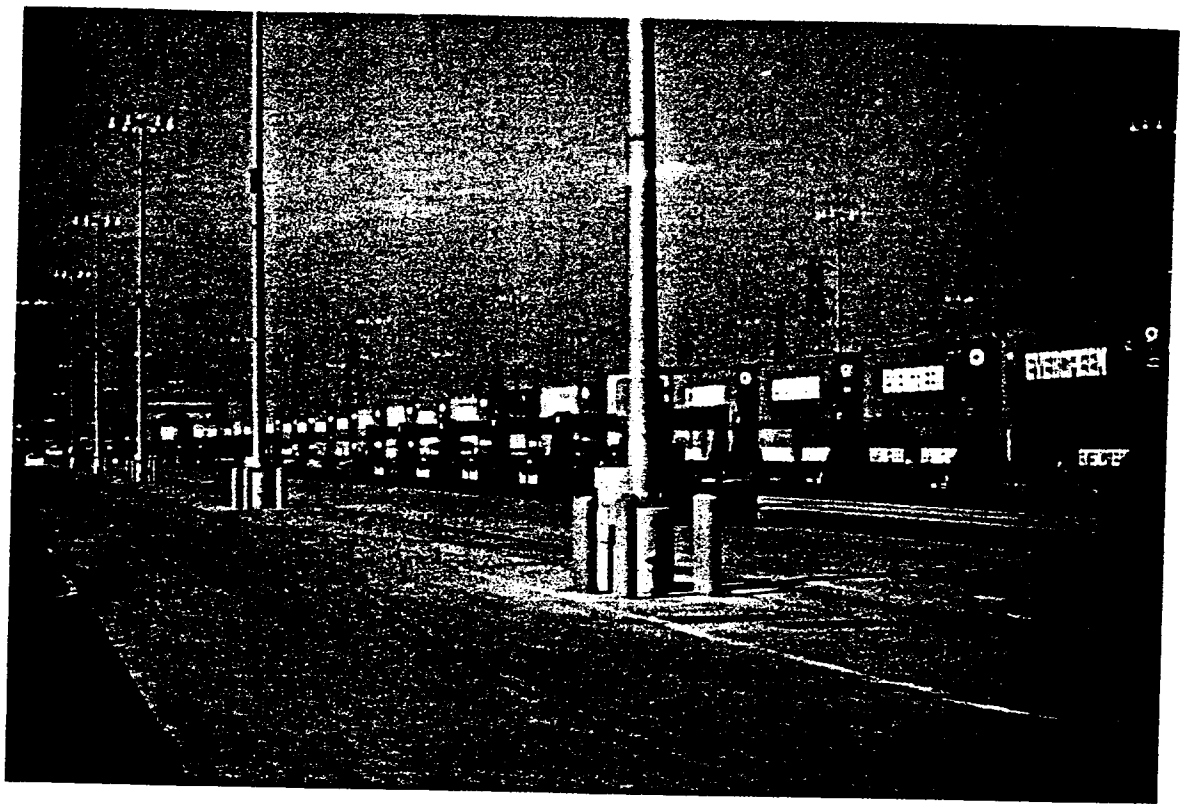


Photo No. 12 - Double Stack Trains

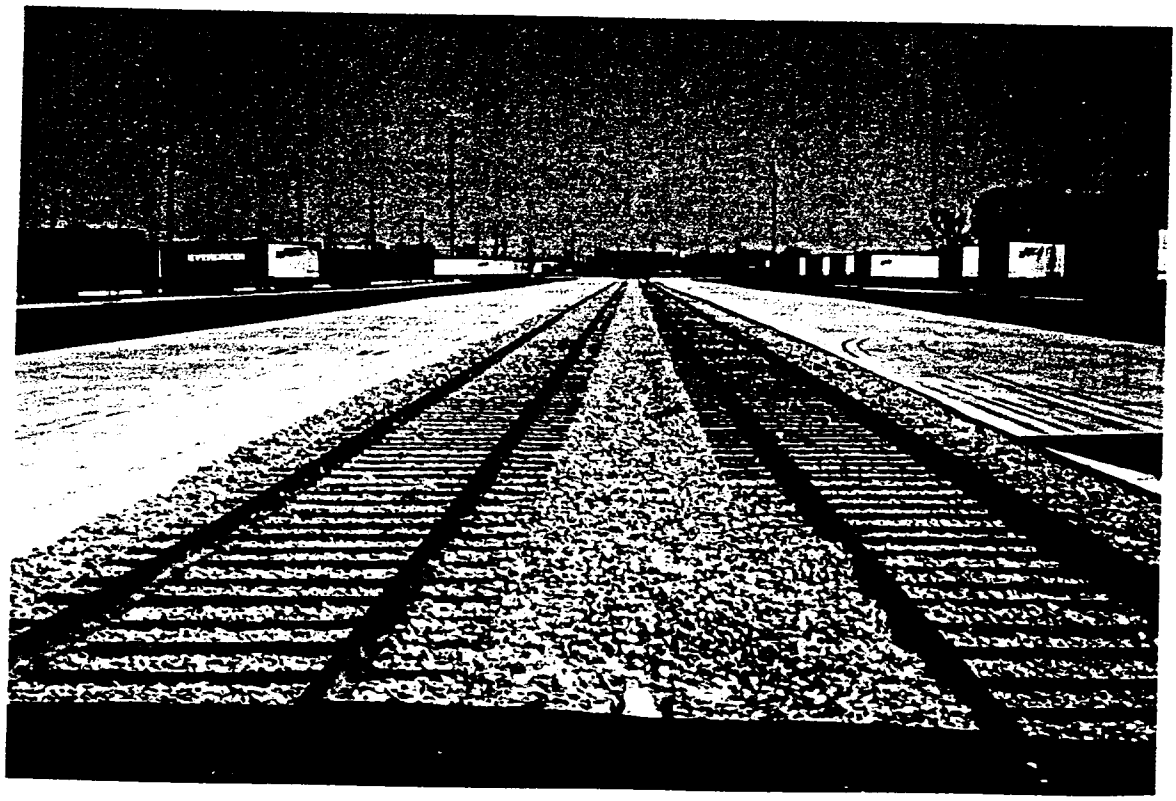


Photo No. 13 - Intermodal Rail Facility

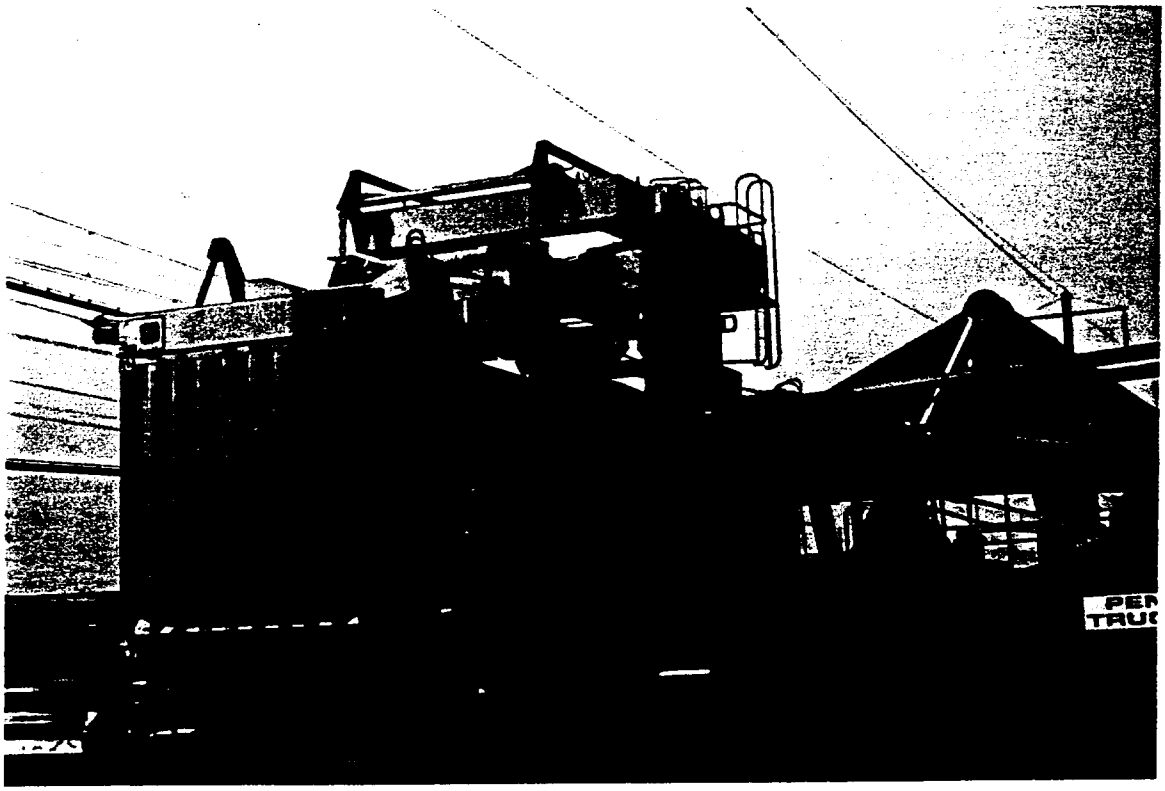


Photo No. 14 - Piggybacker Loading a Double Stack Rail Car

Photo No. 15 - Intermodal Rail Container Transfer Facility

Photo No. 16 - Triple Loading Tracks

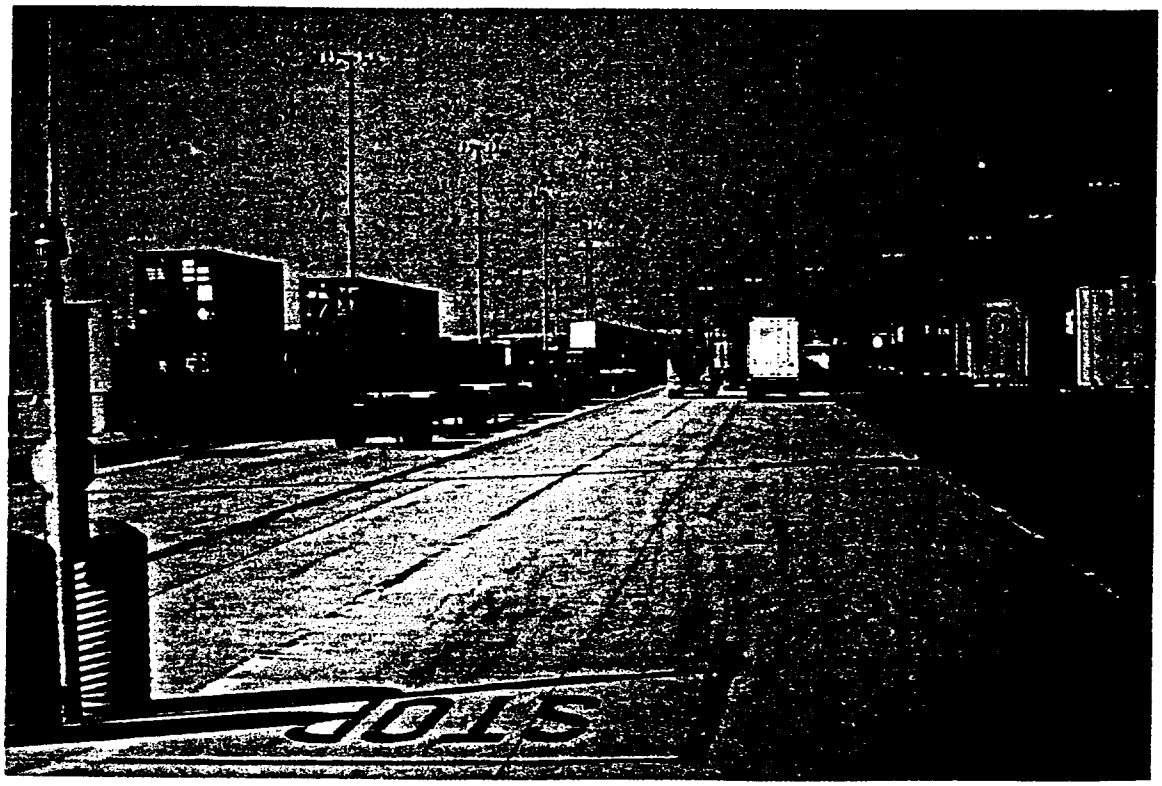


Photo No. 17 - Intermodal Terminal Congestion

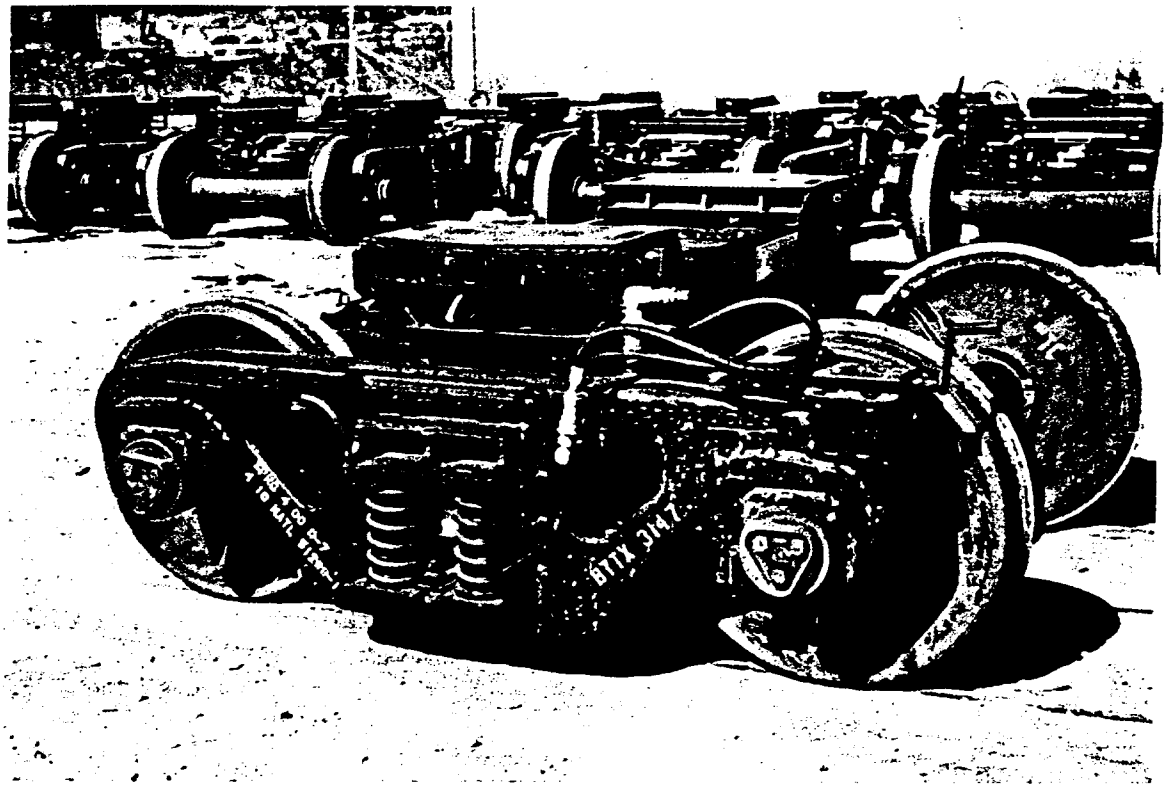


Photo No. 18 - Road-Railer Bogey

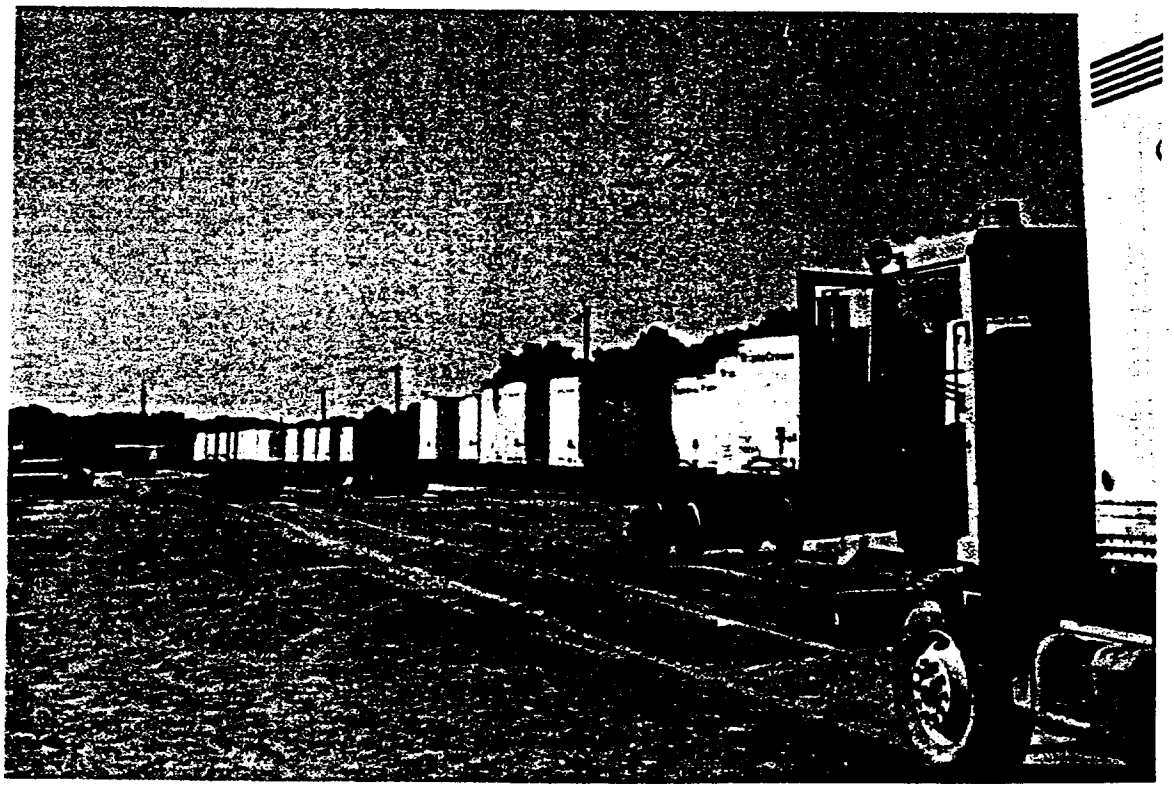


Photo No. 19 - Triple Crown Road-Railer Terminal

