

ENGINEERING PROPOSAL  
FOR THE  
CENTRAL AVENUE CORRIDOR TRAFFIC STUDY  
FOR  
THE CITY OF DOVER, NEW HAMPSHIRE

February 10, 1983

Castello, Lomasney & de Napoli, Inc.  
Consulting Engineers  
Manchester, N.H. • Portsmouth, N.H.

Castello, Lomasney & de Napoli, Inc.

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February 10, 1983

City of Dover  
Purchasing Office  
Municipal Building  
Dover, NH 03820

Attention: Mr. Patrick R. Brady

Re: Proposal of Engineering Services  
Central Avenue Corridor Study  
Our Reference No. 83-114

Dear Mr. Brady:

Attached herewith is a proposal for engineering services for the "Central Avenue Corridor Traffic Study". We have attempted to concisely address all aspects of the "Request for Proposals" as issued by your office; however, if the reviewing officials require any clarification or supplementary data, please feel free to contact our Portsmouth office at 436-6711.

We would be pleased to present additional data and graphics regarding our approach to this project to the appropriate city officials during the interview process.

I would like to thank you, as well as Mr. Sheldon, Mr. Stephens, and other city officials for providing us with the information to enable us to formulate this proposal.

Castello, Lomasney & deNapoli, Inc. is a New Hampshire based firm with offices in Manchester and Portsmouth with over 45 employees. You can be assured that we have the manpower, experience, desire and ability to successfully complete this project well within the time allocated.

Very truly yours,

COSTELLO, LOMASNEY & deNAPOLI, INC.

*Michael Scarks*

Michael Scarks, P.E.

MS:rh

Enclosure

cc: Mr. Tim Sheldon, Planning Director  
Mr. Jay Stephens, City Engineer

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## I. INTRODUCTION

In recent years, the Seacoast Region of New Hampshire has experienced substantial commercial development. The City of Dover, as a major urban center in the region, has attracted a large portion of this growth. In an effort to maintain a controlled and well planned growth strategy, the City of Dover has requested Proposals for Engineering Services for the Central Avenue Corridor Study.

The following proposal has been prepared by the firm of Costello, Lomasney & deNapoli, Inc. for the City of Dover for performance of the Central Avenue Corridor Study that will include Central Avenue and intersecting roads from Oak Street to, but not including, the "Weeks Traffic Circle" (See Figure 1). In this proposal we will describe the details of the study location and the proposed development which has prompted the need for this study. A description of the methodology to be utilized to perform the tasks outlined in the City's "Request For Proposals" will also be included along with a proposed schedule and cost estimate. Sections of this proposal also present the qualifications and experience of the individuals to be assigned to this project.

## II. PROPOSED DEVELOPMENT

A major impetus for conducting the Central Avenue Corridor Study is the proposed development of Shaw's Supermarket (150,000 sf) and Hannaford Brothers, Inc. Supermarket (102,000 sf) both to be located in the vicinity of the Glenwood Avenue intersection (see Figure 1 and photo). This development will substantially increase the traffic demand on Central Avenue, thus decreasing the level of service currently experienced.

Additional growth anticipated along the Corridor includes the development of medical offices in the vicinity of the Wentworth-Douglass Hospital. Limited sight distances offer problems in both of these areas of Central Avenue. These proposed developments will be specifically analyzed along with general trends in traffic demand.

We will identify possible improvements along the entire route that will: 1) maintain the current level of services on Central Avenue based on anticipated demand increases, and 2) improve the future level of service based on anticipated demand increases. Costs of both alternatives will also be presented.

### III. EXISTING INFORMATION

A large portion of the existing information available for this study will be supplied by the City of Dover. Included in this information are planning studies and reports prepared in past years for the City. These studies and reports include:

1. Traffic Circulation Survey, Dover, New Hampshire, 1965.
2. TOPICS Traffic Survey Report, Dover, New Hampshire, 1967.
3. Comprehensive Development Plan for Dover, New Hampshire, 1971.

In addition, a number of maps and plans are available through the City Engineer for use in preparing plans for this study. These materials include:

1. City Tax Assessor Maps, 1'=100±
2. Prints of State Highway Plans for portions of the study area, 1"=40' (originals may be obtained from NH Department of Public Works and Highways)
3. Maps found in previously listed reports
4. If funding is available, photogrammetric maps could be prepared through aerial photography already taken for the City by others. This would supplement existing coverage of the City and be useful in preparing this study. However, since four weeks would be required to prepare these maps, it is doubtful that this could be available within the sixty day time period allocated.

Accident data is available through the Dover Police Department. It is also understood that all materials and background information presently being prepared by engineers for the major developers planning to build along Central Avenue will be available for use by Costello, Lomasney & deNapoli, Inc. in conducting this study.

#### IV. METHODOLOGY

The firm of Costello, Lomasney & deNapoli, Inc., will perform the following tasks in preparing the Central Avenue Corridor Study.

1. Data Gathering (Items 1,3,4,5,7)\* - This task will include work required to provide ample background material for use in developing a conceptual plan for improvements. The major thrust of this task will be to obtain all necessary traffic data. Two types of counts will be taken:
  - a. Continuous counts will be conducted by utilizing Automatic Traffic Recorders at three (3) locations on Central Avenue. These locations would be 1) south of Oak Street; 2) between Old Rollinsford Road and Merry Street; and 3) between Old English Village Road and Morin Street (see Figure 1 and photos.) These counts would cover a minimum of 48 consecutive hours.
  - b. Manual counts will be conducted at key intersections to determine turning movements during the AM and PM peak hours. These counts will be taken at the following locations (see Figure 1 and photos):

Oak Street  
Old Rollinsford Road  
Wentworth-Douglass Hospital Parking Lot  
Entrance  
Glenwood Avenue

\*Item numbers refer to "Request for Engineering Services".



In addition, random 15-minute counts will be taken at minor intersections to determine if any other heavy turning movements requiring traffic control exist. Counts will be taken from 7 AM to 10 AM and 3 PM to 6 PM. All information obtained at the key intersections listed above will be recorded at 15-minute intervals and truck traffic will be recorded separately.

- c. Field Survey and Mapping will be undertaken concurrently with the traffic counts. This effort will entail review of existing mapping and aerial photography. In addition, a visual survey will be made of all pertinent physical features including buildings, curbs, curb cuts, utility poles, signing, signals, lane widths and sidewalk locations. Detailed surveys will be conducted only at critical intersections. It should be noted that weather conditions (i.e. snow covering, rain, etc.) will play an important role in the progress of this work. All survey work will be accompanied by extensive photography for analysis and presentation purposes. The result of this task effort will be the preparation of base maps for graphic presentations.
2. Data Analysis (Items 3,4,5) - This task of the project will involve analysis of the traffic count data gathered in the field. This analysis will include determination of existing capacities and level of service, Average Daily Traffic (ADT), Design Hourly Volumes (DHV), and Directional Design Hourly Volumes (DDHV). In addition, signal warrants will be analyzed.

The analysis phase will also include review of the accident data supplied by the Dover Police Department. This analysis will cover the most recent consecutive two (2) year interval available on file. The result of this review will be a determination of trends in location, time of day, and type of accidents along the Central Avenue Corridor. This phase will also include a cost-benefit analysis of utility pole relocation based on accident data.

During the Data Analysis phase, particular attention will be paid to the "Miracle Mile" portion of Central Avenue and the impacts of proposed development in this area. All of the current traffic data will be projected to 1988, 1993, and 2008, based on population and growth projections provided by the Strafford County Regional Planning Commission, New Hampshire Office of State Planning, and the New Hampshire Department of Public Works and Highways.