Photo No. 20 - Trailer Being Placed on Road-Railer Bogey

Photo No. 21 - Road-Railer Trailer on the Bogey

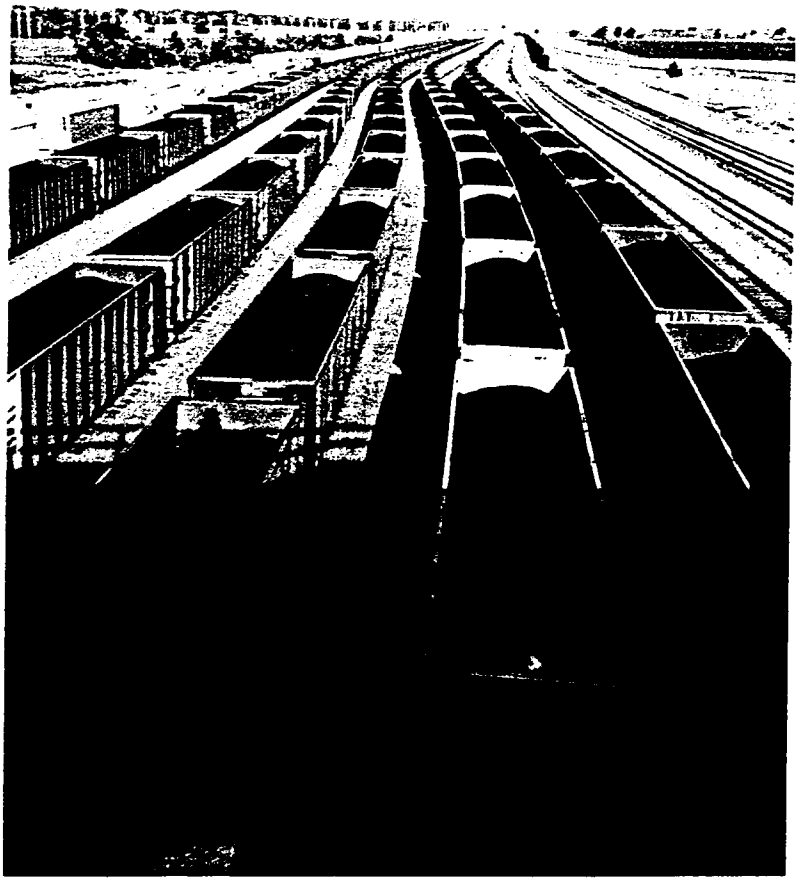


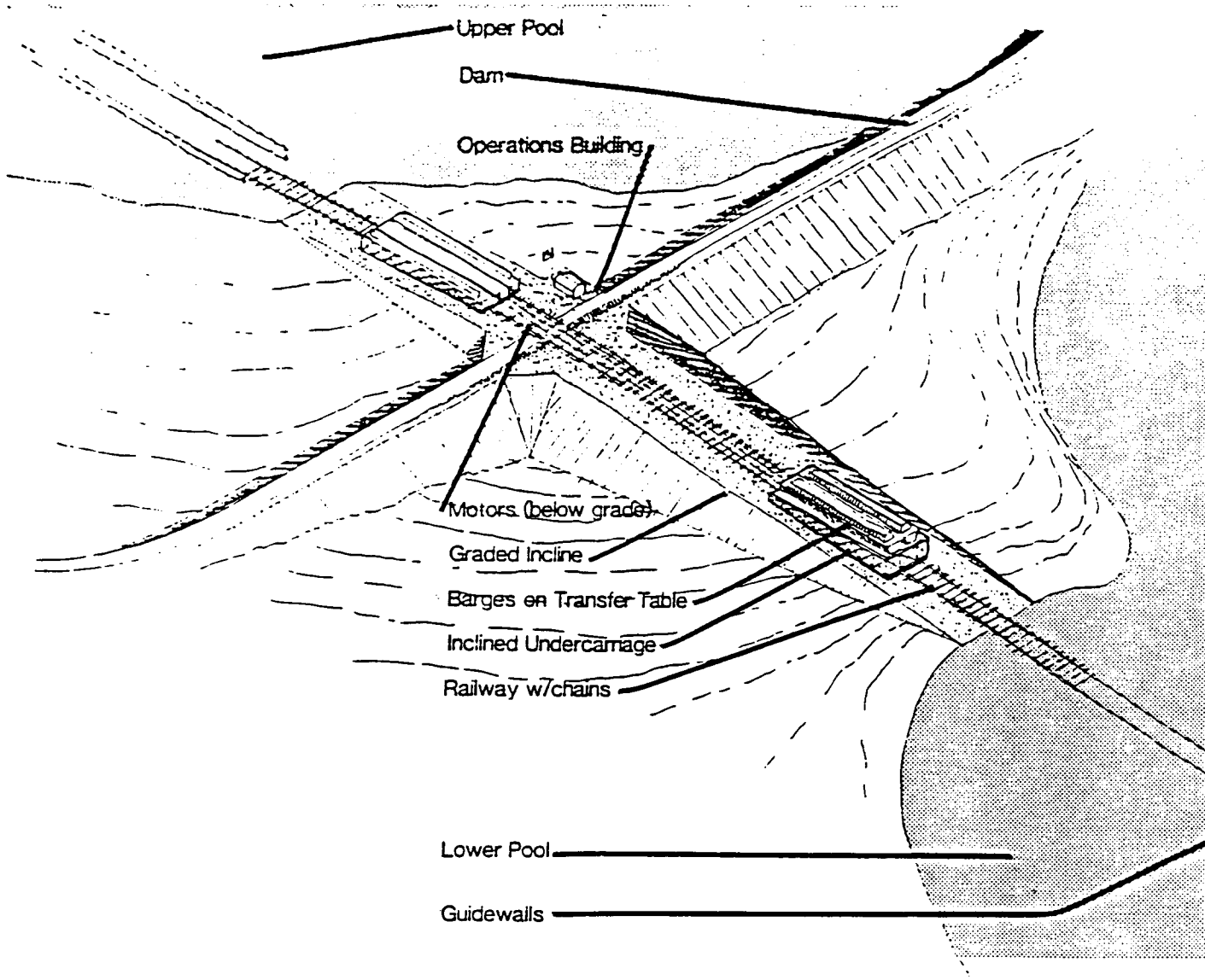
Photo No. 22 - Trough Train Service Yard

Photo No. 23 - Double-Bottom Trailers

APPENDIX D

F I G U R E S

INCLINED RAILWAY SHIPLIFT CONCEPT



MIDDLE COLUMBIA RIVER PRELIMINARY NAVIGATION STUDY – 1986

David Evans and Associates, Inc. – Ogden Beeman & Associates, Inc. – Crandall Dry Dock Engineers, Inc.

FIGURE 1

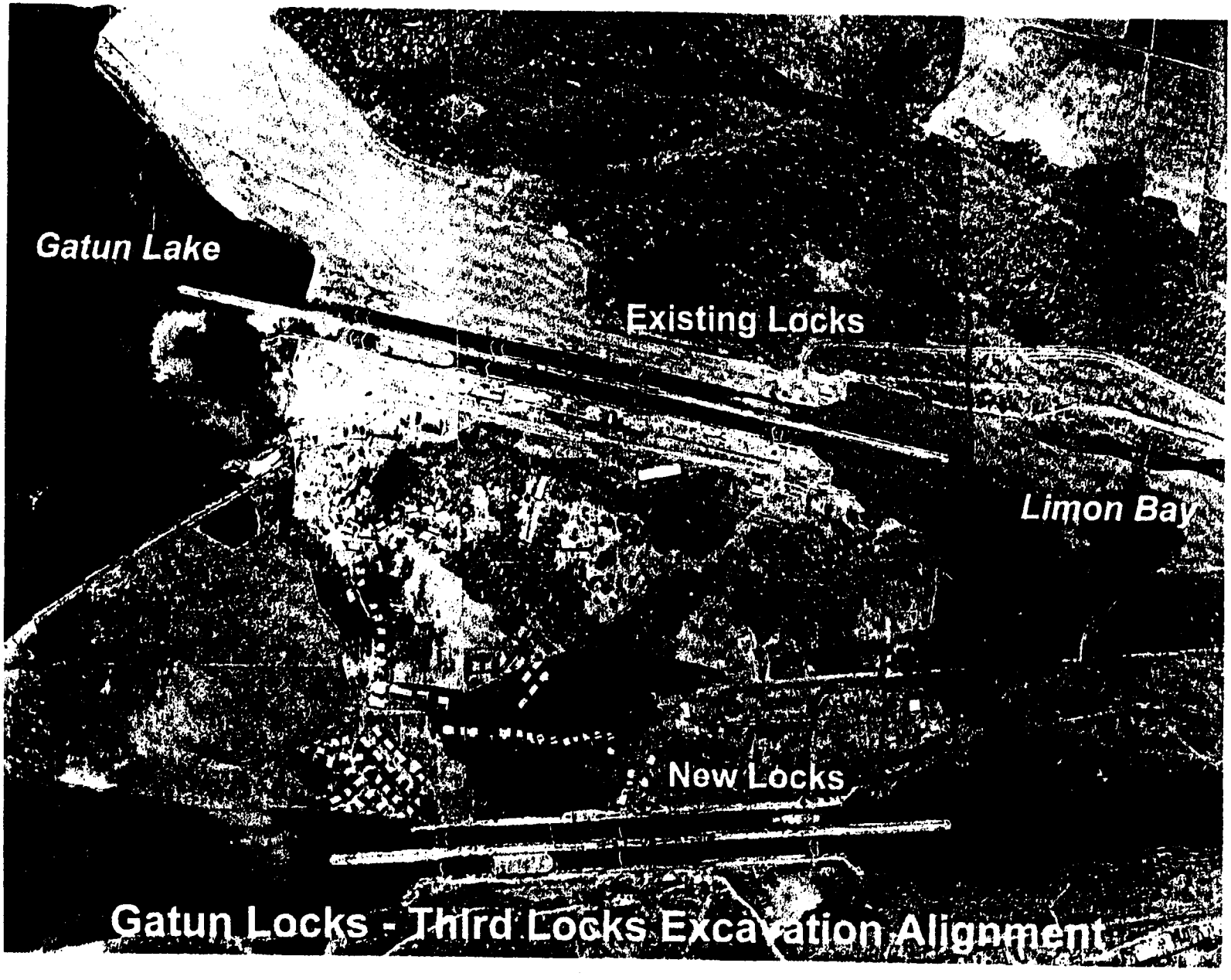

Gatun Lake
Existing Locks
Limon Bay
New Locks
Gatun Locks - Third Locks Excavation Alignment