3. Preparation of Conceptual Plans (Items 1,2,8,9) - Based on the information gathered and analyzed in the previous tasks, Conceptual Plans will be developed within the constraints outlined by City personnel. These plans will be discussed in the text of the final report and presented on plans prepared from existing maps, plans, and field survey data.

The plans will take into account both existing and proposed commercial development along the "Miracle Mile" as well as planned improvements at the Wentworth-Douglass Hospital complex. The intention of the concepts to be developed will be to provide safe and efficient traffic flow without diminishing the business climate of the corridor.

4. Construction Cost Estimates (Item 10) - This task will involve the preparation of a preliminary cost estimate for the improvements outlined in the Conceptual Plans. All information will be presented in 1983 dollars. All costs will include the cost of engineering services for design and construction.
5. Recommended Course of Action (Item 11) - In conjunction with the development of a cost estimate, a course of action will be developed which will best utilize available funding to meet the demands of growth in the study corridor. This task will be closely coordinated with Dover City Officials.
6. Report Preparation (Item 11) - The final product of the previously listed tasks will be a report presenting all background information and findings of the Corridor Study. This report shall include all text, tables and figures necessary for a clear and concise presentation of the study material. An Executive Summary of the study findings will also be included.
7. Meetings and Correspondence - In a fast-track project such as the Central Avenue Corridor Study, it is necessary to maintain close communications with the client. For this reason, Costello, Lomasney & deNapoli, Inc., has set aside a specific task to meet this need. The Principal In Charge will attend all significant meetings and presentations.

In order to discuss and consolidate all the ideas, opinions, and concerns relative to this project, it is suggested that a meeting be held with City officials and department heads at the onset of the project. Attendance by the following officials

and/or representatives is suggested.

City Council Members  
Planning Board Members  
Planning Director  
City Engineer  
Dover Police Department Representative

This meeting will also be useful to ascertain budgetary restraints to be considered in the development of conceptual plans.

In the early stages of the project, Costello, Lomasney & deNapoli, Inc. will also meet with the engineers representing the two major developers, Shaw's Supermarkets and Hannaford Brothers, Inc., to discuss details of site design, parking lot capacity, traffic generation and other matters pertinent to Central Avenue.

A meeting will also be held with hospital officials to discuss future expansion plans and specifically the addition of a doctor's office park and the resulting traffic circulation problems. Throughout the progress of the Study, the City will be notified of all meetings scheduled by the Consultant should any City officials choose to attend.

As the project reaches the final stages, Costello, Lomasney & deNapoli, Inc. will present its findings and recommendations to the Planning Board and City Council. A presentation will also be made to the Metropolitan Planning Organization as directed by City officials. We will also prepare graphics and literature for public viewing and review at these presentations.

Throughout the duration of the project, the City will be sent copies of all correspondence and will be provided with a weekly report of project progress.

8. Origin/Destination Study-Optional (Item 12) - As instructed in the Request for Proposals, this portion of the Scope of Services has been developed for separate consideration.

The O/D Study will involve random interviews at the following locations:

1. Broken Pushcart
2. McDonald's Restaurant
3. Service Merchandise
4. Glenwood Avenue (East Bound)
5. Garrison Greenhouse
6. Sawyer's/Seigel's Complex
7. Dover Bowl/Star Market
8. Johnson's Hardware Shopping Plaza
9. Wendy's
10. Fun Spot/R-W Realty

Each location will be surveyed for three (3) consecutive days, Thursday, Friday and Saturday, during the hours of 11 AM to 1 PM and 3 PM to 7 PM. Traffic counts will also be made during the interview periods at the entrances to each location, for purposes of statistical analysis.

The purpose of this study is to determine patterns of movement of vehicles within the Corridor and to determine points of origin of trips to the Study Corridor. A survey data sheet will be developed for review by City officials prior to commencement of the survey and dates for conducting the survey will be approved by the City Manager.

The results of the study will be presented as an appendix to the Central Avenue Corridor Study.



Photo #1: Intersection of Oak Street and Central Avenue



Photo #3: Intersection of Glenwood Avenue and Central Ave.



Photo #2: Intersection of Old Rollinsford Road and Central Avenue and Hospital Entrance



Photo #4: Proposed Site Development Location



Proposed Office  
Development

Central

Wentworth-Douglass  
Hospital

Avenue

Photo #5: Proposed Office  
Development Adjacent to  
Wentworth-Douglass Hospital



Counter  
Location

Yield House

Oak Street

Photo #6: Proposed traffic  
counter location south of Oak Street



Development Site

Central

Ave.

Counter Location

Photo #7: Midblock counter location



Week's  
Circle

Counter Location

Service  
Merchandise

Photo #8: Proposed Counter  
Location at North End of Project



Photo #9: Poor Horizontal Alignment at Glenwood Avenue



Photo #11: Northern Portion of the "Miracle Mile"

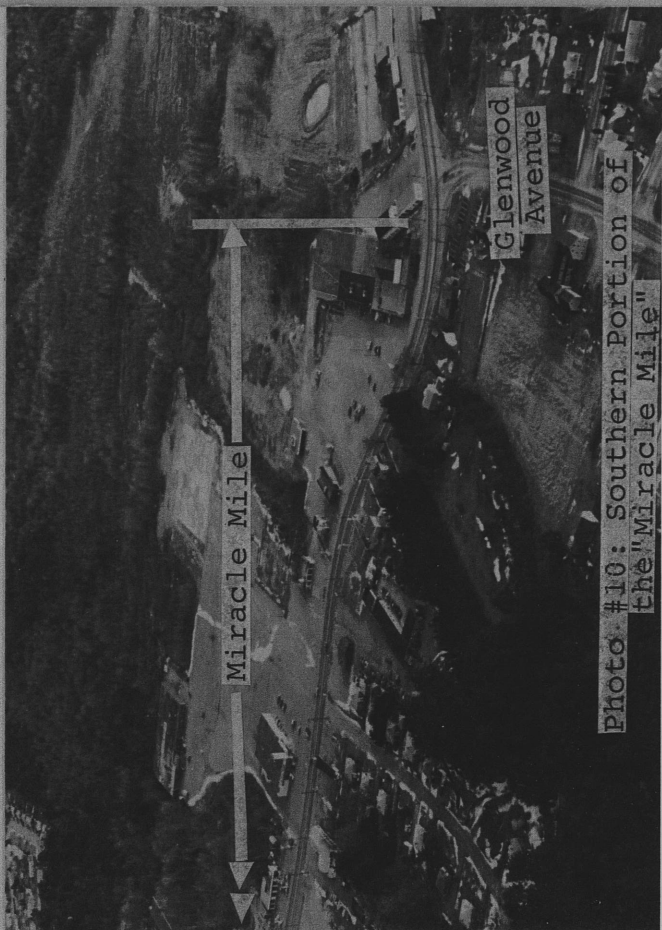


Photo #10: Southern Portion of the "Miracle Mile"



Photo #12: Week's Rotary



V. PROJECT TEAM: QUALIFICATIONS & EXPERIENCE

1. Transportation Studies

US Route 202 - New Castle County, Delaware

This project involved the preparation of concept plans and environmental impact studies for reconstructing and widening a major 4 lane arterial highway to a six lane section. Over five miles in length the project involved developing at grade intersection layouts, grade separated interchange layouts, horizontal and vertical geometry, and traffic control schemes that would maximize traffic flow and minimize damage to the abutting commercial development. The project involved working closely with the business community developing schemes to reduce the number of uncontrolled access points to the highway.

Albuquerque Highway Location Study, Litchfield, NH

Preliminary corridor location study for a major north-south arterial roadway through Litchfield, New Hampshire, including transportation planning studies, environmental assessments and preliminary ground survey.

Urban Street Design, Roy Drive, Manchester, NH

Complete design including corridor location study, traffic analysis, environmental assessment, air impact investigation, soils evaluation, final roadway and intersection design, sewer and drainage design, street lighting and utility design, and preparation of final

contract plans and documents for a 1½ mile urban street serving a residential and industrial area. Final construction cost was \$1.3 million.

Interstate 895 Corridor Study/Environmental Impact Statement, RI

This work included the planning of transportation improvements throughout a 40-mile corridor connecting I-95 and I-195 through the southern portion of the state.

East Bay Rail Corridor Study

Report prepared for the evaluation of potential ridership revenues, and corridor improvements for an abandoned rail line between Bristol and Providence, RI.

JFK International Airport, New York, NY

Development of Conceptual Plans for improvements to traffic circulation at the United Airlines and American Airlines terminals.

Master Plan: Roadway Improvements, Clasons Point, NY

This project involved survey and data collection for development of reconstruction recommendations for this roadway system in the South Bronx.

Post Road High Hazard Elimination Project

This study provided the evaluation of traffic and accident data and field review of this 1.5 mile arterial highway

to determine improvements necessary to enhance the safety record of this roadway located in Warwick, RI.

#### Route 108 Design Study Report

This project included the evaluation of traffic volumes, horizontal and vertical geometry, and signalization of major intersections for use in preparation of final plans and specifications for reconstruction of this roadway in Narragansett, RI.

#### Central Avenue 3R Improvements Conceptual Design Report and Broad Street 3R Improvements Conceptual Design Report

This project included the evaluation of traffic volumes, turning movements at major intersections, parking restrictions, pavement, sidewalk, and curb condition, accident data, and utility pole relocation for both these major arterial roadways located in Pawtucket, RI.

#### Other Transportation Studies

Major planning studies carried out in Connecticut for following projects: 1966 Highway Beautification Program (Statewide plan and estimate), 1968 and 1970 interstate cost estimates (Statewide analysis of cost to complete system), Connecticut Route 15 (Current I-86) widening estimate (Vernon to Massachusetts state line), Groton major highway planning studies for east-west highway to by-pass Route 1 and limited access defense access road to connect I-95 to Electric Boat Co. complex.

Site-specific traffic studies involving vehicle volume projections, turning movement conflicts, pedestrian/vehicle interrelationships, and accident studies in association with proposed service stations for Mobil Oil Co. and Gulf Oil Corporation and major race track proposals in Middletown, Wethersfield, Watertown, and Plainfield, Connecticut.

2. Highway Development & Design Projects

South Willow Street Widening and Reconstruction -  
Manchester, NH

This project involves preparation of plans, specifications and construction documents for the reconstruction of a 1½ mile major urban arterial street (and connecting streets) through a highly developed commercial area in Manchester that includes the main entrance to the Mall of New Hampshire. Work includes traffic analysis, new arterial street alignment, reconstruction of a diamond interchange with Interstate 293, signalization for 5 major intersections, drainage, utility relocation, and right-of-way acquisition.

Granite Street Access Ramps - City of Manchester, NH

In conjunction with the City of Manchester's Downtown Revitalization Program, this Firm has been performing engineering feasibility studies and final designs and construction administration for new access to Downtown at Granite Street from the F.E. Everett Turnpike.

Urban Street Reconstruction, Goffstown, NH - 114A

Preparation of final construction documents for Route 114A including traffic analysis, signalization design, unique improved inlet culvert design, structural design, utility relocation and drainage, preparation of right-of-way acquisition plans and final estimate.

Urban Street Reconstruction, Hooksett, NH - 28A

This project involved preparation of contract documents for reconstructing Route 28A through a residential area. Extreme care was exercised in the design of the horizontal and vertical geometry to minimize damage to abutting private property in an area of rolling topography. Project included drainage design, utility relocation, preparation of right-of-way acquisition plans and cost estimates.

3. TOPICS Projects

Connecticut

Area-wide TOPICS studies, TOPICS early implementation studies and designs, and TOPICS improvement plans and specifications in following Connecticut communities: Hartford, New Haven, Stamford, New London, Danbury and Meriden.

New Jersey

TOPICS studies including survey and data collection and preparation of plans and specifications in Margate and Ventnor, NJ.

## VI. PROJECT TEAM: ORGANIZATION

This project will be conducted primarily from our Portsmouth Office, which is managed by Michael Scarks. Our proximity to the Study Corridor will provide the City with the highly responsive service necessary to meet the proposed project schedule. In addition, as residents of the Dover area, the office staff is acquainted with the study area and the problems which currently exist along the Central Avenue Corridor.

Mr. Dana Lynch will be responsible for preparing and coordinating all technical aspects of this study. As the attached resume indicates, Mr. Lynch has gained considerable experience in the field of conceptual designs and corridor studies as well as the design and implementation of roadway improvements.

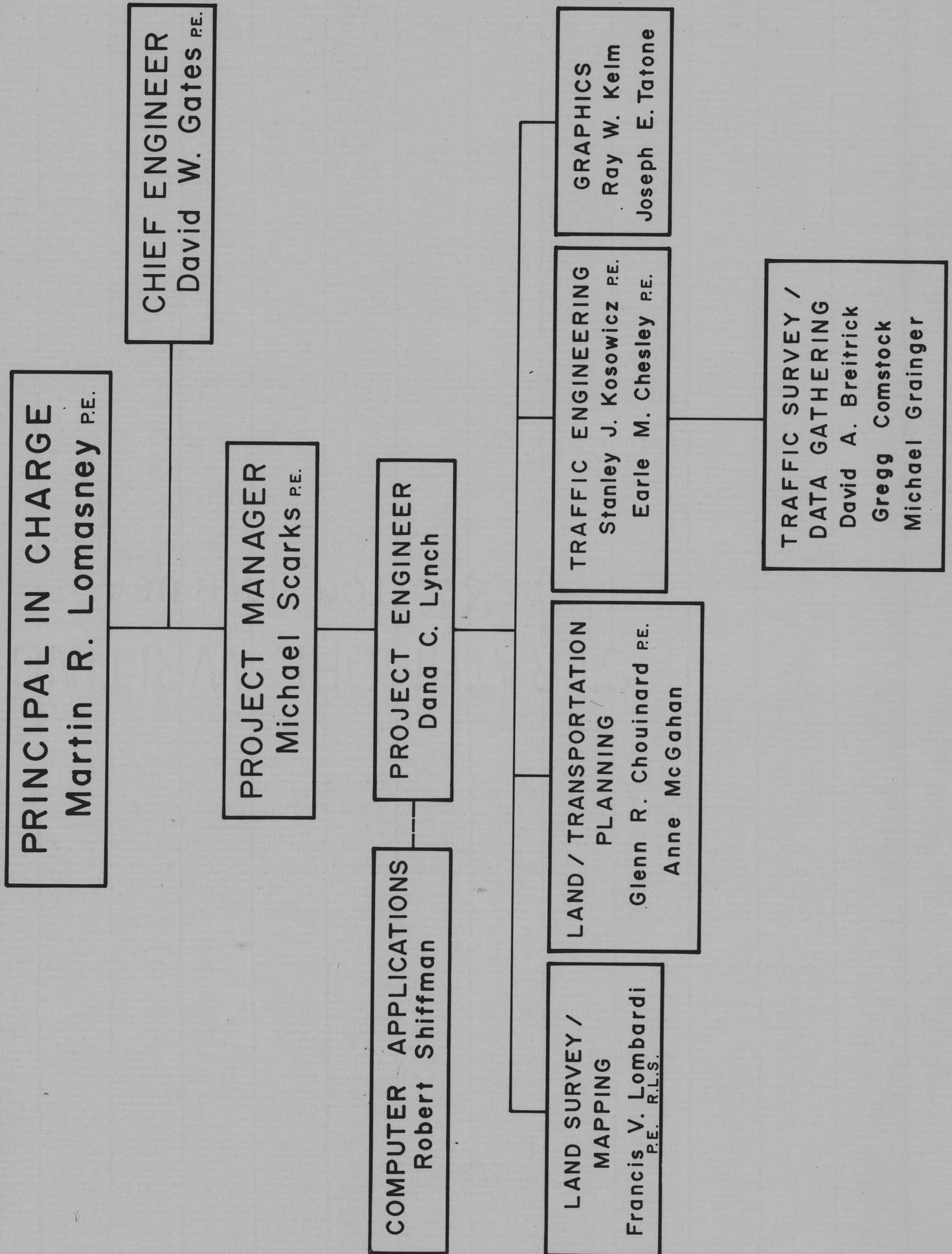
Mr. Lynch will be supported by Messrs. Chouinard, Kosowicz and Chesley who all have an extensive background in traffic analysis and review of various transportation planning studies at the State level.