FIGURE 2

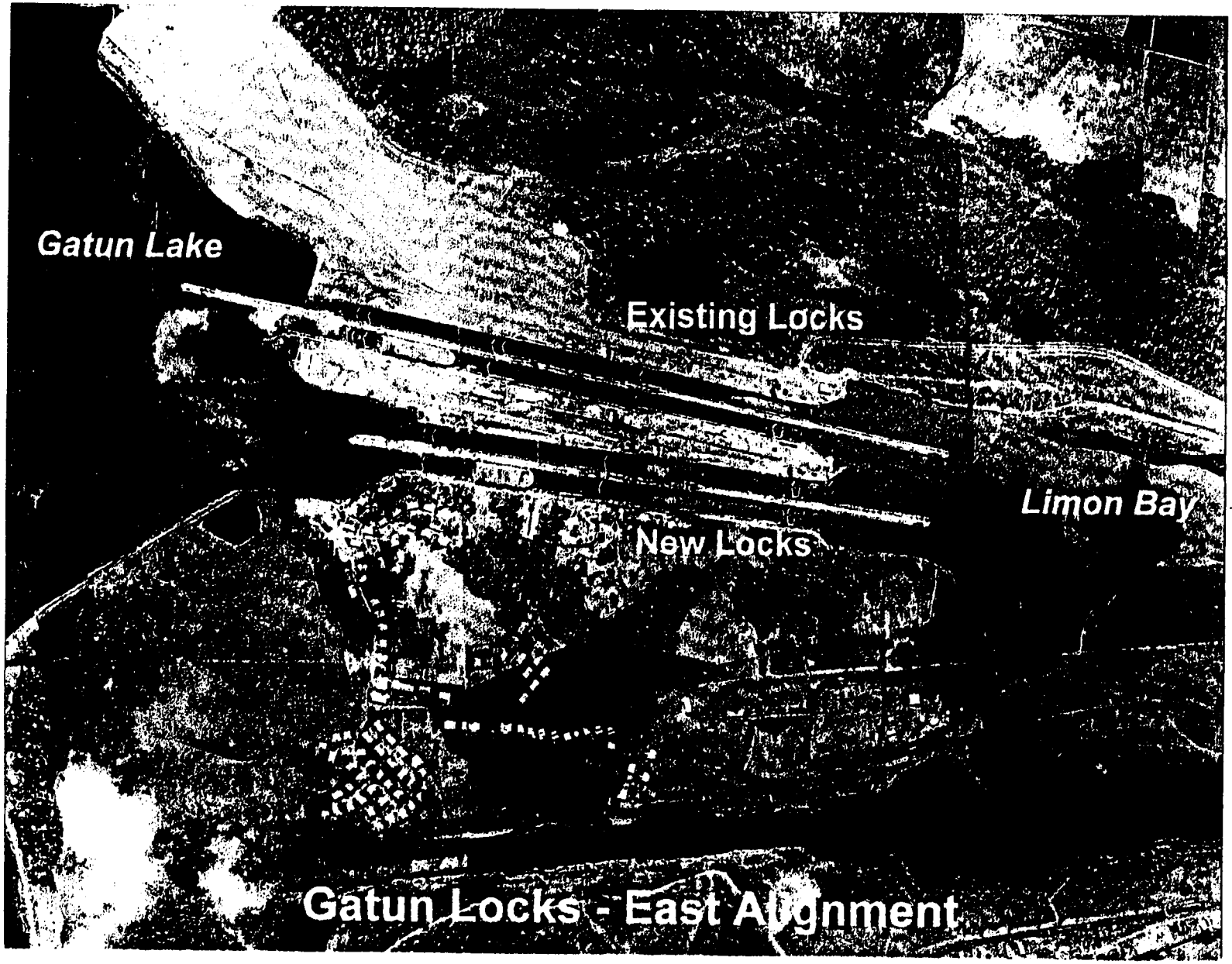

Gatun Lake
Existing Locks
Limon Bay
New Locks
Gatun Locks - East Alignment

FIGURE 3

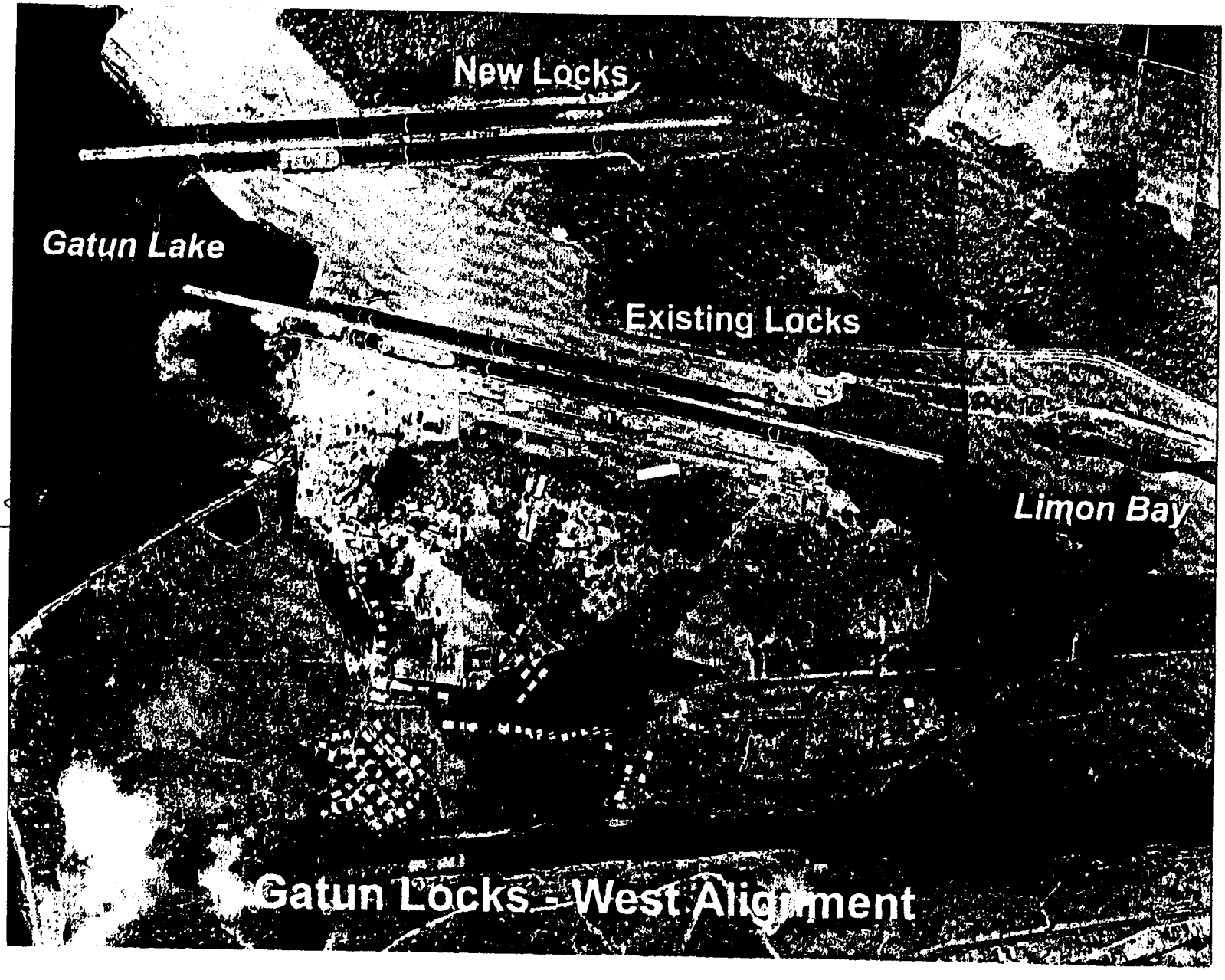

New Locks
Gatun Lake
Existing Locks
Limon Bay
Gatun Locks - West Alignment

FIGURE 4

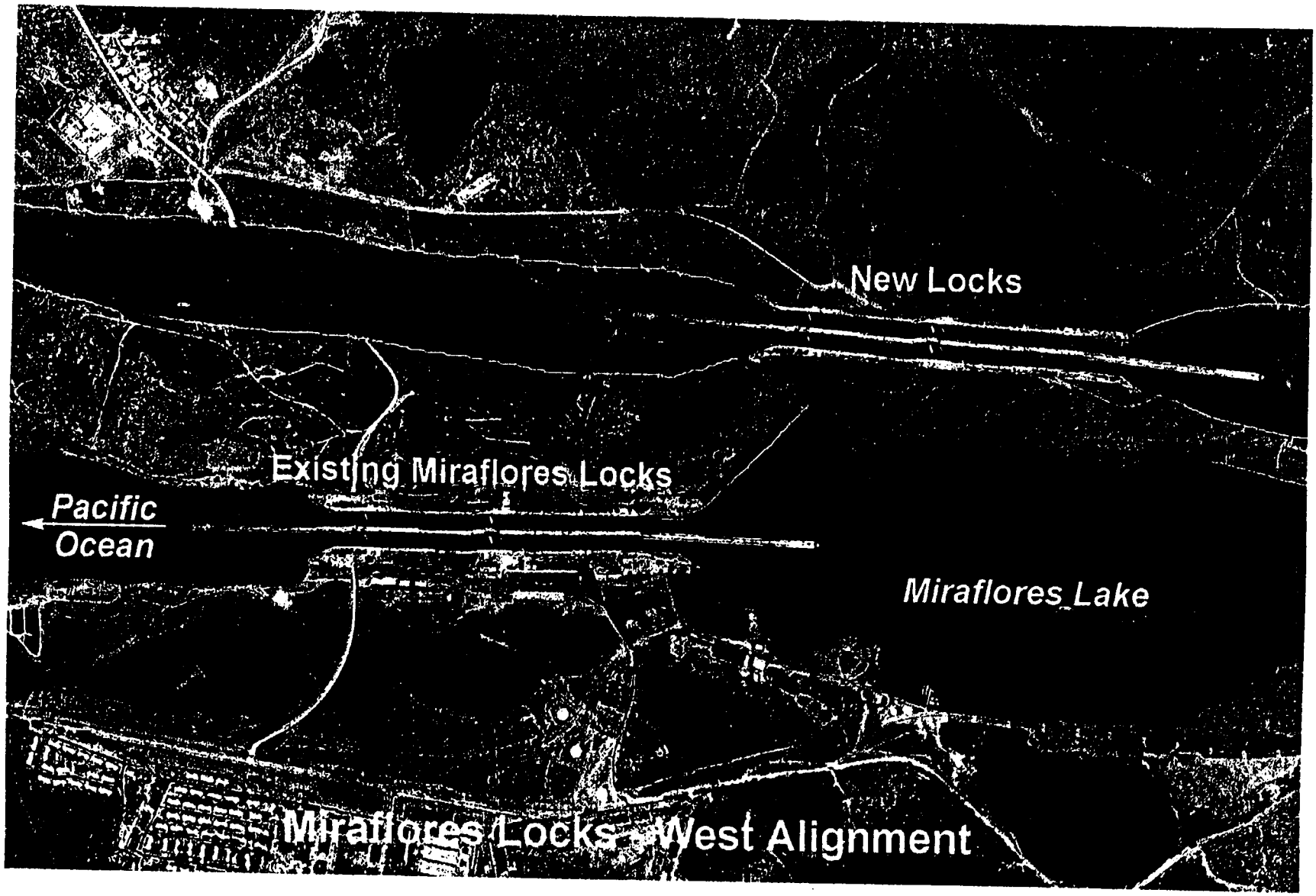

New Locks
Existing Miraflores Locks
Pacific
Ocean
Miraflores Lake
Miraflores Locks - West Alignment

FIGURE 5

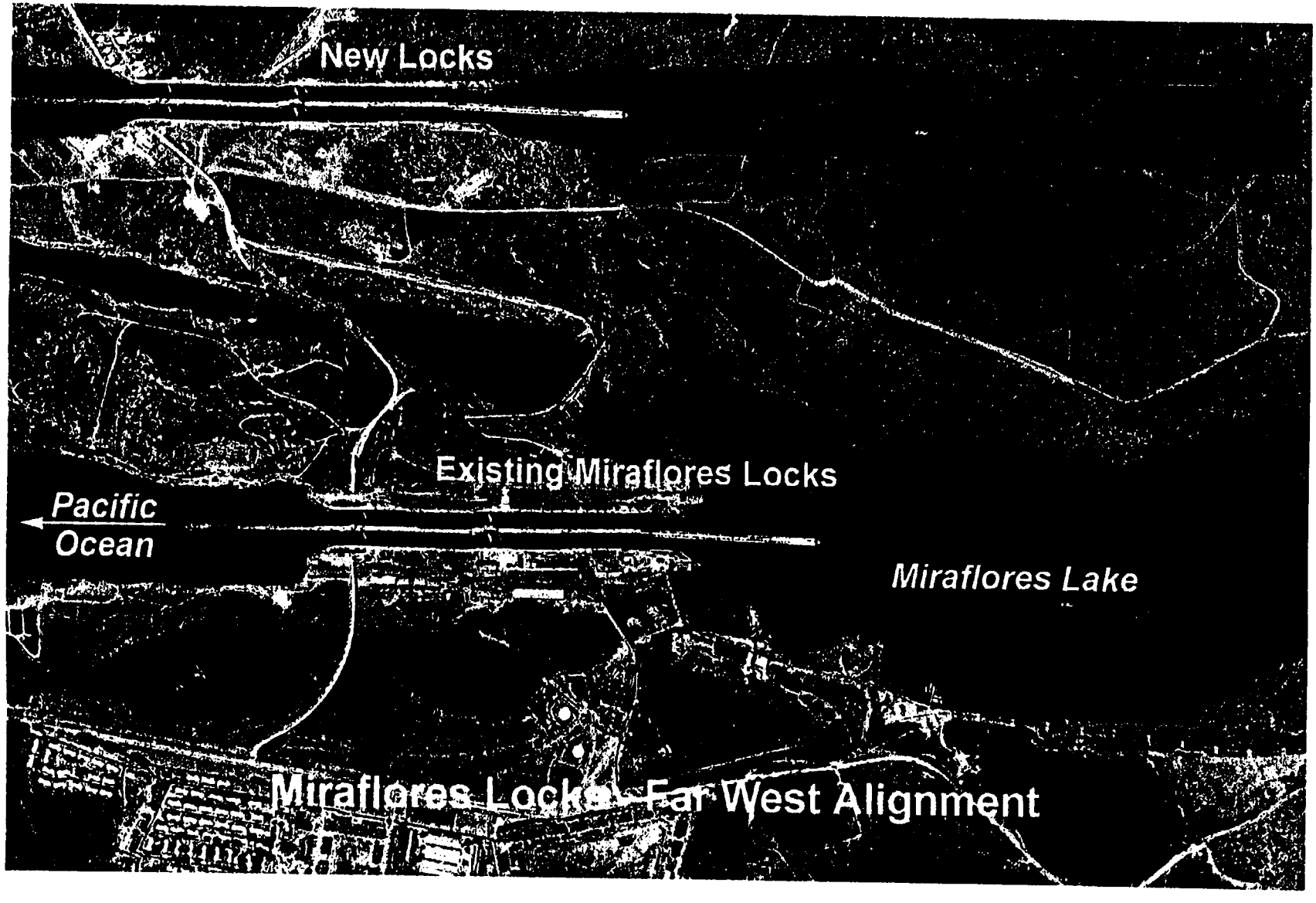
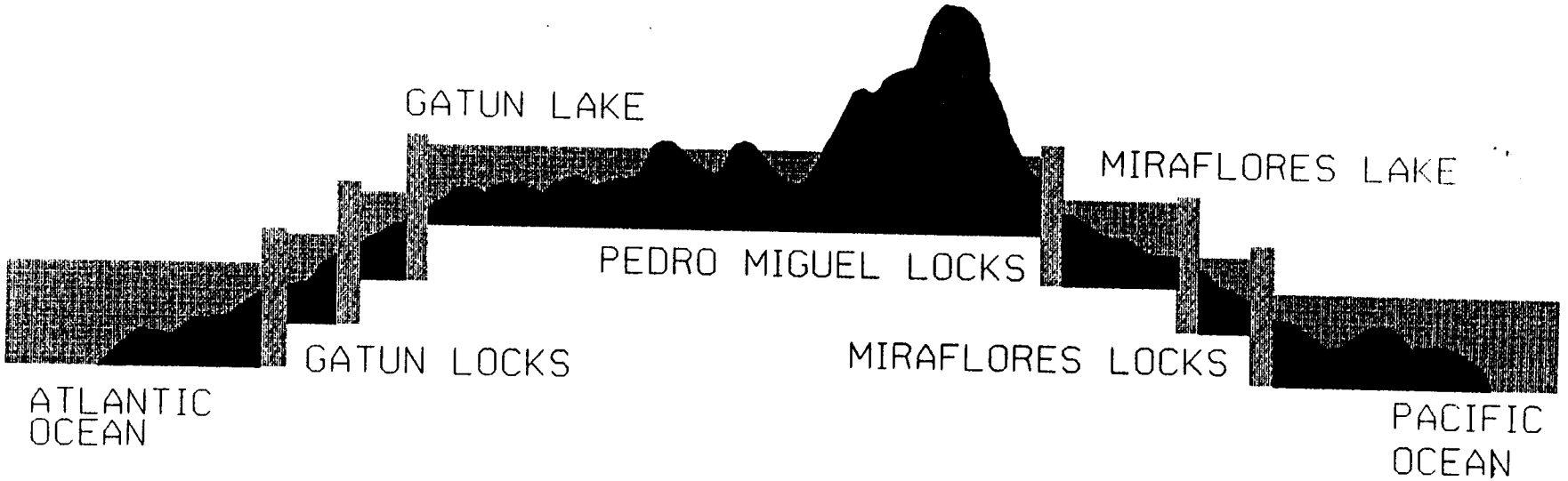

New Locks
Existing Miraflores Locks
Pacific
Ocean
Miraflores Lake
Miraflores Locks - Far West Alignment

FIGURE 6

Existing Canal Profile



Single Lift Locks

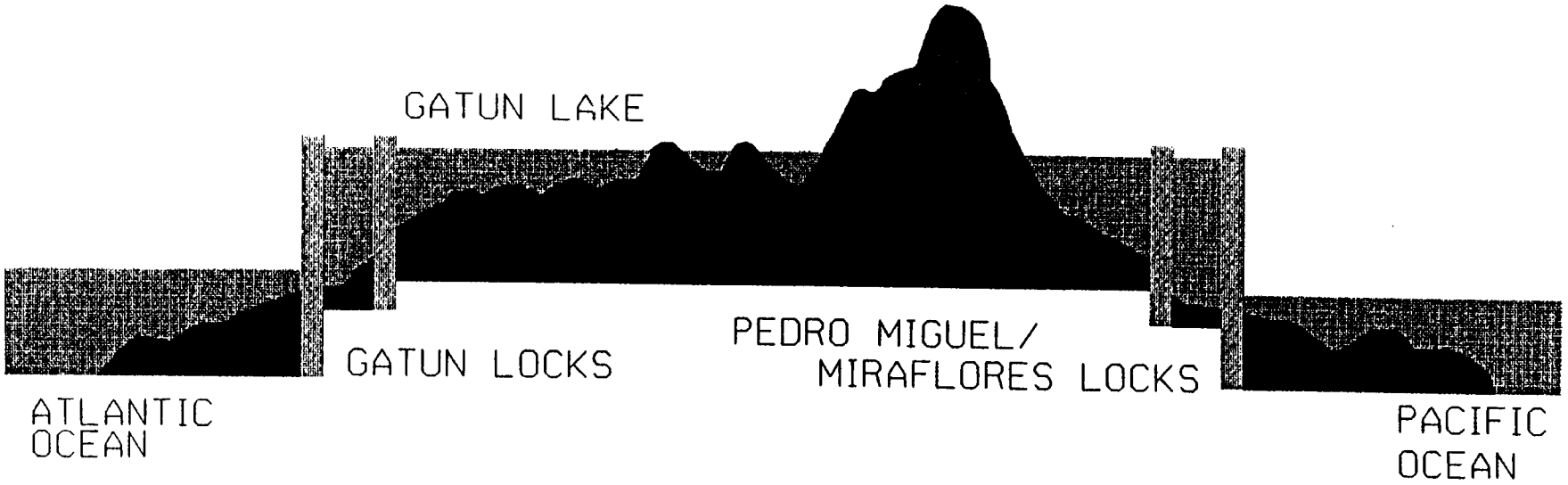
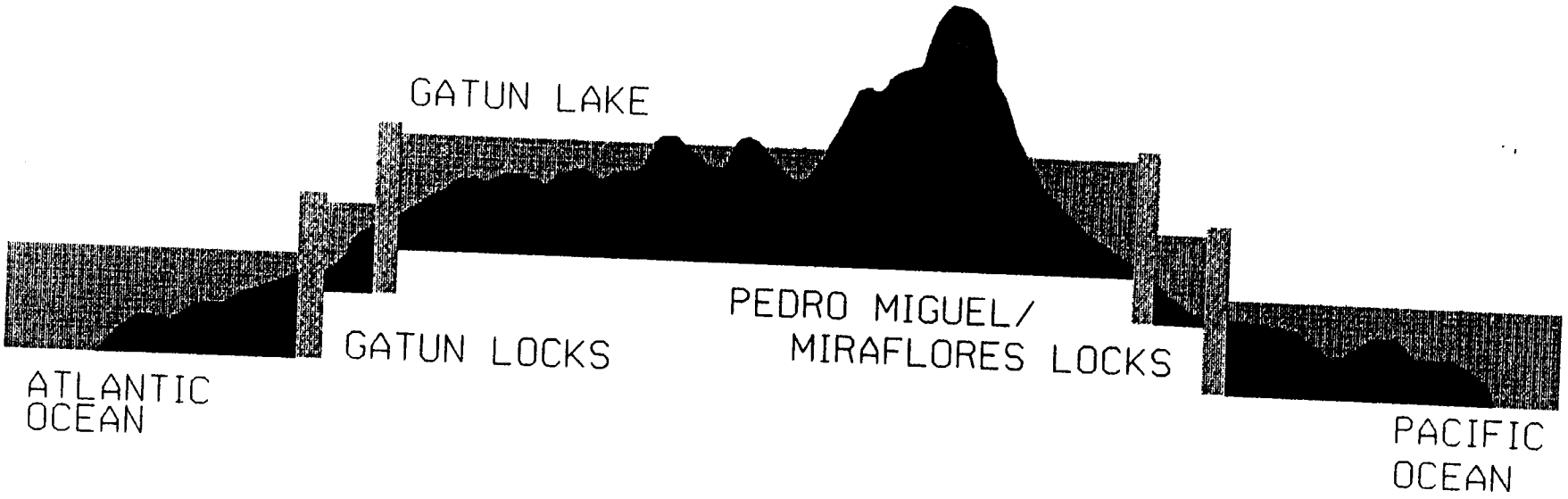