Mr. Michael Scarks will administer the project, coordinate with City officials, and assure compliance with the schedule of services to be provided.

Mr. Martin R. Lomasney, as a principal of the firm, will oversee all phases of the project and present our findings at meetings and presentations as outlined in Section IV: METHODOLOGY, Task 7.

Resumes for the Project Team are included on the following pages.

# PROJECT TEAM ORGANIZATION



Martin R. Lomasney, P.E.  
Principal, Vice President, Treasurer

EDUCATION -

Northeastern University - BS, 1958 - Civil Engineering  
Northeastern University - MS, 1967 - Sanitary Engineering

PROFESSIONAL REGISTRATION - Professional Engineer

Massachusetts, New Hampshire - Sanitary

EXPERIENCE -

1976 - Present Costello, Lomasney & deNapoli, Inc., Engineers  
Project Manager and Partner in Charge of various projects, including solid waste management programs, facility planning, sewer design and industrial waste treatment facilities and highway planning and design.

1973 - 1976 Rollins, King & McKone & Associates, Inc., Engineers  
Vice President, President  
Project Manager and Partner in Charge of all civil projects, including industrial abatement, construction management of industrial buildings, solid waste management, coordination of energy conservation projects, and preparation of operation and maintenance manuals for treatment plants.

1959 - 1973 Hayden, Harding & Buchanan, Inc., Engineers  
Principal Civil/Sanitary Engineer  
In the early years of his career with this Firm, Mr. Lomasney worked on a variety of civil engineering projects including the design of storm and sanitary facilities, water supply and distribution systems, highway route locations, traffic studies, industrial park designs, recreational facilities and bulk storage facilities. With increasing responsibilities, he was made Project Engineer on various highway projects and in responsible charge of highway design, drainage design, estimates and preparation of contract documents. Subsequently, Mr. Lomasney became Project Engineer for design of various components of pumping stations and secondary treatment plants. Ultimately, he was made Project Manager in responsible charge of numerous sanitary projects including a 20 MGD secondary treatment plant, solid waste studies, design of drainage facilities, and design of sanitary sewers and pump stations.

1958 - 1959 Fay, Spofford & Thorndike, Engineers  
Civil Engineer  
Assistant Project Engineer responsible for various design components of highway projects including horizontal and vertical control, estimates, drainage design and preparation of final bid documents.

PROFESSIONAL SOCIETIES -

Board of Registration for Professional Engineers  
American Society of Civil Engineers  
New England Water Works  
American Water Works  
New Hampshire Society of Professional Engineers



Michael Scarks, P.E.

EDUCATION -

University of New Hampshire - courses in civil engineering  
Lowell Technological Institute, BS - 1975 Civil Engineering

PROFESSIONAL REGISTRATION - Professional Engineer  
New Hampshire, Maine, Massachusetts (pending)

EXPERIENCE -

1982 - Present Costello, Lomasney & de Napoli, Inc., Portsmouth, N.H.  
Seacoast Area Manager - Responsibilities include management of  
Portsmouth Office, client contacts, preparation of proposals and fiscal  
responsibility for production of projects within established budgets.

1981 - 1982 Director of Engineering, Chalet Susse International,  
Nashua, N.H.

1977 - 1981 City Engineer, City of Portsmouth, N.H.

1976 - 1977 Resident Engineer, City of Portsmouth, N.H.

1975 - 1976 United States Navy

1970 - 1975 Maintenance Mechanic, Edgcomb Steel of N.E., Nashua, N.H.

DESIGN: Sewer lift stations, masonry construction, steel frame construction, reinforced concrete foundations, pre-fabricated metal buildings, electrical/mechanical building rehabilitation, bridge rehabilitation, wood frame construction, highway/intersection improvements, underground utilities (water/sewer), heavy steel fabrications, master plans, recreation areas

CONTRACT ADMINISTRATION/INSPECTION: All of the above, gunite construction and restoration, urban renewal, water treatment facilities, industrial park

CONSTRUCTION: Underground utilities (water/sewer), sewer lift stations, steel frame structure, masonry structures, wood frame structures, steel shop fabrication, highway/intersection improvements (soils, pavements, signalization)

ADMINISTRATION: Head of Engineering Department for national budget motel chain: responsible for land acquisition, site development, new construction, rehabilitation, major maintenance, energy conservation program, and capital budget preparation. Head of Engineering and Building Inspection Divisions of Public Works Department (20 employees), Deputy Director of Public Works Department (120 employees), Program Coordinator-Federal Sewer Grant Program (\$35 million), Construction Estimator (for most of above), involved with annual operating and capital budget preparation (\$2-4 million)

PROFESSIONAL SOCIETIES -

American Society of Civil Engineers  
American Society of Military Engineers  
American Public Works Association  
New Hampshire Public Works Association (former president)

David W. Gates, P.E.  
Chief Engineer

EDUCATION -

University of Maine - BS, 1954 - Civil Engineering

PROFESSIONAL REGISTRATION - Professional Engineer

Connecticut, Delaware, Florida, Massachusetts, Maine,  
North Carolina, New Hampshire, New Jersey, New York,  
Pennsylvania, Rhode Island

Land Surveyor

Connecticut, North Carolina, New Jersey

EXPERIENCE -

1982 - Present Costello, Lomasney & deNapoli, Inc.  
Chief Engineer responsible for all in-house technical activities  
including quality control, project budgets, manpower allocations,  
and schedules.

1980 - 1982 E.C. Jordan Company  
Manager, Civil Engineering Services responsible for Civil  
Engineering, Construction Services, and Survey Departments.  
Administrative responsibilities included preparation and monitoring  
of department budgets, (capital, operating, and manpower), prepara-  
tion of department marketing plans, personnel evaluations and salary  
reviews, and miscellaneous duties of a Division Manager. Technical  
responsibilities were largely review roles, although they included  
project management activities on a number of assignments, most of  
which required specialized services of one sort or another.

1961 - 1979 James P. Purcell Associates, Inc., Engineers  
and Planners  
Project Engineer, Project Manager, Vice President and Chief  
Engineer responsible for or heavily involved with a myriad of  
engineering and planning assignments involving studies, investi-  
gations, reports, designs and construction on the domestic as  
well as the international scene. Included were expressways, grade  
separations, urban arterial and local streets, utility systems,  
storm drainage master plans and designs, wastewater collection,  
pumping and treatment facilities (including innovative and  
alternative technologies), industrial pollution control systems  
(including administration of NPDES permits), solid wastes/  
resources recovery facilities of several types, urban renewal  
projects, industrial parks, shore erosion control studies and  
facility designs, marinas, hydrologic and hydraulic studies  
(flood assessments), recreational facilities (including a summer  
camp), lake restoration studies and designs (314 Program),

airport studies and designs, site planning for multi-family residential complexes and shopping centers, demolition and site clearance projects, traffic studies, surveys of various types, tax mapping, feasibility studies, investigations and expert witness services, review of plans for various public agencies and environmental impact assessments. Also provided engineering support to an architectural division working principally on commercial and industrial building projects.

1959 - 1961 Levitt and Sons, Inc.

Office Engineer and Designer responsible for design activities on all phases of municipal facilities construction to support "new city" type developments, working on 17,000 home Levittown in New Jersey and a 6000 homes subdivision in Prince George County, Maryland. Complete site planning for four elementary schools, one junior/senior high school, four municipal swimming pools, a regional shopping center and several other commercial sites. Designed subdivision streets, storm drains and sanitary sewers.

1957 - 1959 Seelye, Stevenson, Value and Knecht, New York City, Consulting Engineers

Highway Design Engineer responsible for design activities on a 20-mile section of Interstate Route 87, North of Glens Falls, New York, and a section of the Long Island Expressway in the Town of Huntington. Responsible for interchange designs on I-87 assignment and preparation of property appropriation maps for about ten miles of that route as well as four miles of the Long Island Expressway.

1955 - 1957 U.S. Army Signal Corps. Radar Platoon Leader.

1954 - 1955 Junior Engineer in U.S. Bureau of Public Roads (now FHWA).

Highway Engineer training Program. Held various field assignments while assigned to the Montana District Office. Assignments included all phases of survey and office work connected with the supervision of construction of 50 miles of National Forest access roads. Also did survey and office work on a location survey for an unimproved section of U.S. Route 89, north of White Sulphur Springs, Montana.

PROFESSIONAL SOCIETIES -

American Society of Civil Engineers  
American Society of Mechanical Engineers, Solid Wastes  
Processing Division  
Water Pollution Control Association  
National Society of Professional Engineers

Dana C. Lynch

EDUCATION -

University of Rhode Island, BS - 1977 Civil Engineering  
Certificate of Training in Safety Design and Highway Operations

EXPERIENCE -

1982 - Present Costello, Lomasney & deNapoli, Inc.  
Project Engineer - Responsible for site development, drainage,  
and highway projects.

1980 - 1982 R. A. Cataldo and Associates, Inc., Pawtucket, RI  
Design Engineer - Responsible for preparation of plans, specifica-  
tions, and cost estimates for roadway and site improvement projects.  
Work included preparation of Conceptual Design reports, progress  
reports, supervision of support staff, and coordination of efforts  
with clients and government agencies. Major projects included:

Narragansett Parkway 3R Improvements, Warwick, RI  
Mineral Spring Avenue 3R Improvements, No. Providence, RI  
Riverside Square Intersection Improvements, E. Providence, RI  
Reconstruction of Route 108, Narragansett, RI  
Post Road High Hazard Elimination Project, Warwick, RI

1978 - 1980 Wilbur Smith and Associates, Providence, RI and  
New Haven, CT  
Design Engineer - Responsible for preparation of design work in-  
cluding client contact and direction of design personnel. Areas of  
specialization included roadway and drainage design. Major projects  
included:

Jamestown Bridge Replacement Design Recommendations,  
No. Kingstown/Jamestown, RI  
East Bay Rail Corridor Design Recommendations, RI  
Long Ridge Road Reconstruction, Stamford, CT  
Ventnor TOPICS, Ventnor, NJ  
United/American Airlines Curb Frontage Improvements,  
JFK International Airport, NY  
I-895 Corridor Location/EIS, RI

1976 - 1978 Wilbur Smith and Associates, Peace Dale, RI  
Junior Engineer - Assisted in the preparation of the I-895 Corridor  
Location/Environmental Impact Study. Responsibilities included  
tabulation and analysis of traffic data, ambient noise level studies,  
study of air quality and water quality impacts and right-of-way cost  
analysis.

Dana C. Lynch  
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1973 - 1976 Joseph W. Frisella, Civil Engineering, Wakefield, RI  
Survey Crew Chief and Senior Draftsman - Supervised and coordinated  
land surveying projects at a small engineering firm. Major areas  
of responsibility included deed research, land surveying, design  
and layout of sub-divisions and roads, and design of sewage treat-  
ment systems for homes and businesses.

PROFESSIONAL ORGANIZATIONS -

American Society of Civil Engineers  
Institute of Transportation Engineers

Robert Shiffman  
Design and Computer Applications Engineer

EDUCATION -

Goddard College, AB, 1970 - Mathematics  
Northeastern University, BA - Civil Engineering

EXPERIENCE -

1977 - Present Costello, Lomasney & deNapoli, Inc., Engineers  
Mr. Shiffman is responsible for design, specifications and production of contract documents on several projects including industrial waste abatement, a public works administration building, a solid waste shredder plant and a facility plan report. He has also been involved in computer applications with this firm.

1963 - 1977 Hayden, Harding & Buchanan, Inc., Engineers  
Mr. Shiffman worked on a variety of civil projects as Draftsman, Chief Draftsman and Designer. These projects included highways, bridges, municipal buildings, industrial parks, sewers, drains, water supply and distribution systems, pump stations and sewage treatment plants. He also served as a field inspector on a 20 million dollar treatment plant. Subsequently, Mr. Shiffman worked as a computer applications engineer with the firm. He also served as Project Manager on a street improvement project for the Boston Redevelopment Authority.

1960 - 1963 H. D. Fine Associates, Engineers  
Mr. Shiffman worked on highway and bridge projects as a draftsman and detailer.

1959 - 1960 Fay, Spofford & Thorndike, Engineers  
Mr. Shiffman was employed as a draftsman and worked on a variety of civil projects.

Francis V. Lombardi, P.E., R.L.S.  
Sanitary Engineer

EDUCATION -

Northeastern University, A.C.E. 1954 Civil  
Northeastern University, B.B.A. 1956

PROFESSIONAL REGISTRATION - Professional Engineer

MA, NH, ME - Civil and Sanitary

Registered Land Surveyor - MA & NH

EXPERIENCE -

1980 - Present Costello, Lomasney & deNapoli, Inc., Engineers  
Mr. Lombardi, who recently joined this Firm, will be assigned to various projects in a capacity of land surveyor, design engineer and resident engineer.

1974 - 1980 Hoyle, Tanner & Associates, Inc., Engineers  
During this period, Mr. Lombardi was project engineer on a new water system in Bartlett, N.H.; design engineer for a tertiary treatment system in Wolfeboro, NH; and sewerage systems in Upton, MA.; the Lakeport area of Laconia, NH; Gilford, NH; Durham, NH and Goffstown, NH.  
Mr. Lombardi served as Resident Engineer in the construction of a sewerage system at Weirs Beach, Laconia, NH and on a spray irrigation of effluent project in Wolfeboro, NH.

1972 - 1974 Blais Associates, Engineers, Surveyors  
Mr. Lombardi was involved in the design and supervision of many sub-divisions, sewerage systems, roadway design and layout and property line determinations. His responsibilities included conferences with the client and State and municipal regulatory agencies and construction supervision to assure compliance with the specifications.

1968 - 1972 Town of Foxborough, MA  
Mr. Lombardi accepted the position of Town Surveyor for the Town of Foxborough in 1968. During this period he designed and supervised the reconstruction of approximately 15,000 feet of public roadway, designed 12,000 feet of storm drainage and completed land surveys on 300 acres of land acquired by the Conservation Commission. He was responsible for several investigations of water pollution control and abatement, and acted as a consultant to the Board of Health, Board of Selectmen, Permanent School Building Committee, Board of Water Commissioners, Conservation Commission and the Planning Board.