FIGURE 8

Double Lift Locks



Triple Lift Lock

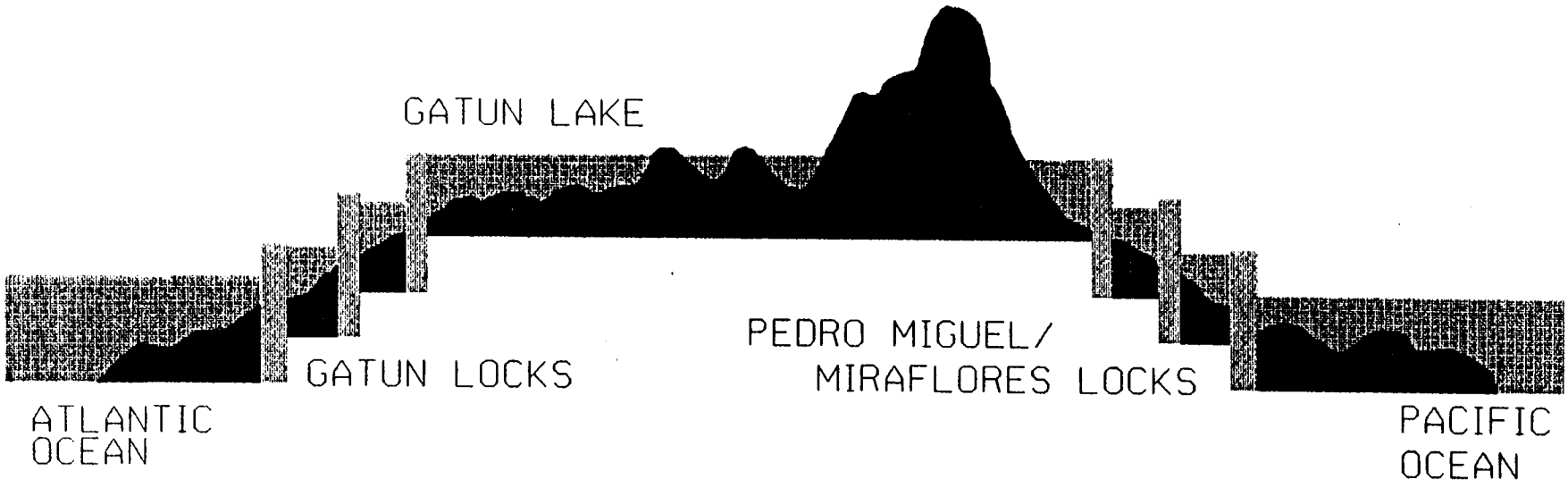
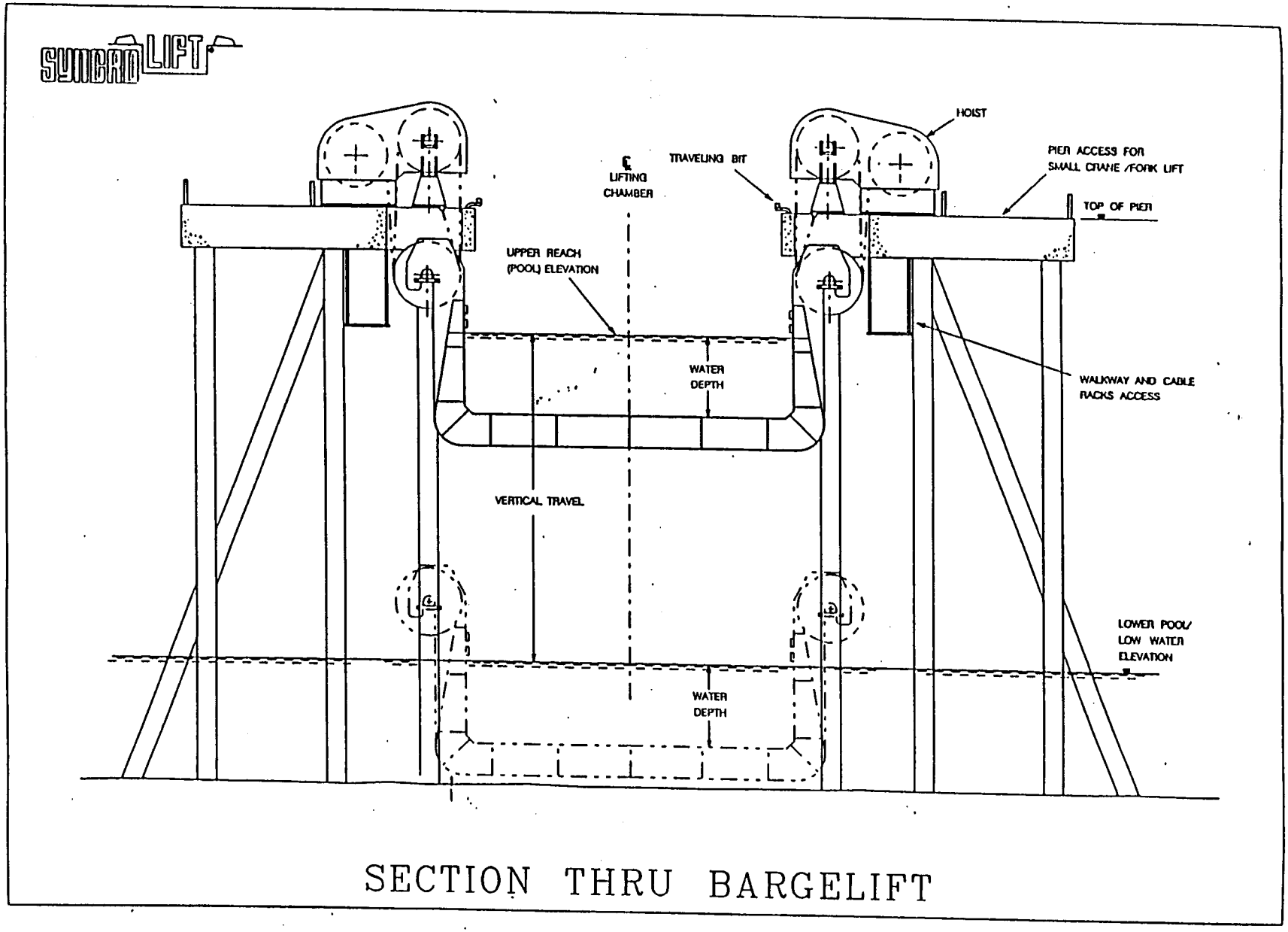
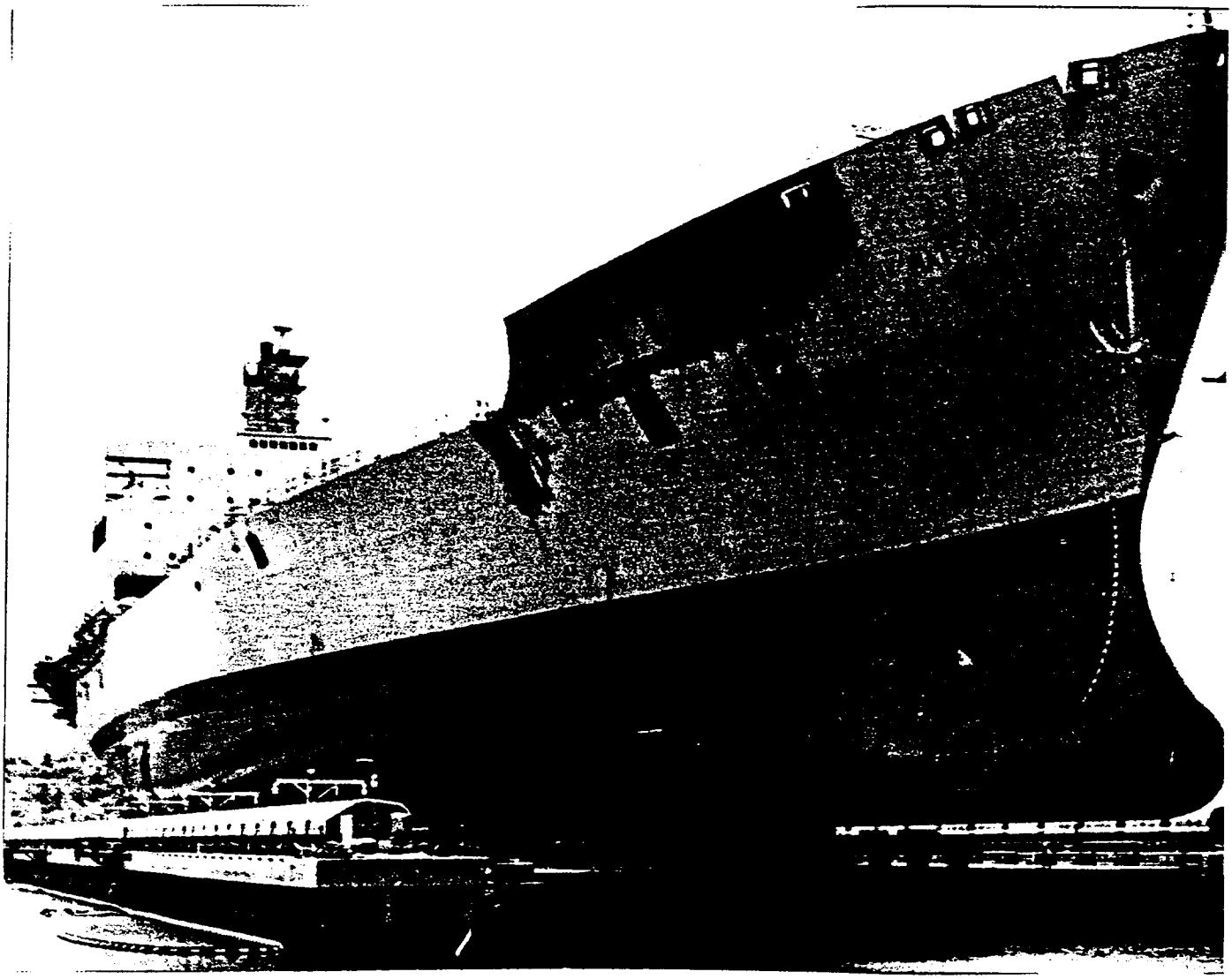


FIGURE 10



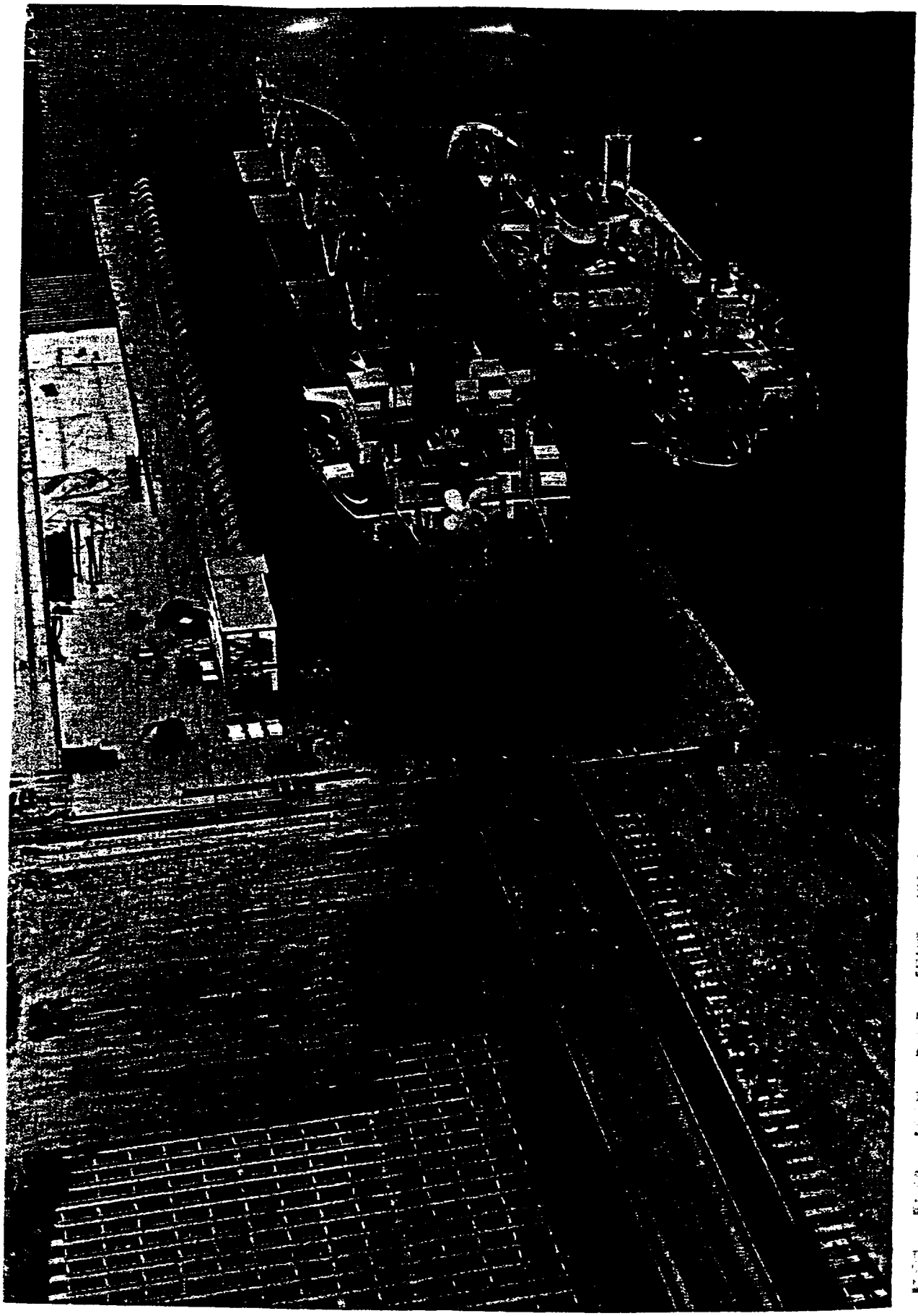
SECTION THRU BARGELIFT

FIGURE 11



Panamax Size Ship on Syncro-Lift

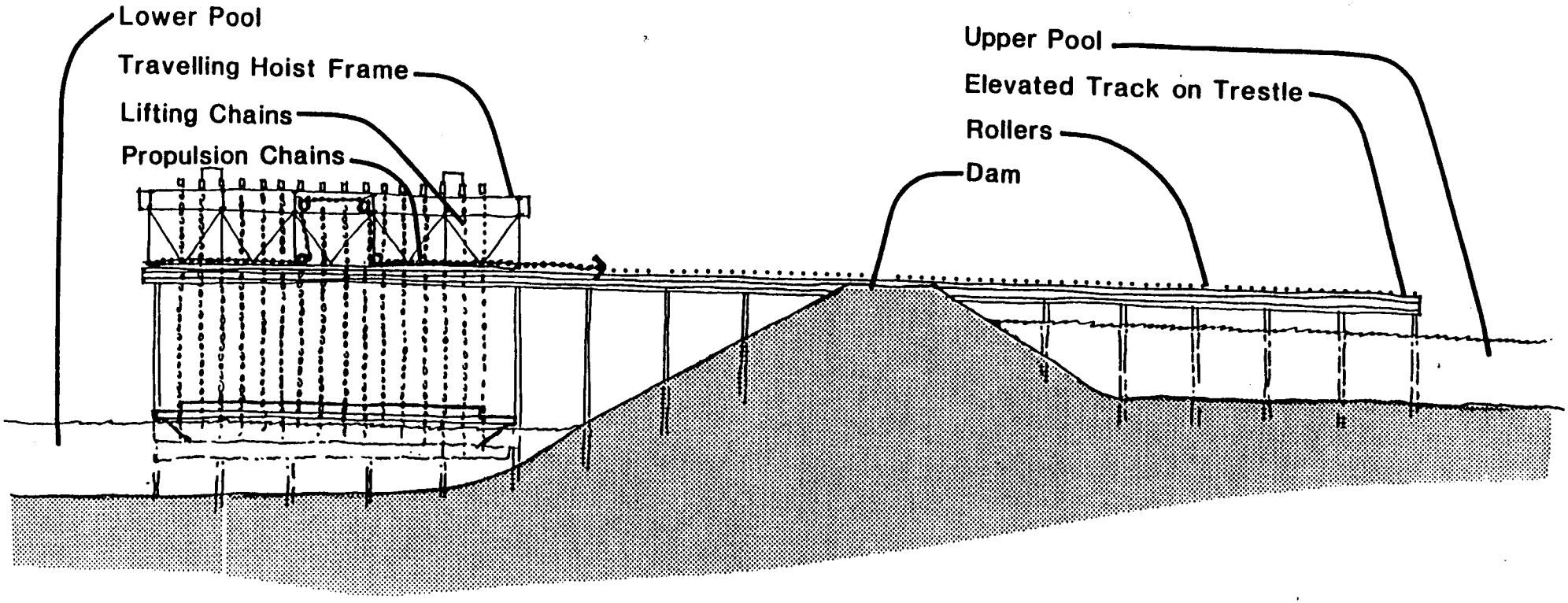
FIGURE 12



Locomotives Being Pulled-Off Syncro-Lift

FIGURE 13

VERTICAL SHIPLIFT LONGITUDINAL SECTION



MIDDLE COLUMBIA RIVER PRELIMINARY NAVIGATION STUDY - 1986

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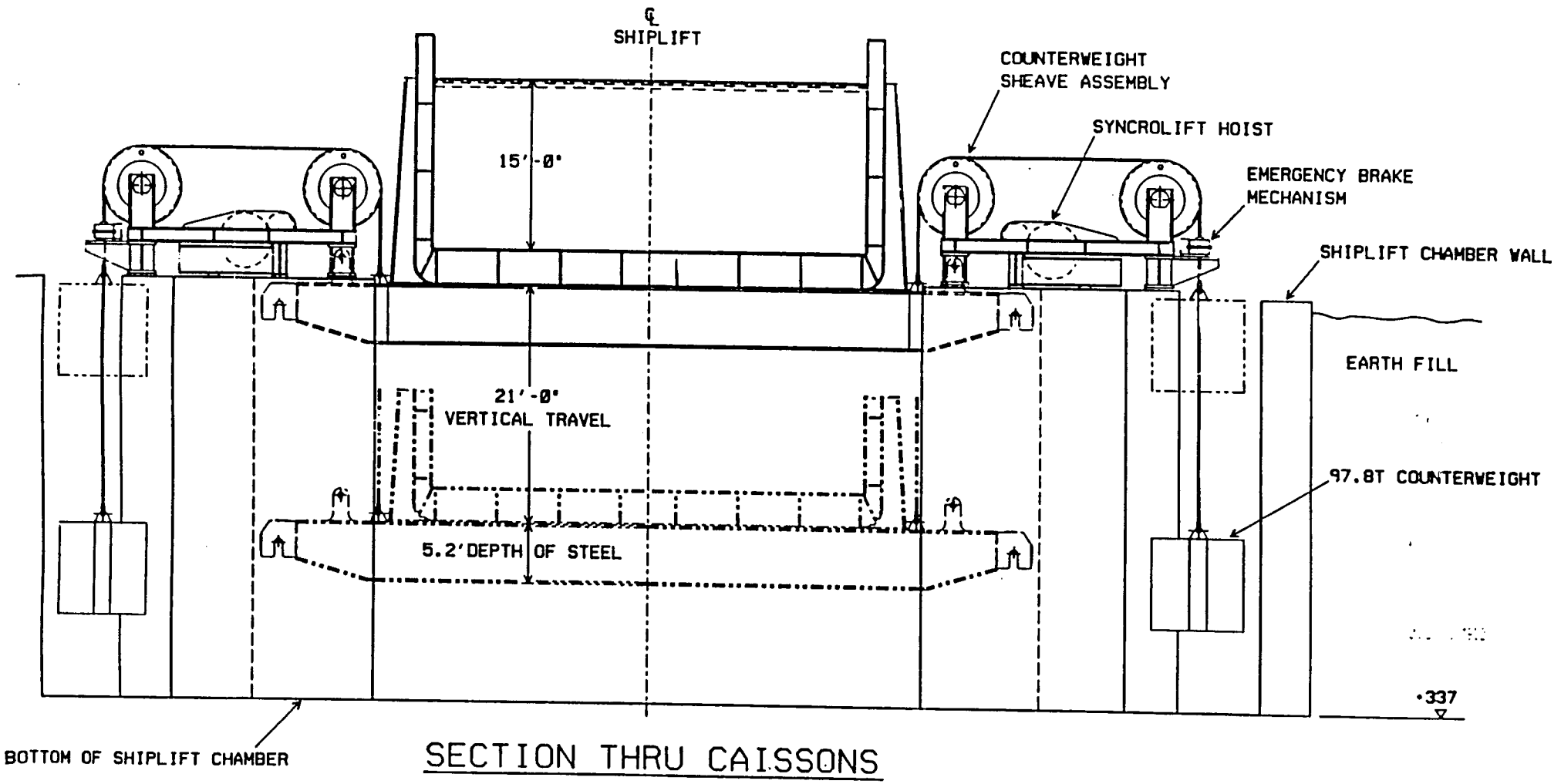
FIGURE 14

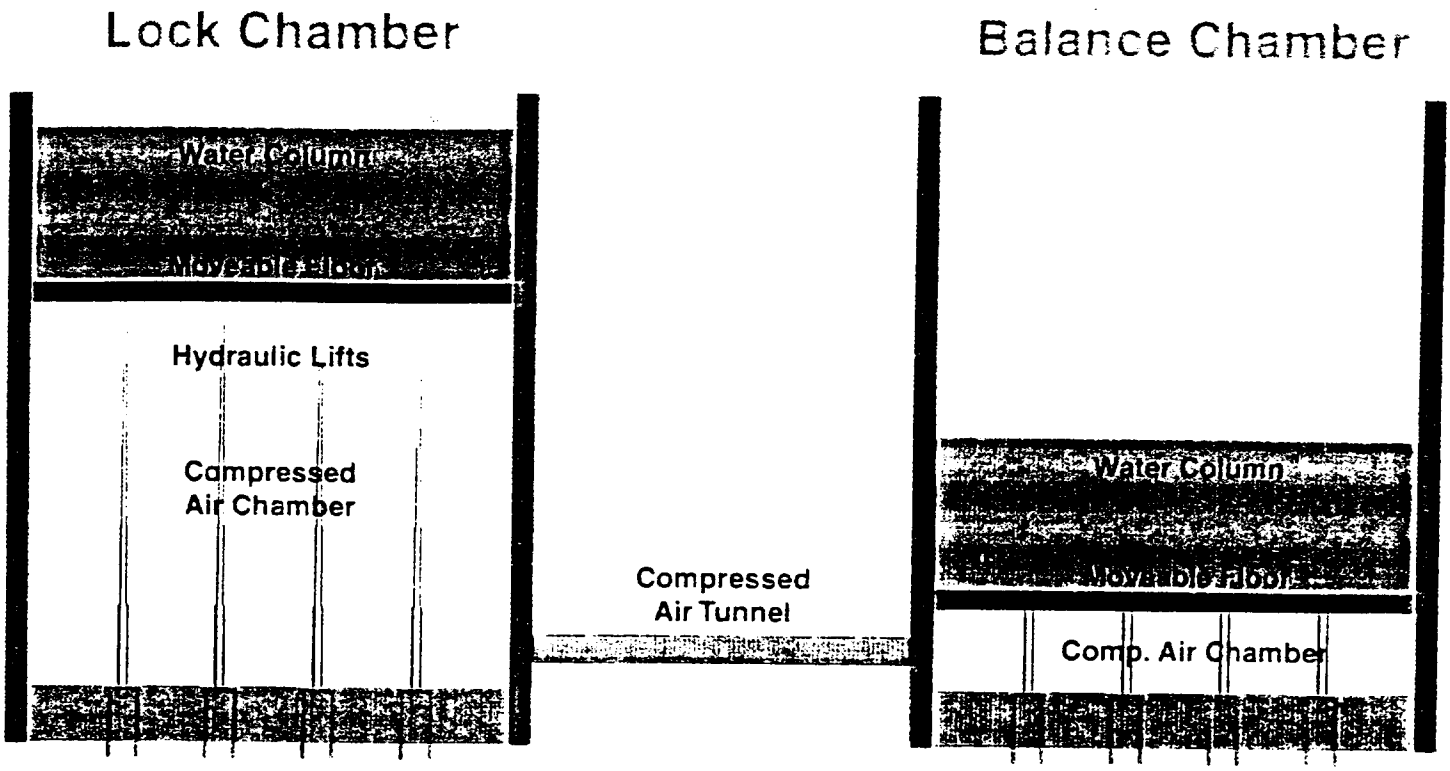


SECTION THRU CAISSONS

SYNCRO-LIFT WITH COUNTERWEIGHTS

FIGURE 15

Counter Balanced Lock System



Description of operation of the Counter Balanced Lock System.

The above objectives are accomplished in full by the prvision of a counter balanced marine lock system, comprised of two chambers as described herein:

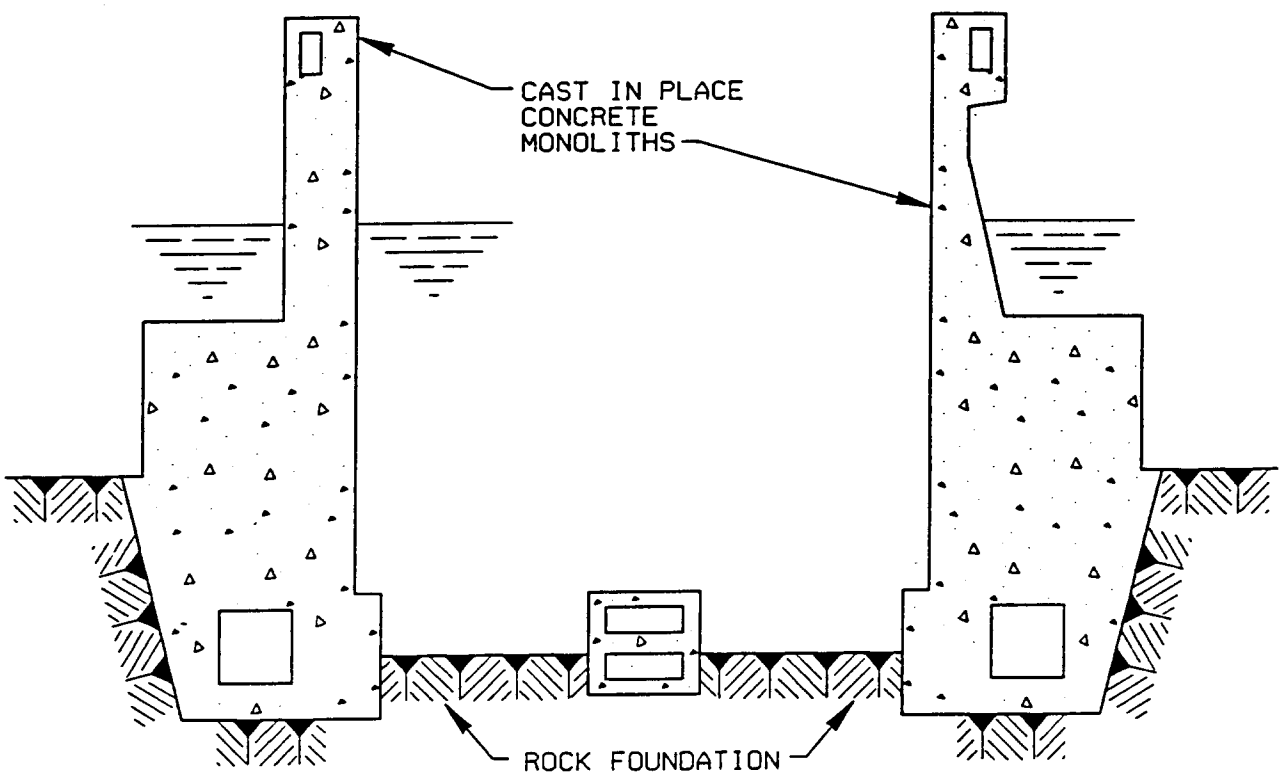
1. There is a horizontal, vertically movable first floor within the lock chamber having an area conforming to, but slightly less, than the horizontal cross sectional area of the lock chamber and on inflatable gasket associated with the perifery of said first floor to prevent liquid supported thereby from flowing below and to form a variable volume first pressure compartment between the first floor and the first bottom.
2. The lock chamber further comprises first hydraulic means to positively raise and lower the first floor within the lock chamber.
3. There is a horizontal, vertically movable second floor within the counter balance chamber which operates in the same method as the lock chamber.
4. The counter balance chamber further comprises second hydraulic means to positively raise and lower the second floor and conduit, connecting the first pressure compartment to the second pressure compartment for flow of presurized air between them.
5. The objectives are further accomplished, in part by the provision of a method of operation of marine locks which comprises:
   - Supporting a first column of water within a lock chamber upon a vertically movable first floor.
   - Supporting a second column of water within a counter balance chamber upon a vertically movable second floor.
   - Supporting the first and second floors upon a confined volume of compressed air communicated between the lock chamber and the balance chamber by tunnel. In a first mode of the operation, the first floor is caused to rise by the application of upward hydraulic pressure on the first floor to overcome the balance and initiate vertical motion while causing the second floor to descend. In a second mode of the operation, the first floor is caused to descend by application of upward hydraulic pressure on the second floor.

Descripción de cómo opera el Sistema de Esclusas de Contrabalance

Los objetivos antes mencionados se logran con el Sistema de Contrabalance que describimos a continuación:

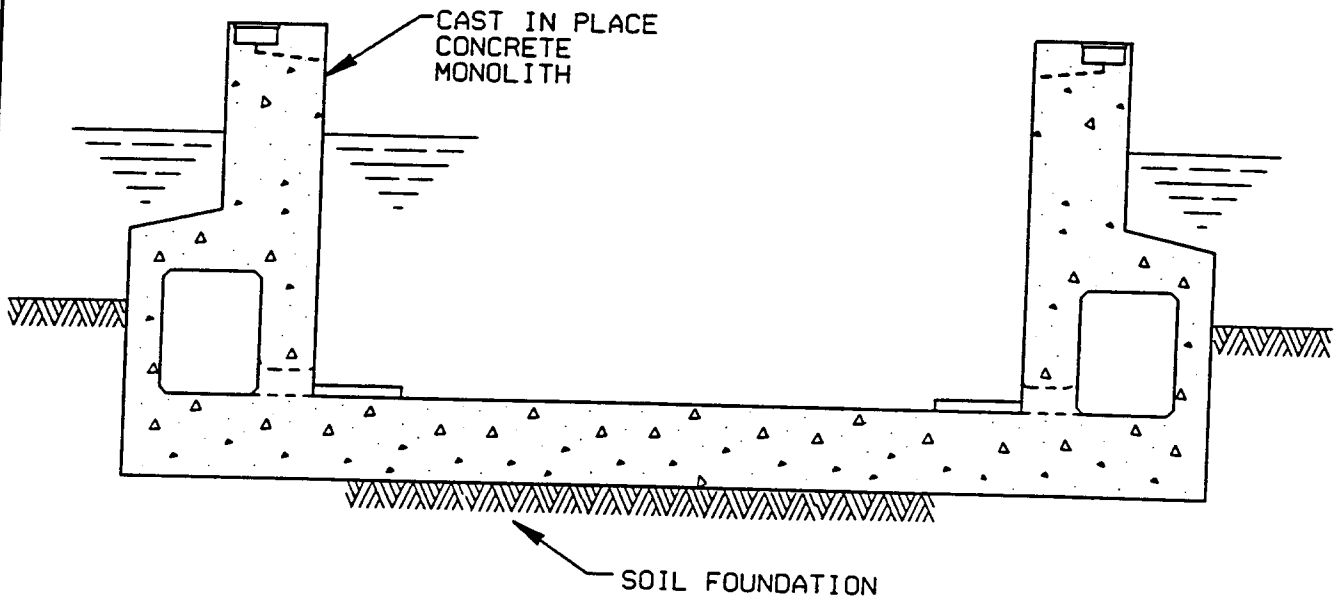
1. Hay dos pisos horizontales de movimiento vertical reciproco ligeramente más pequeños que la configuración de las camaras de la esclusa (cámara para el barco y cámara para el contrapeso Alrededor del borde de los dos pisos movedizos van sellos inflables que mantienen separada el agua de arriba de los pisos movedizos del aire comprimido de abajo de los mismos.
2. La cámara de la esclusa lleva un primer conjunto de pistones hidráulicos para levantar o bajar el piso movedizo dentro de ella.
3. Hay un segundo piso de movimiento vertical reciproco dentro de la cámara de contrabalance que opera de igual forma que el piso de la cámara de la esclusa.
4. La cámara de balance lleva un segundo conjunto de pistones hidráulicos (conectados con el primer conjunto de la cámara de la esclusa) que sube y baja el segundo piso movedizo, y lleva un tunel que conecta el aire comprimido que soporta el peso de los dos pisos movedizos con agua arriba de ellos.
5. Los objetivos se logran por el siguiente método de operación:
   - La primera columna de agua arriba del primer piso de movimiento vertical va dentro de la cámara de la esclusa.
   - La segunda columna de agua (contrapeso) arriba del segundo piso de movimiento vertical va dentro de la camara de balance.
   - Soportando ambos pisos movibles, va una masa de aire comprimido conectada por un tunel. En el primer modo de la operación, el primer piso (de la cámara de la esclusa) sube por la acción del primer conjunto de pistones hidráulicos conectado al primer piso que rompe el equilibrio de balance e inicia el movimiento vertical de cambio de niveles de agua dentro de la esclusa y su cámara de balance. En un segundo modo de la operación, el primer piso es bajado por la acción hacia arriba del segundo piso movible (el de la cámara de balance).