Francis V. Lombardi, P.E., R.L.S.

1956 - 1968 Hayden, Harding & Buchanan, Inc., Engineers  
Design Engineer and Resident Engineer. During his 12 years  
with this firm Mr. Lombardi was given increasing responsibility  
as he served the firm as an assistant resident engineer, chief  
of survey party, design engineer, resident engineer and project  
engineer in responsible charge. Some of the major projects he  
worked on include the Massachusetts Turnpike, municipal incin-  
erators in Salem, MA; Lowell, MA and Pawtucket, RI; industrial  
parks in New Bedford, Fall River and Lowell, MA; foundations  
for a multi-million dollar batch plant in Cambridge; right-of-  
way and land taking determination for I195 in south MA;  
redevelopment projects for the Boston Redevelopment Authority  
and numerous sewerage systems and pump stations in Groton, CT,  
Manchester, NH, Fall River, MA and Lowell, MA.  
One of his last assignments with this firm was on the design  
team for the 52 MGD sewage treatment plant in Manchester, NH.



Glenn R. Chouinard, P.E.

EDUCATION -

Clarkson College of Technology - BS, 1976 - Civil Engineering  
Clarkson College of Technology - ME, 1979 - Civil Engineering

PROFESSIONAL REGISTRATION - Professional Engineer

EXPERIENCE -

1982 - Present Costello, Lomasney & deNapoli, Inc.  
Work load includes various highway and site development projects with tasks such as geometric layout of highways and commercial accesses, traffic impact analyses and transportation studies, preparation of contract plans, estimates and contract bid documents, construction engineer for highway projects.

1976 - 1982 New Hampshire Department of Public Works and Highways  
Served as Civil Engineer in highway design division. Responsibilities included geometric layout of interstate, state and local highway projects, review of consultant contract projects, preparation of contract plans, estimates, standards and specifications.

Granted an educational leave after receiving the National Highway Institute/Federal Highway Administration Fellowship for graduate study in Transportation/Traffic Engineering. Authored master's degree thesis dealing with computer simulation analysis of traffic actuated signals for optimization of operating parameters.

Returned to state and served as Traffic Planning Engineer, duties included state representative to technical committee of Metropolitan Planning Organization, development and review of various transportation planning studies, coordinated and conducted traffic engineering studies for state and local planned highway projects, developed traffic projections and data for state and local highway projects, traffic signal analysis, capacity analysis, development and review of traffic impact studies, including recommendations for highway improvements due to commercial developments accessing state highways, including the 570,000 s.f. "Fox Run Mall" in Portsmouth, N.H.

Also served as Railroad Planning Engineer for the state railroad division. Specific tasks included benefit cost analyses of railroad related projects, preparing applications for available Federal grants (F.R.A. and E.D.A.), marketing of state owned rail lines, preparations of shortline operating agreements, consultant contracts and railroad rehabilitation contracts. Obtained federal funding including \$1,000,000 for rehabilitation of the B&M owned Conway Branch from Rochester to Ossipee.

PROFESSIONAL SOCIETIES

Associate Member, Institute of Transportation Engineers, (1981)  
Associate Member, American Society of Civil Engineers, (1976)

Ann Sales McGahan  
Planner

EDUCATION \_

University of New Hampshire - B.S., 1979 - Environmental  
Conservation - Land Use Planning

EXPERIENCE -

1982 - Present Costello, Lomasney & deNapoli, Inc., Portsmouth,  
New Hampshire

Planner - Responsible for research and preparation of Emergency  
Response Plans for 24 communities within the emergency planning  
zone of the Seabrook Nuclear Power Plant. This includes the  
gathering of data on each individual town regarding population,  
warning systems, communications, and special facilities.

1981 - 1982 T & T Associates, Easton, Pennsylvania  
Engineering Assistant - Acted in the capacity of rodperson,  
chainperson, draftsperson, operated a desk top computer,  
performed percolation tests for on-lot sewage systems, and  
attended municipal meetings in regards to projects requiring  
municipal approval.

1980 - 1981 Central New Hampshire Regional Planning Commission,  
Concord, New Hampshire

Regional Planner - Responsible for the research and preparation  
of the following plans:

Epsom, New Hampshire, Master Plan

Regional Economic Profile

Penacook, New Hampshire, Downtown Revitalization Study

1979 - 1980 Concord Union School District, Concord, New Hampshire  
Research Assistant - Responsible for the research and preparation  
of the long-range facilities plan for the Concord area schools.  
This included the gathering of data on school-aged children  
and an inventory of all school facilities.

Dec. 1979 - Jan. 1980 Concord City Planning, Concord,  
New Hampshire

Planning Aide - Prepared environmental assessment statements  
to the Heritage Conservation and Recreation Service to obtain  
funds for recreational projects planned by the City of Concord.

Sept. 1978 - Dec. 1978 Strafford Regional Planning Commission,  
Dover, New Hampshire

Planning Intern - Prepared natural resource maps for the Master  
Plan of Northwood, New Hampshire.

Stanley James Kosowicz, P.E.

EDUCATION -

University of New Hampshire, BS - 1969 Civil Engineering

PROFESSIONAL REGISTRATION - Professional Engineer  
New Hampshire - Highway

EXPERIENCE -

1981 - Present Costello, Lomasney & deNapoli, Inc.  
Project Engineer on the redesign of a major city street needing coordination with utilities, right-of-way purchases, developers and city officials.

Construction Project Engineer in the building of a major city street to serve a future manufacturing site and residential site. Spent one month as the resident engineer on this project.

1969 - 1981 New Hampshire Department of Public Works & Highways  
Highway Design

Assistant Consultant Supervisor Engineer (Preliminary Design). Responsible for the supervision of several project engineers and technicians, administration and review of work performed by private consultants on state projects, preparation of consultant project agreements, presentation of projects to State Highway staff members, Federal Government officials, town officials and general public, miscellaneous technical and administrative projects for the assistant state highway design engineer. Representative at several meetings for the highway design engineer and/or the state highway commissioner. Project assignments included the preparation of conceptual and final design plans for interstate, urban and rural highways, arterial intersection improvements, analysis and recommendations of impacts on highways by the construction of major traffic generators, supervision of junior engineers on several projects, highway capacity analysis, highway geometric layout, including horizontal and vertical alignment, channelization and interchanges, preparation of estimates, studies for safety improvement projects, evaluation of alternate proposals, corridor location studies for highway and surveying.

PROFESSIONAL SOCIETIES -

American Society of Civil Engineers

Earle M. Chesley, III, P.E.

EDUCATION -

Lehigh University, BS - 1975 Civil Engineering  
University of Delaware, MS Candidate 1982 Civil Engineering

PROFESSIONAL REGISTRATION - Professional Engineer  
New Hampshire - Civil

EXPERIENCE -

1979 to Present Costello, Lomasney & deNapoli, Inc.  
Project Engineer in charge of a variety of civil and environmental engineering projects including highway design, urban street reconstruction design, transportation studies, traffic impact analyses, air and noise studies, interceptor sewer design, water quality studies, wastewater treatment facilities and sanitary landfill design.

Responsibilities include management of overall technical effort; preparation of construction plans, specifications, and related documents; preparation of engineering reports and investigations; coordination with Federal, State and local agencies.

Project assignments include preparation of construction plans and specifications for 20 miles of sewer interceptors and appurtenant hydraulic studies; construction plans for reconstruction of several state route urban highways; traffic impact studies, including noise and air analyses, for major industrial and residential developments; sanitary landfill designs and engineering reports: Wastewater Treatment Plant Refurbishment.

1978 - 1979 State of Delaware, Department of Transportation  
Project Engineer Environmental Studies. Develop concept plans and location studies for major highway projects; preparation of project work schedule including community involvement program; coordination with Federal, State and local agencies.