FIGURE 16



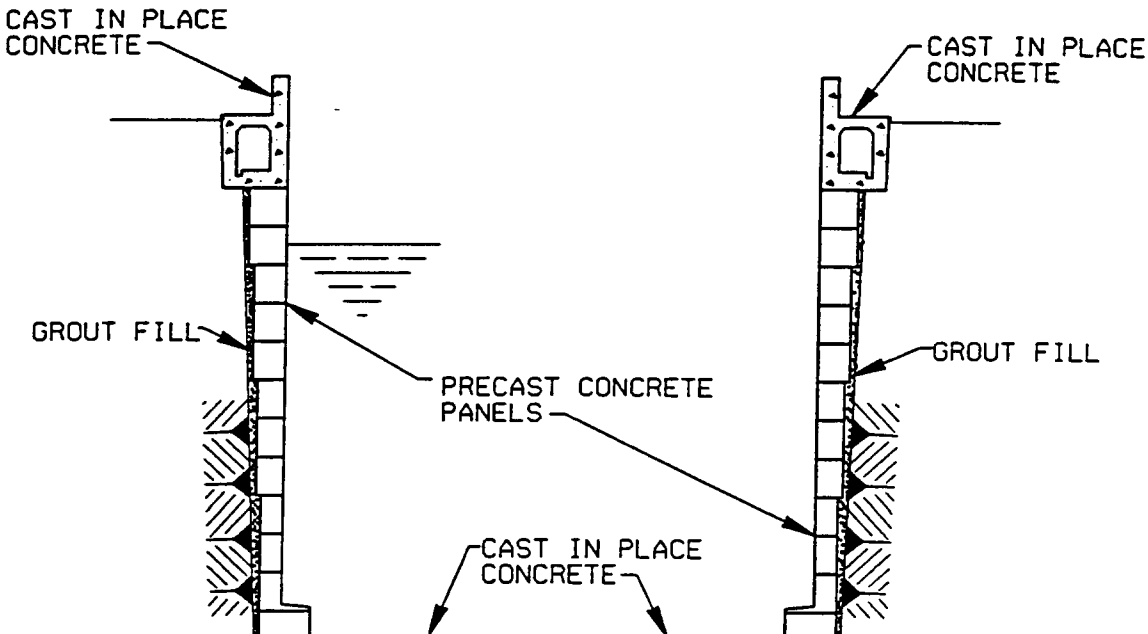
CONCRETE GRAVITY WALLS

FIGURE 17



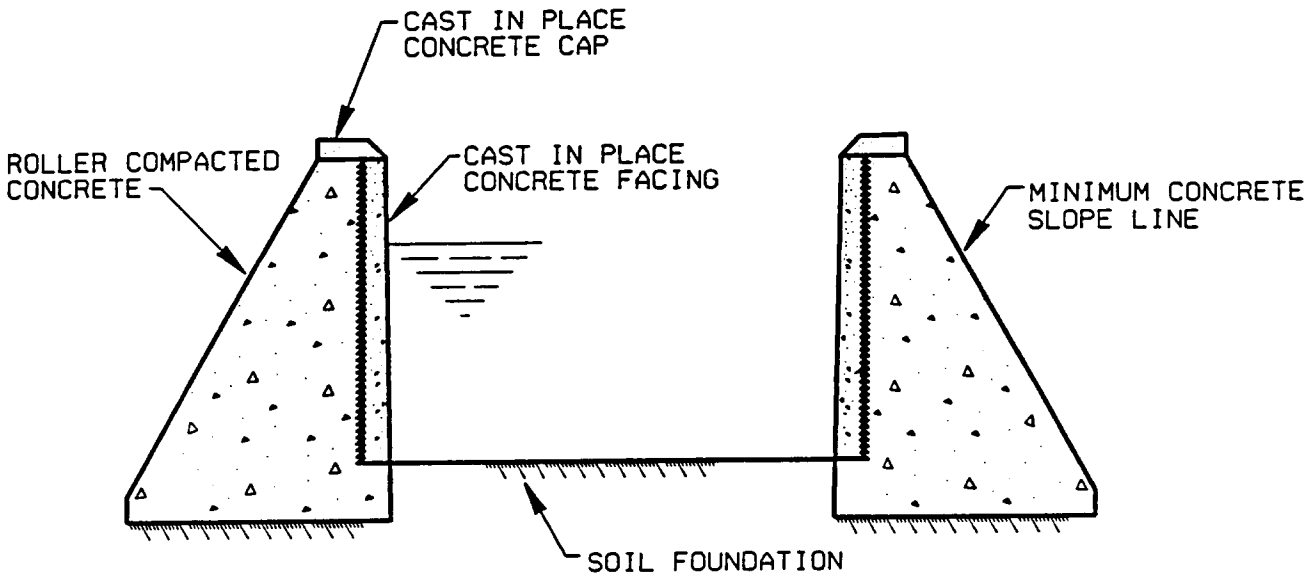
REINFORCED CONCRETE U-FRAME

FIGURE 18



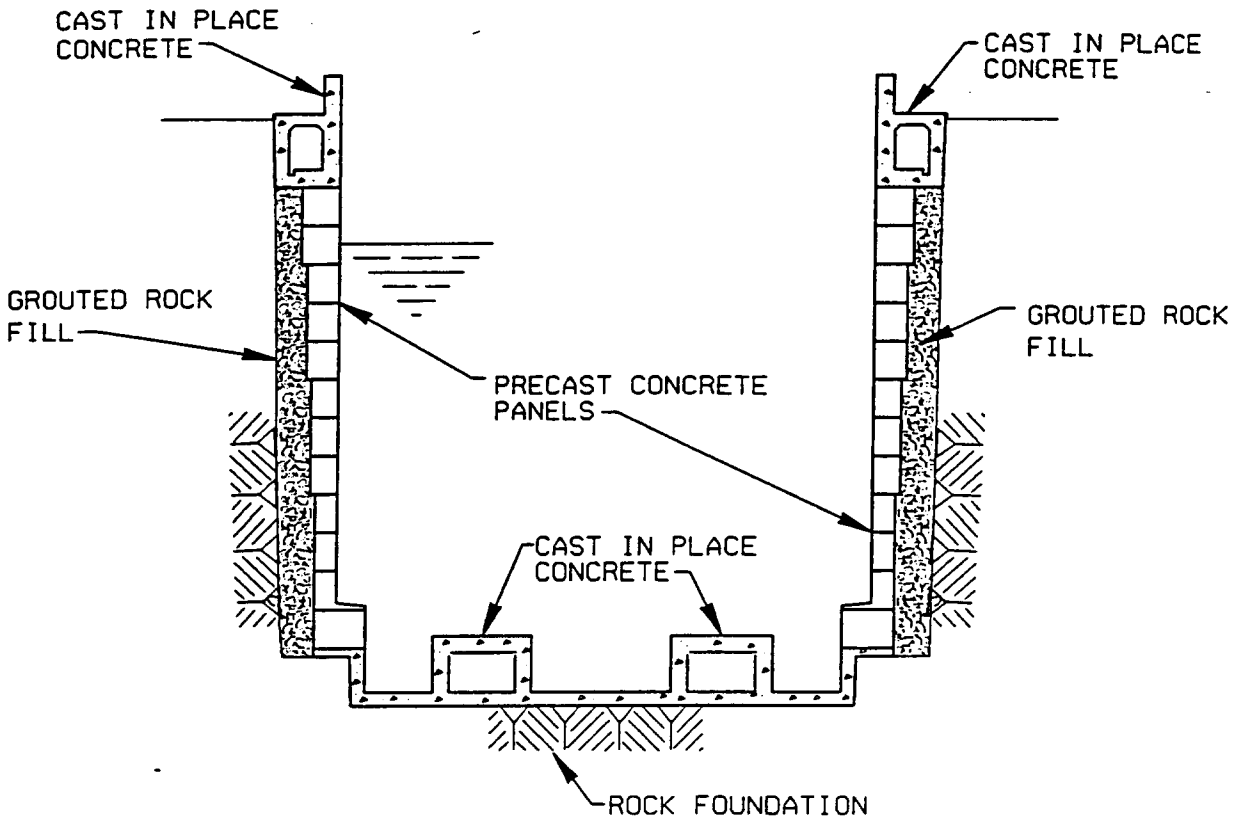
PRECAST CONCRETE WALLS

FIGURE 19



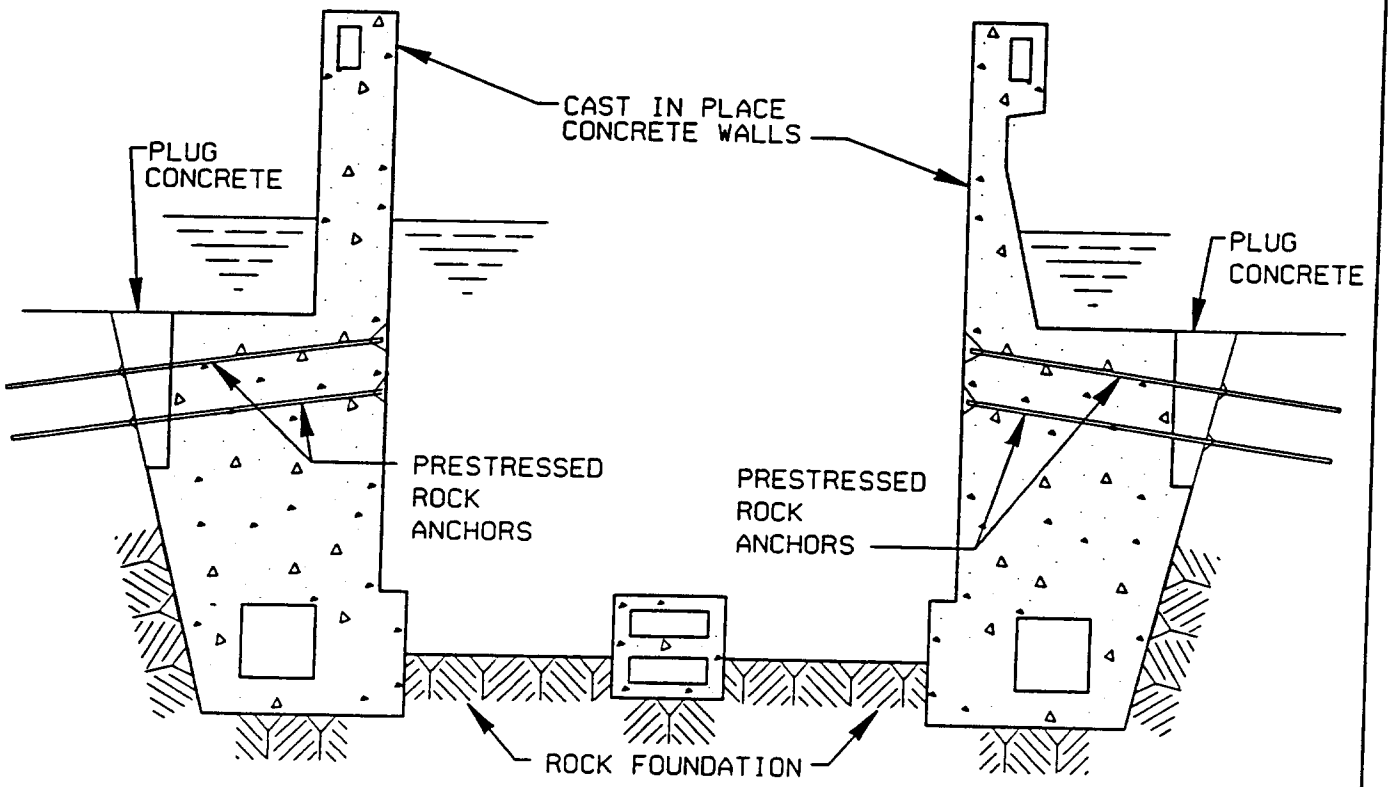
ROLLER COMPACTED CONCRETE

FIGURE 20



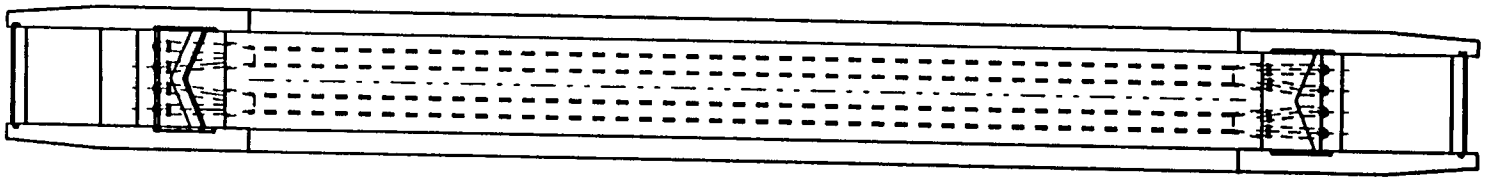
GROUTED ROCK FILL WALLS

FIGURE 21

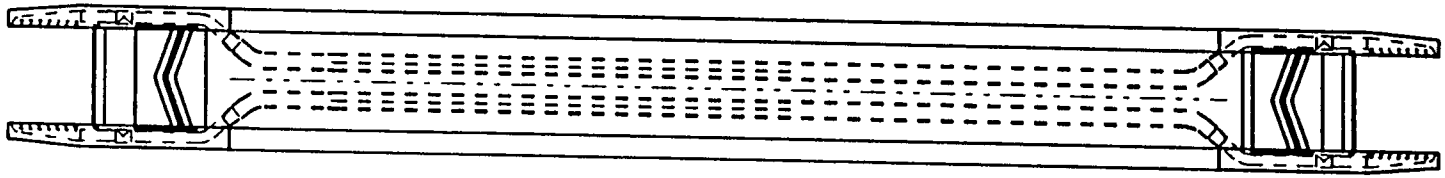


TIED-BACK CONCRETE WALLS

FIGURE 22



THROUGH THE SILL FILLING AND EMPTYING SYSTEM

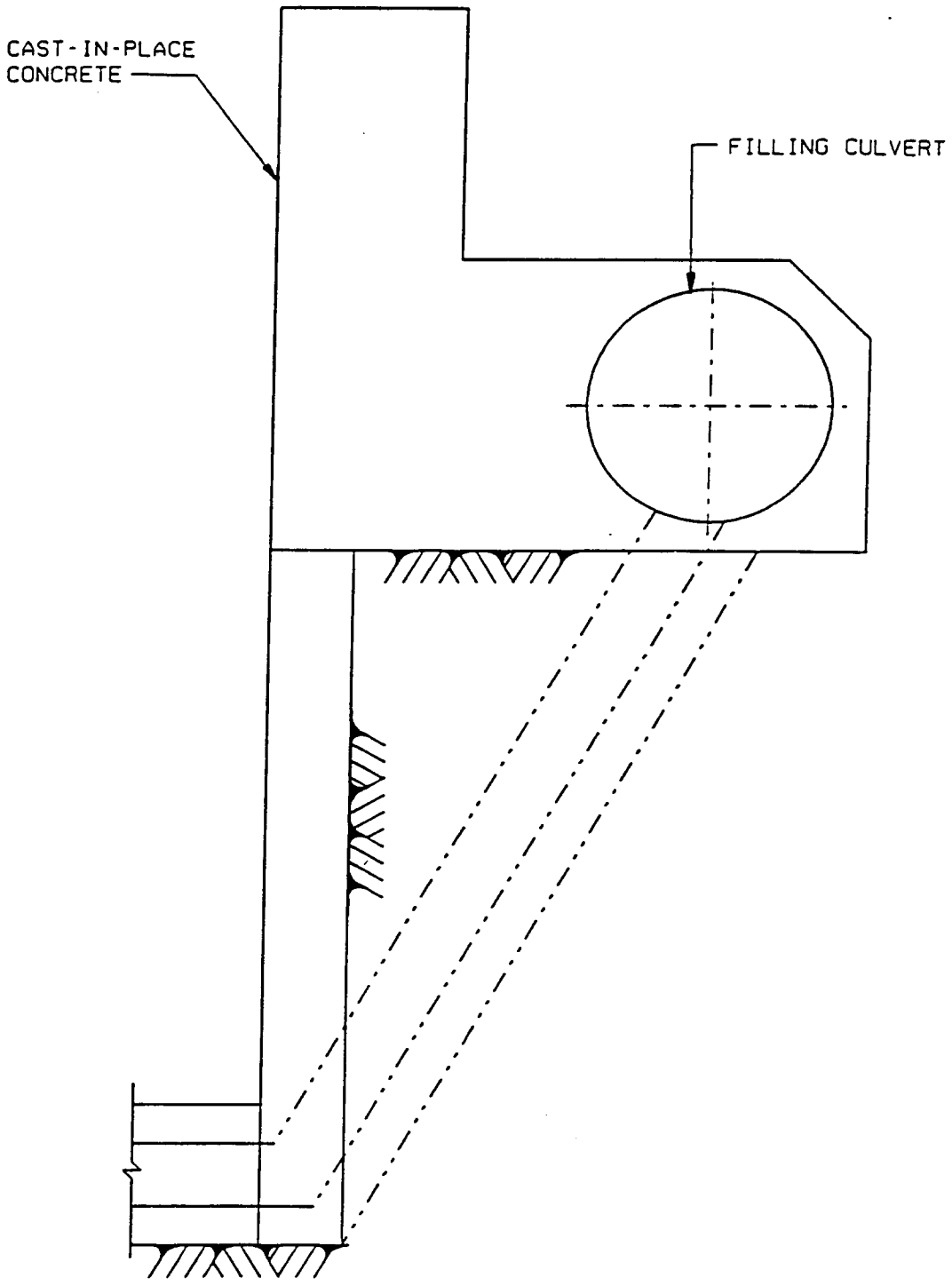


CONVENTIONAL INTAKE SYSTEM FEEDING LONGITUDINAL CHAMBER CULVERTS

*NON-TRADITIONAL FILLING AND EMPTYING SYSTEMS

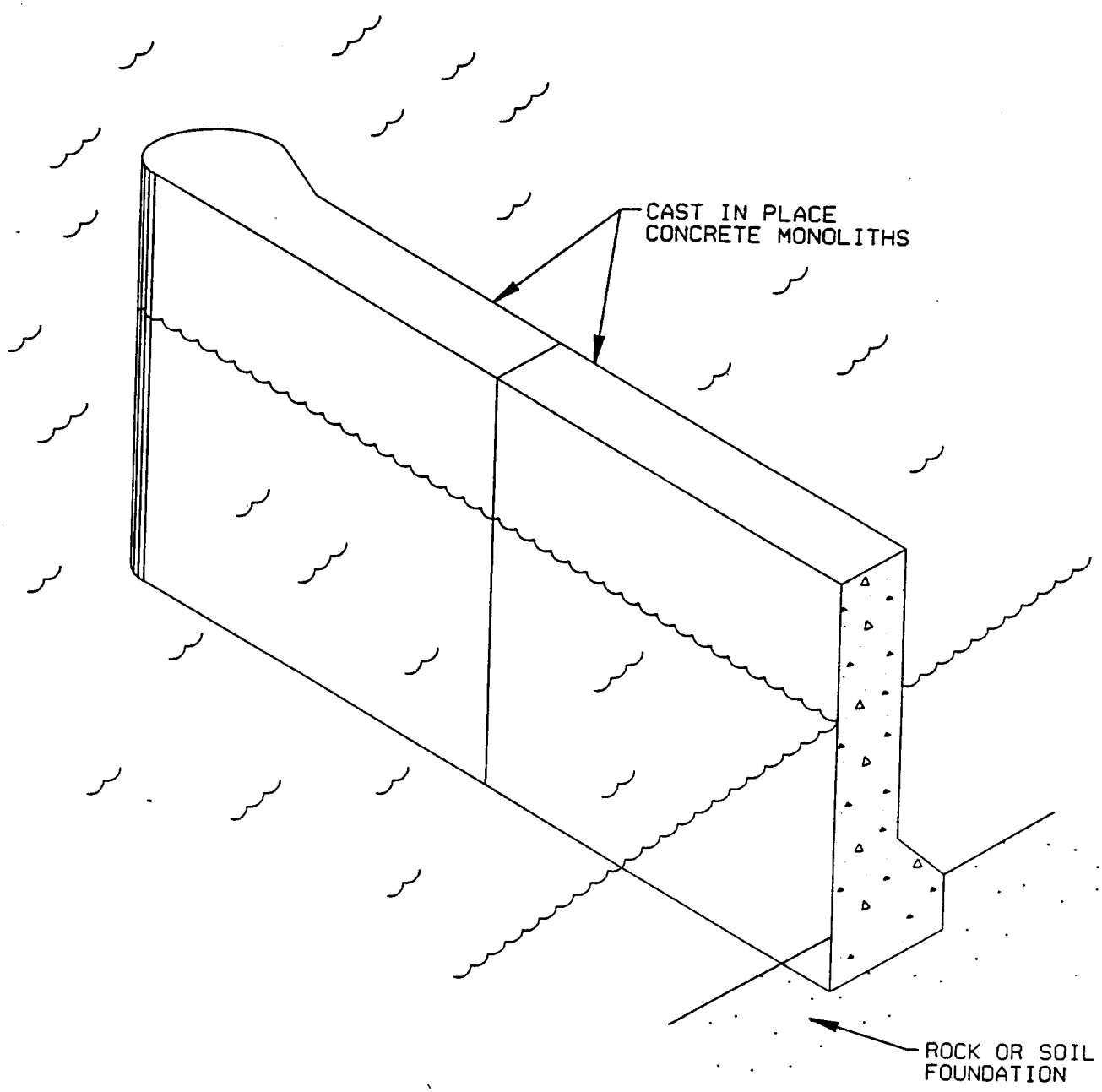
* LONGITIDINAL CHAMBER CULVERTS PERMIT ECONOMICAL LOCK WALL ALTERNATIVES.

FIGURE 23



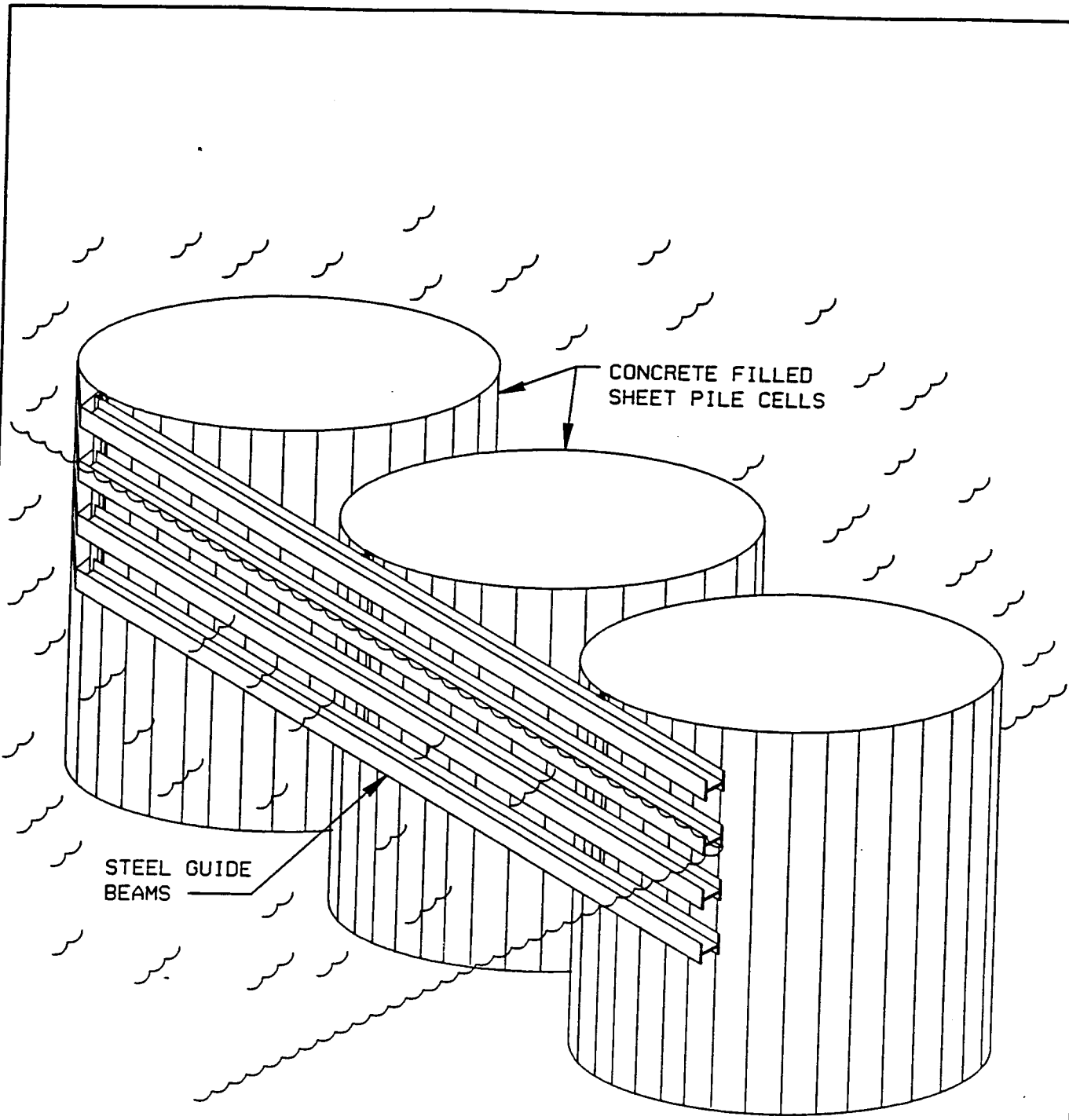
LOCKWALL WITH HIGH CULVERT

FIGURE 24



APPROACH WALL - MASS CONCRETE

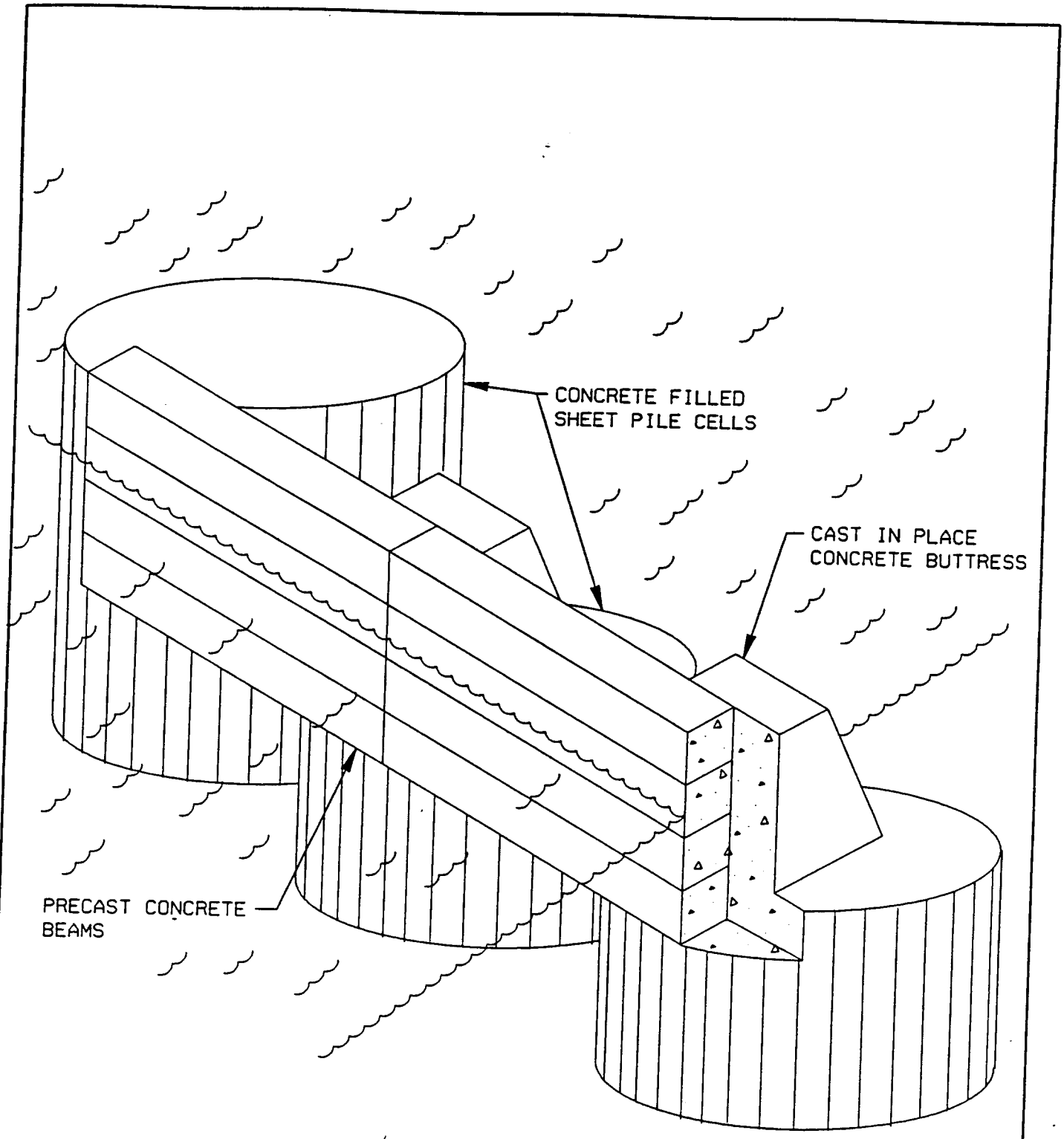
FIGURE 25



APPROACH WALL - CELLUAR SUPPORTED

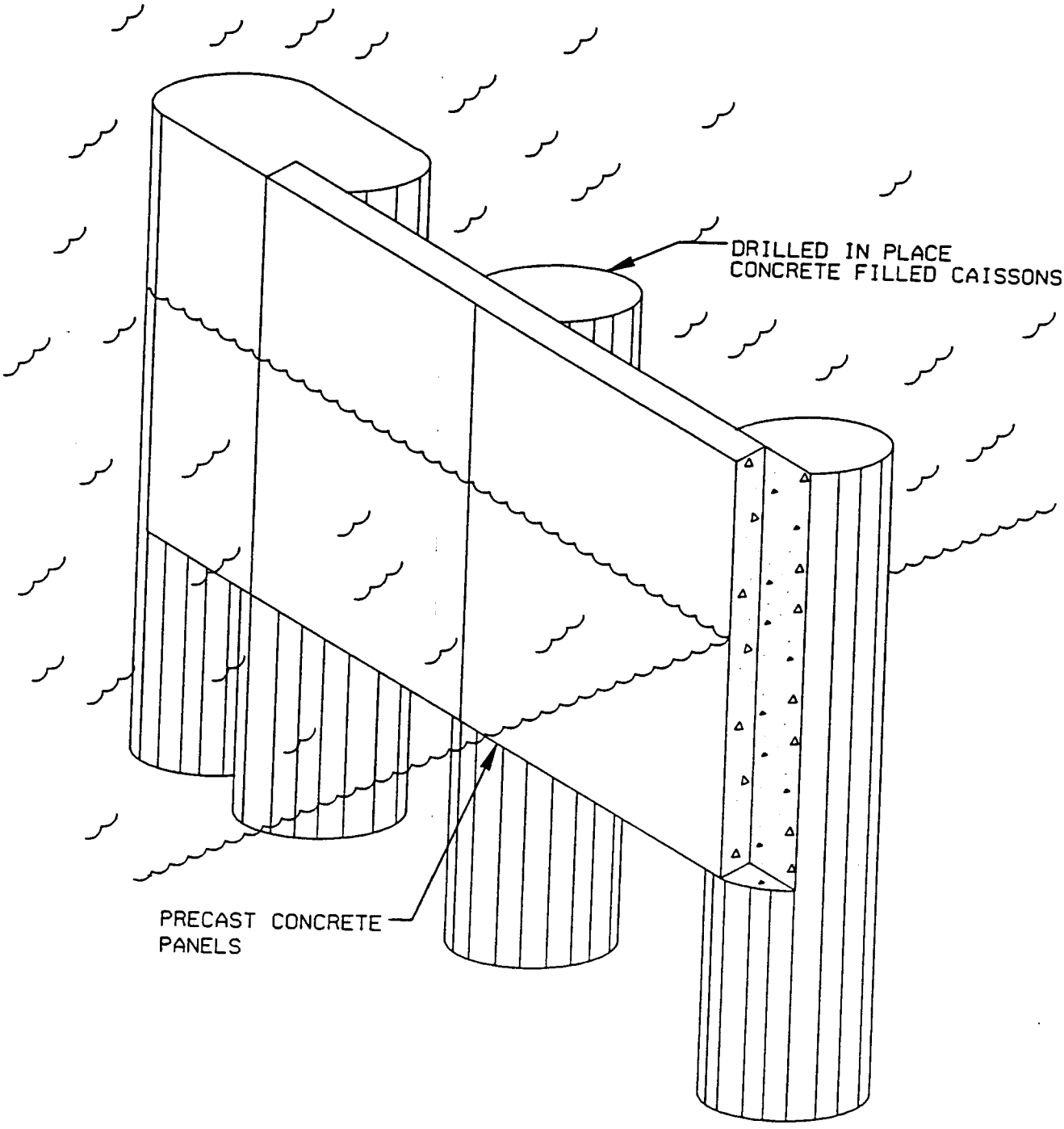
STEEL BEAMS

FIGURE 26



APPROACH WALL - PRECAST CONCRETE BEAMS WITH CELLUAR BASE

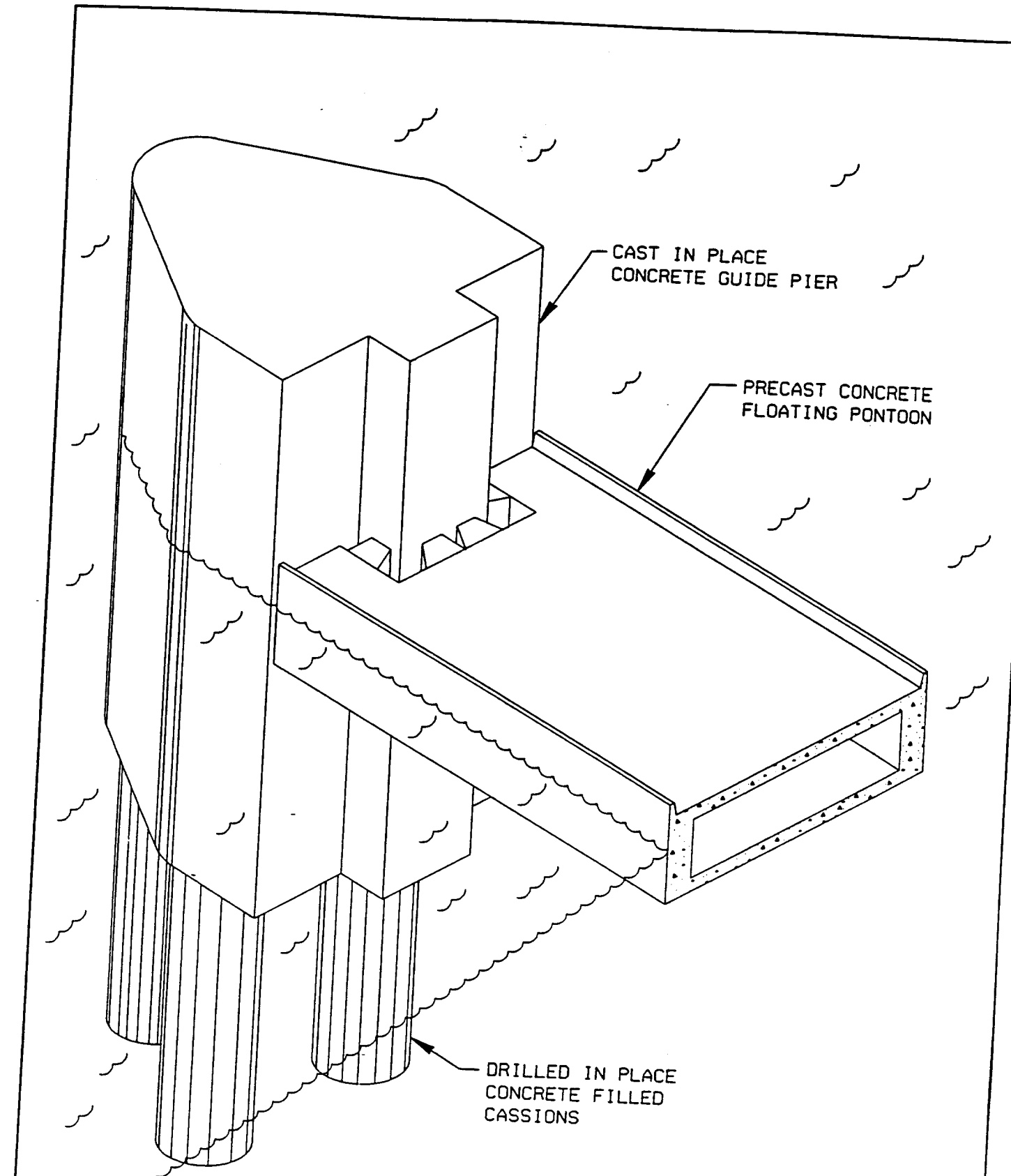
FIGURE 27



APPROACH WALL - CAISSON SUPPORTED

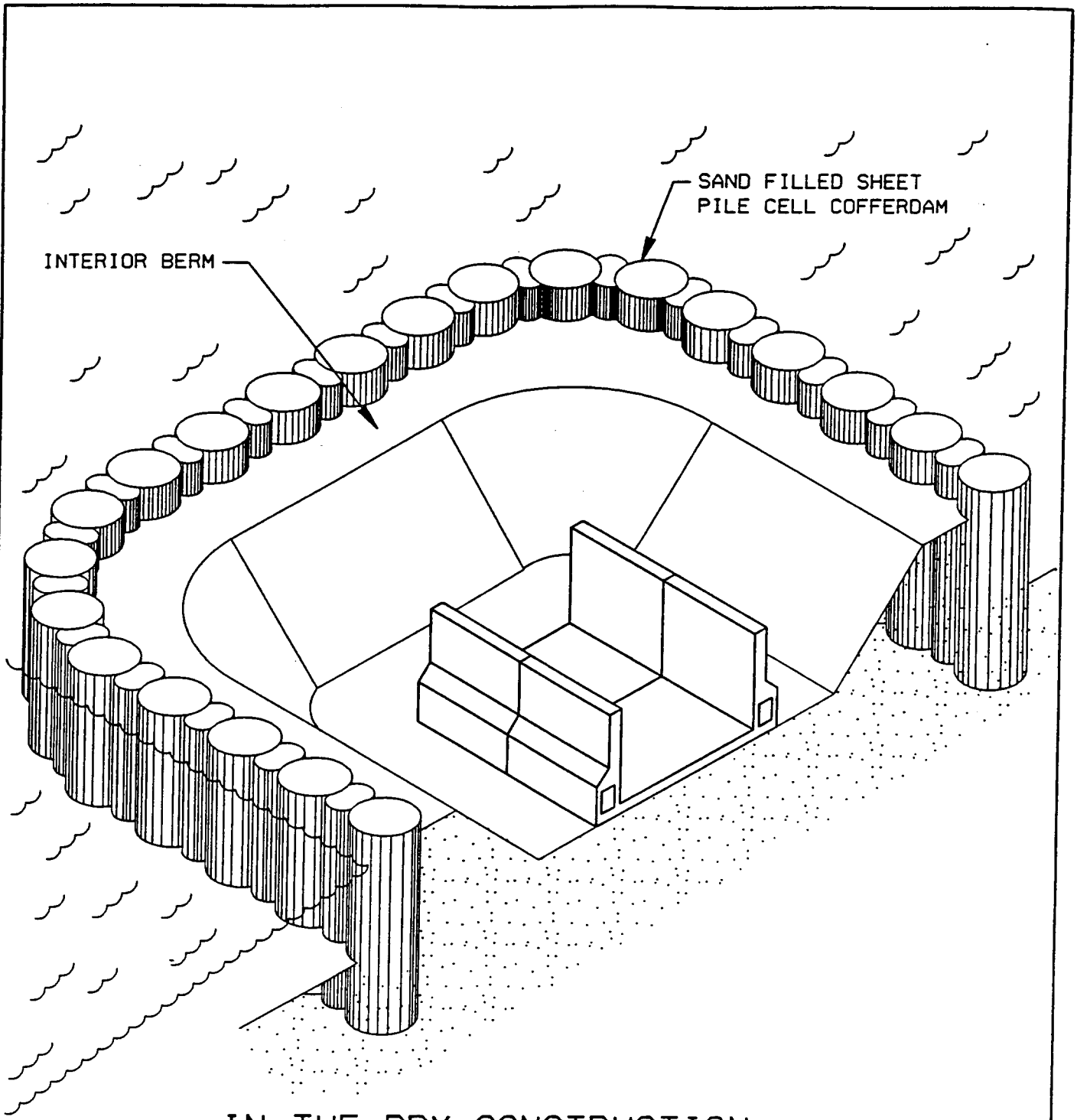