Analysis of alternative technical proposals and associated environmental impacts; preparation of environmental impact statements and highway conceptual plans; acquire permits from all Federal and State regulatory agencies.

Project assignments included the development of concept plans for widening an existing arterial highway to a six lane divided facility within a highly developed corridor and preparation of the environmental impact statement; development of concept plans for reconstruction of a rural roadway through a Historic District.

1975 - 1978 State of Delaware, Department of Transportation  
Design Engineer - Highway Design. Design and preparation of final plans for highway construction and improvements, grade and channelization layouts, signalization, horizontal and vertical alignments, drainage systems, and other projects.

Earle M. Chesley, III, P.E.  
Page - 2

Supervision of drafting, quantity calculations and cost estimates; coordination and negotiation with private utilities, local municipalities, private landowners, and contractors.

Project assignments included urban drainage improvements, arterial intersection improvements, suburban street reconstruction and drainage improvements and traffic operation studies.

PROFESSIONAL SOCIETIES -

American Society of Civil Engineers  
Institute of Transportation Engineers  
Transportation Research Board

Ray W. Kelm  
Chief Draftsman

EDUCATION -

New Hampshire College - BS, 1982 - General Management

University of Houston - BS Candidate - 1974, Civil Engineering

EXPERIENCE -

1979 - Present Costello, Lomasney & deNapoli, Inc.

Chief Draftsman responsible for preparation of all contract plans, including graphic layout and design, estimating and budgeting. Also responsible for design of visual communications and displays for presentations.

1978 - 1979 Hoyle Tanner & Associates

Lead Draftsman on several major pollution abatement, water treatment site design and commercial development projects.

1974 - 1978 MFI Associates, Inc., Consulting Engineers,  
Houston, Texas

Vice President/Production Manager responsible for organizing all projects and keeping related books, management of Drafting Department, experience in sales and customer service, inspect residential post-tensioned slab-on-grade foundations, experience in structural steel layout for single and two-story office buildings, tilt-wall warehouses, multi-story parking garages and other commercial buildings.

1973 - 1974 Lenert Engineers, Houston, Texas

Draftsman on many types of projects including post-tensioned slab-on-grade foundations for residential and multi-family housing, structural steel layout for commercial buildings and civil site designs.

Joseph E. Tatone

EDUCATION -

University of New Hampshire, A.A.S., Civil Technology, May 1980  
Oyster River High School, Durham, NH, June 1978

EXPERIENCE -

1982 - Present Costello, Lomasney & deNapoli, Incorporated,  
Portsmouth, NH  
Draftsman - Responsible for all engineering plans, details, and  
graphics for site development, highway and drainage improvements,  
and other projects performed by the Portsmouth, NH, office.

1980 - 1982 Suntree Design Group Ltd., Bedford, NH  
Draftsman - Responsible for Drafting (Engineering & Architectural),  
Graphics (Proposal Covers, Renderings in matt board frames for  
Planning Board Meetings), Modelmaking, & Rod Man.

Sept. - Oct. 1980 Birch Hill Builders, York, ME  
Carpenter

Aug. - Sept. 1980 Thibault Building Co., Litchfield, NH  
Carpenter

June - Aug. 1979 Granite State Solar Ind., Dover, NH

David A. Breitrick

EDUCATION -

University of New Hampshire - B.S., 1981 - Civil Engineering

EXPERIENCE -

1982 - Present Costello, Lomasney & deNapoli, Inc., Engineers

Engineer, assisting on a wide variety of projects including the City of Manchester Interceptor Program, a study of dredging along the New Hampshire coast, and subdivision work. Work has included report writing, hydrologic and hydraulic computations, survey and plotting of data, and use of the computer for determining sewer profiles and transverse information.

1981

To fulfill requirements for a B.S. degree at the University of New Hampshire, assumed full responsibility for the theoretical design of a 2.4 MGD Wastewater Treatment Plant, from bar racks through chlorination designed to treat typically domestic waste using RBC's for biological treatment. With respect to structural engineering was responsible for the geotechnical section of a report designed to assist a major southern New Hampshire city in determining the optimum location and preliminary design of a dam for future water supply purposes.



William Gregg Comstock  
Civil Engineer

EDUCATION -

Clarkson College of Technology, Potsdam, NY, M.S. degree  
in Environmental Engineering, 1982  
Clarkson College of Technology, Potsdam, NY, B.S. degree  
in Civil and Environmental Engineering, 1978

EXPERIENCE -

1980 - Present Costello, Lomasney & deNapoli, Inc., Engineer  
Work has included the design of a 400 unit Planned Unit  
Development in Concord, NH including road utility and building  
layout; sewer, water and drainage design; grading plans; and  
school and noise impact analyses. Road, sewer and storm drainage  
design of an industrial park in Hudson, NH. Computer design of  
sewer interceptors and pump station and design of a 1-acre park  
with a fountain/sculpture in Manchester, NH. Design of two  
secured sanitary landfills in Londonderry, NH and a comprehensive  
Dredge Management Plan for the State of New Hampshire.

1980 Anderson-Nichols & Company, Inc., Engineer  
Served as an engineer on numerous projects related to a variety  
of disciplines. Work included dam safety inspections under the  
National Dam Safety Program including hydrologic and hydraulic  
assessments; a land use feasibility study for the City of  
Burlington, Vermont to determine if the floodplain along the  
Winooski River would best be suited for industrial or recreation;  
conservation and open space uses - work included soil analyses  
and use of the Army Corp of Engineers' HEC-2 Step Backwater  
Computer Program; and a detailed engineering economic analysis  
to determine the lost economic value of flowage rights for a  
privately owned hydropower dam in Connecticut which had its  
flowage rights taken away by the State by eminent domain.

1978 - 1979 Clarkson College of Technology, Graduate Teaching  
Assistant, Water Quality Analyst  
Performed various water quality tests including BOD, COD, NH<sub>4</sub>-N,  
Total and Suspended Solids, pH, Grease and Oil, Iron and Copper,  
Chlorides, Fluorides, Fecal Coliforms and Settable Solids for  
local companies to determine if they abided by SPDES. Also  
conducted microbiology and hydraulic labs.

1977 Flood Insurance Study Assistant, Anderson-Nichols & Co., Inc.  
Assisted in the preparation of Federal Insurance Studies. Work  
involved hydraulic and hydrologic analysis, field reconnaissance,  
drafting and mapping of flood prone areas.

1976 New Hampshire Highway Department, Technician I  
Work involved inspection of contractor's work through each  
progressive stage of highway construction, concrete plant  
inspection, survey, compilation of quantities and types of  
materials used during construction and the writing of daily  
reports.

PROFESSIONAL SOCIETIES -

American Society of Civil Engineers  
American Water Works Association  
American Public Works Association

Michael J. Grainger

EDUCATION -

University of New Hampshire - BS Civil Engineering 1976

PROFESSIONAL REGISTRATION -

EIT - New Hampshire

EXPERIENCE -

1982 - Present Costello, Lomasney & deNapoli, Inc., Engineers  
Mr. Grainger has been involved in a variety of projects including a condominium and apartment complex, two sanitary sewer projects, interceptor sewers, as well as some highway design and cost estimates. He has designed the temporary and permanent easements for the Manchester Interceptor Sewer Systems. Mr. Grainger has also been the Resident Engineer on a park renovation project as well as on the Granite Street road reconstruction project in Manchester, N. H.