PRECAST CONCRETE PANELS

FIGURE 28



APPROACH WALL - FLOATING PRECAST CONCRETE PONTOONS

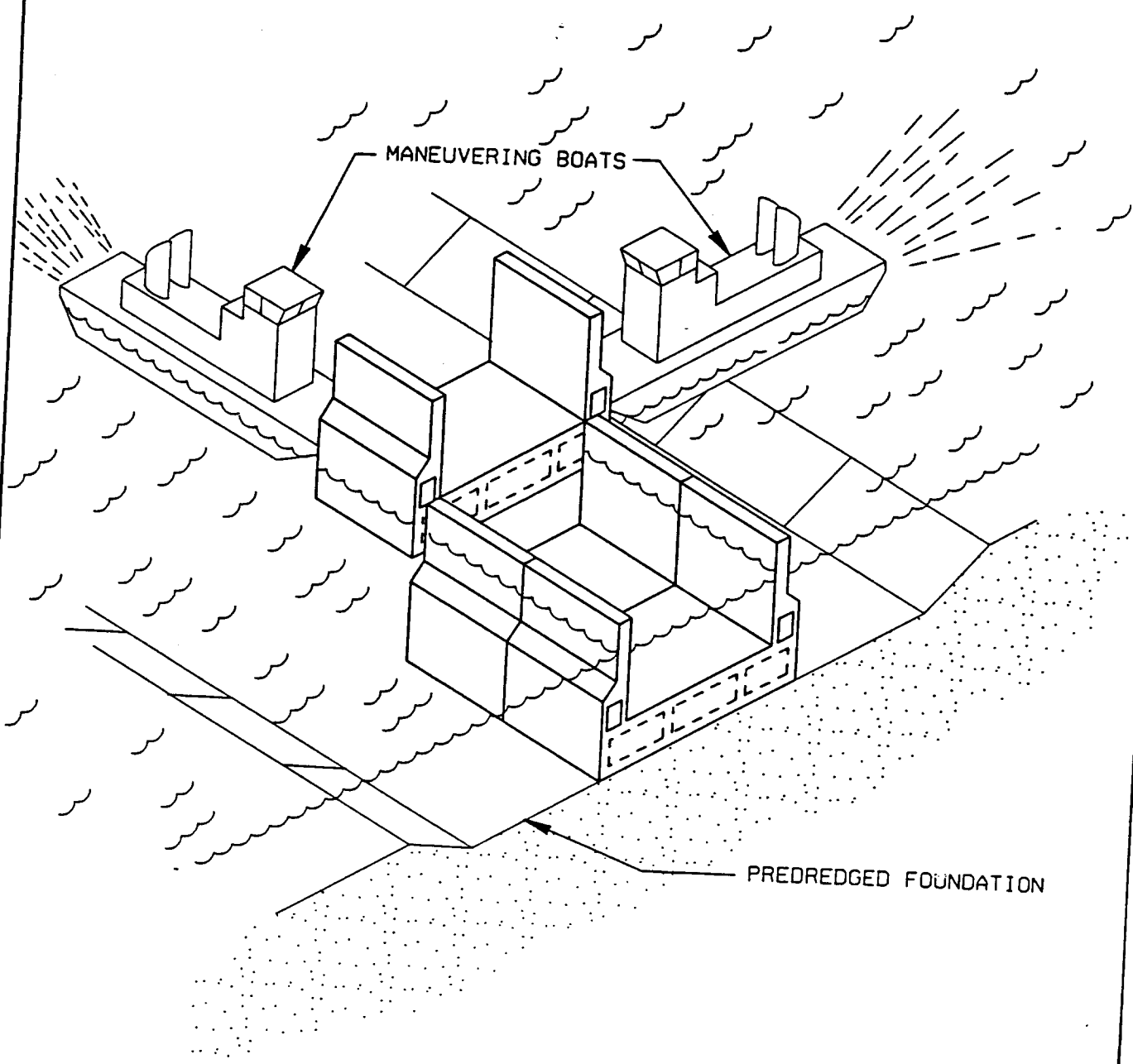
FIGURE 29



IN THE DRY CONSTRUCTION

SHEET PILE CELL COFFERDAM

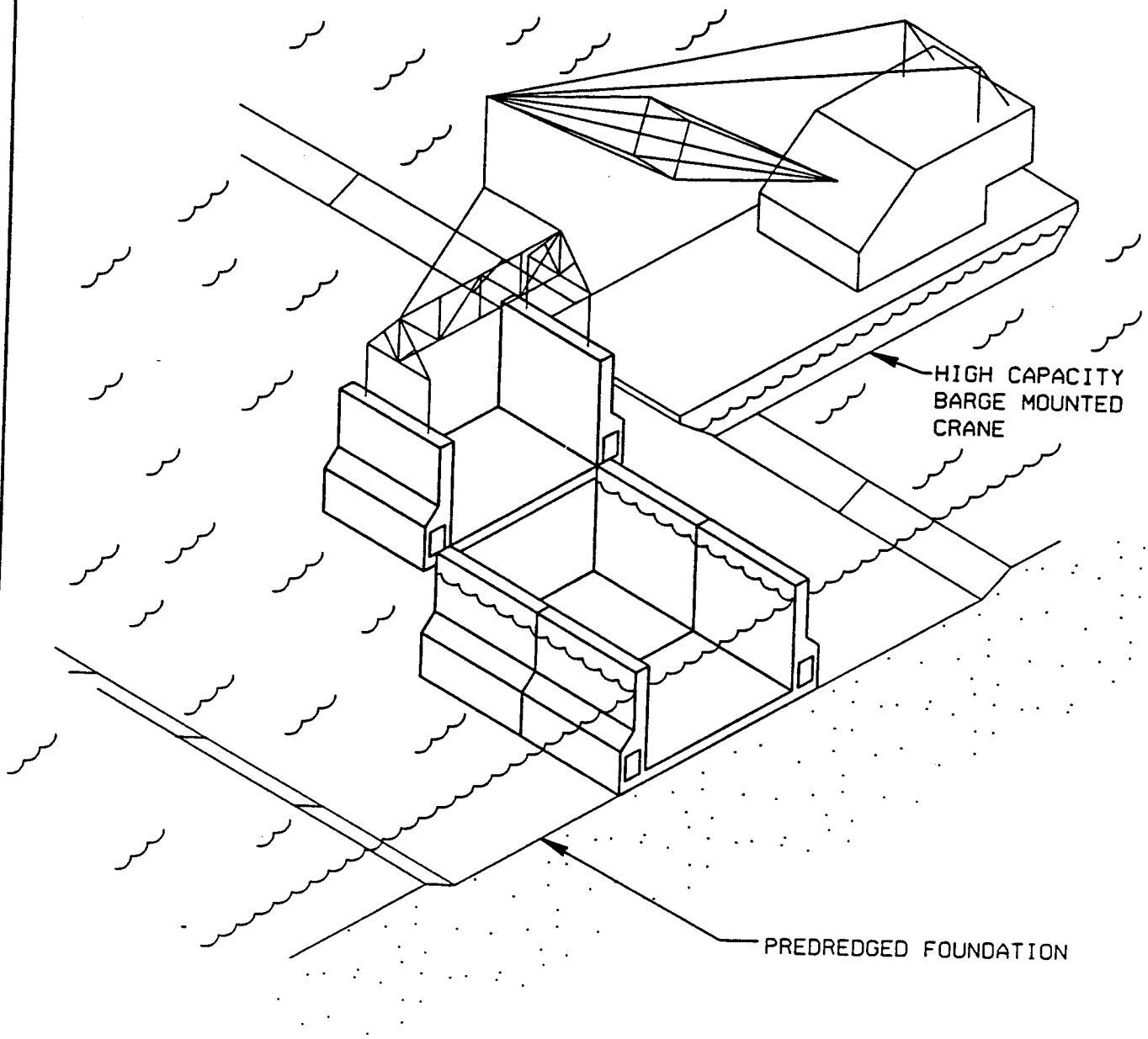
FIGURE 30



IN THE WET CONSTRUCTION

FLOAT IN PRECAST UNIT

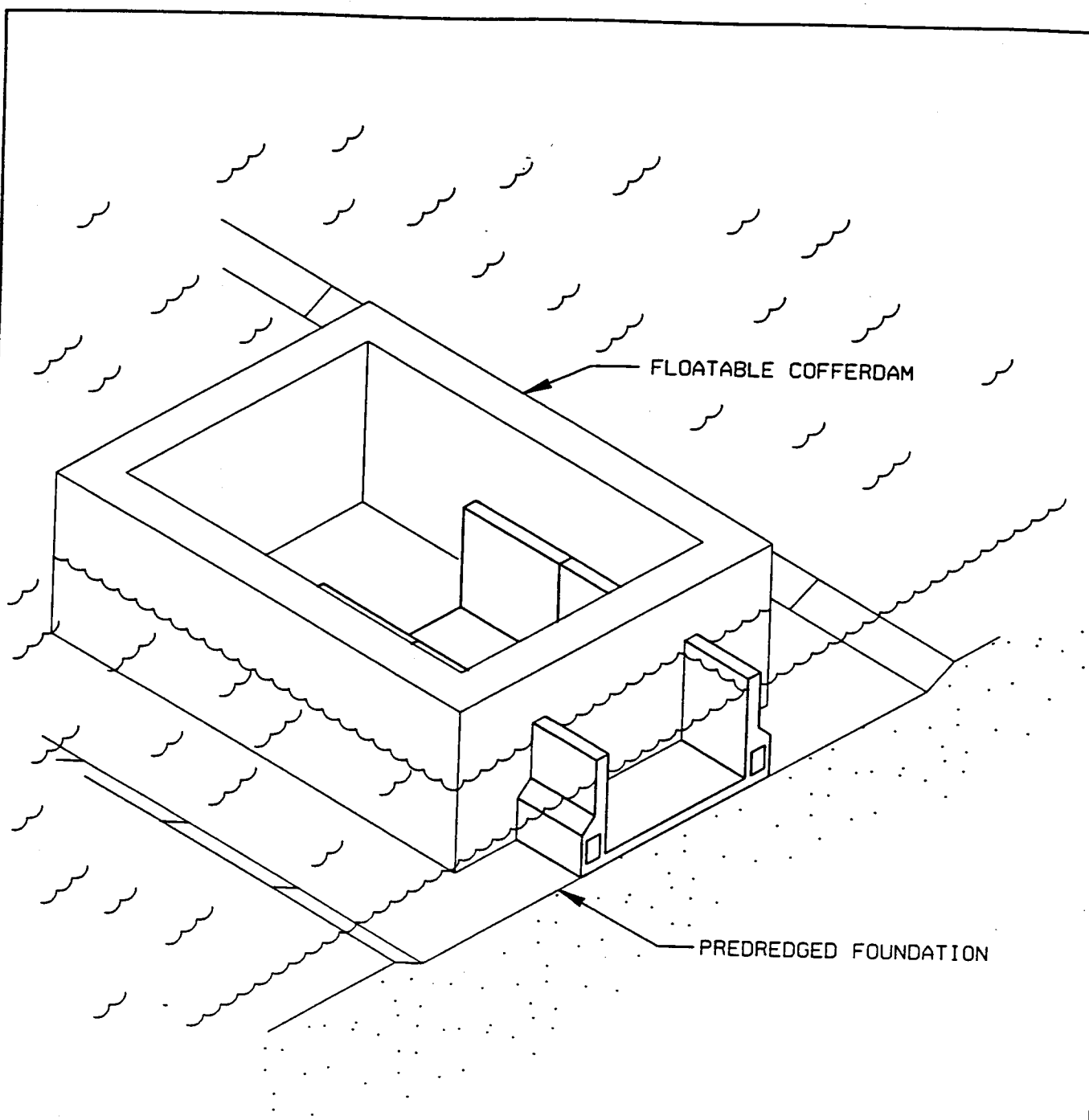
FIGURE 31



IN THE WET CONSTRUCTION

HOISTED IN PRECAST UNIT

FIGURE 32



IN THE WET CONSTRUCTION

MOBILE COFFERDAM

FIGURE 33