1977 - 1982 Whitman & Howard, Inc., Engineers and Architects  
Resident Engineer  
Mr. Grainger worked on a variety of civil engineering projects including water supply and distribution systems, pump stations, water tanks, and a water treatment plant. He has also worked on several sanitary sewer projects in Massachusetts and New Hampshire and has been certified as a resident inspector by the New Hampshire Water Pollution Control Commission. Duties included field inspection, traverse and level runs to determine possible field changes, processing change orders and field work orders. He was also responsible for all aspects of quality control testing and assurance as well as preparation of daily reports, monthly cost estimates, and permanent record plans. Mr. Grainger was in charge of coordinating with City and State officials to update work completion schedules. He also acted as mediator in any conflicts between local townspeople and contractors. Mr. Grainger also has been design engineer on a wide range of projects including highway renovations, water control dams, municipal water reports, and sanitary sewer projects throughout New Hampshire.

1976 - 1977 Curran-Lavoie, Inc., General Contractors & Engineers  
Assistant Supervising Engineer  
Duties included layout of formwork for structures and reinforcing steel, line and grade on forms, surveying and drafting, and determining concrete quantities for field ordering. Mr. Grainger also prepared monthly cost estimates and quantity cost estimates for bid proposals. He was responsible for reviewing cofferdam and temporary bridge designs for State approval, material control data, contract change orders, proposals, field order changes and purchase orders.

1975 McKenna Associates, Division of Town Planning and Engineering

Survey Chief and Draftsman, Summer and part-time

Served as party chief on various survey projects including topographic surveys, boundary surveys and subdivisions as well as road layouts and grading. Office work included survey closures, drafting and the use of Olivetti computer.

1973 - 1975 Frank G. Sprague Associates

Surveyor, Summer and part-time

Worked on surveying and drafting including transit work, taping, and road grades. Also responsible for research at county registry, computer closures and final drafting. Expertise required with Olivetti computer.

PROFESSIONAL SOCIETIES -

American Society of Civil Engineers

New Hampshire Society of Civil Engineers

VII. SCHEDULE

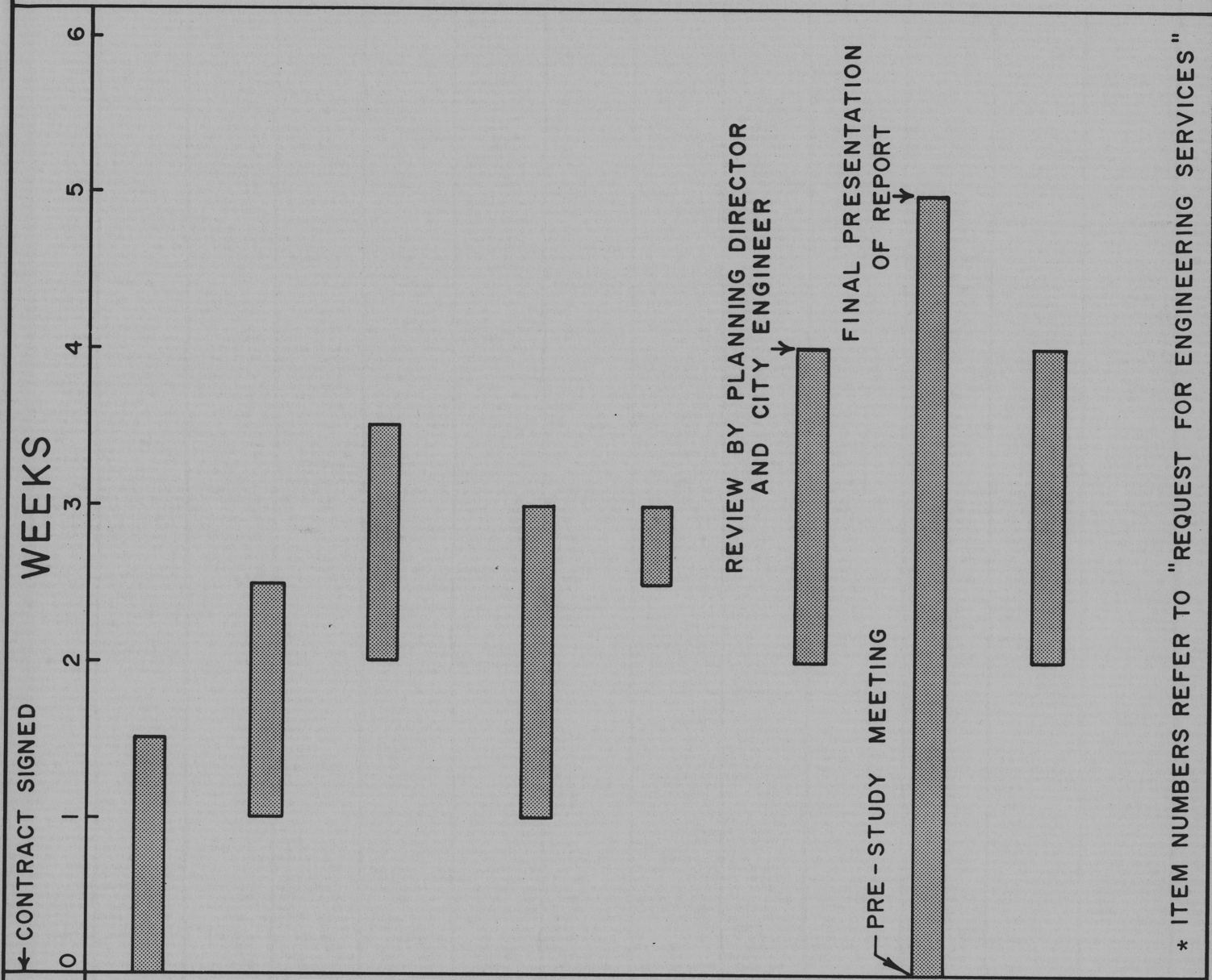
We propose to complete all aspects of the projects in a five (5) week period commencing with the contract signing. The "Proposed Project Schedule" chart on the following page shows the individual time frames and milestones for each item listed in Section IV: METHODOLOGY. It also relates these items to those listed in the "Request for Engineering Services" as provided by the City of Dover Purchasing Agent.

We will also be able to complete Item 8 (Origin/Destination Study) within the same five (5) week time frame if it is included as part of the entire project.

It should be noted that base plans for the entire route could be prepared from existing aerial photography\* taken by Sewell Mapping of Old Town, ME., with a slight additional cost to the project. This would add to the existing photogrammetry coverage of the City but would add four to six weeks to the project schedule based on Sewell's workload.

\*See Section IV: METHODOLOGY, Task No. 1, and Section III

# PROPOSED PROJECT SCHEDULE



## TASK

1. DATA GATHERING  
(ITEMS 1,3,4,5,7) \*
2. DATA ANALYSIS  
(ITEMS 3,4,5)
3. PREPARATION OF  
CONCEPTUAL PLAN  
(ITEMS 1,2,8,9)
4. COST ESTIMATES  
(ITEM 10)
5. RECOMMENDED COURSE  
OF ACTION  
(ITEM 11)
6. REPORT PREPARATION  
(ITEM 11)
7. MEETINGS AND  
CORRESPONDENCE
- 8 O/D STUDY  
(OPTIONAL)  
(ITEM 12)

\* ITEM NUMBERS REFER TO "REQUEST FOR ENGINEERING SERVICES"

VIII. COST

Based on the projected manhours required to complete Tasks 1 through 7 of Section IV: METHODOLOGY, we propose to complete this study for \$35,300.

The Origin/Destination Study (Task 8, Section IV: METHODOLOGY) could be completed for \$12,100 based on the information provided in the "Request for Engineering Services"; however, we believe that savings could be realized by alternative data gathering methods. The various methodologies that might be employed could be presented to the City, if desired.

IX. SUPPLEMENTAL INFORMATION



COSTELLO, LOMASNEY & deNAPOLI, INC.

CONSULTING ENGINEERS

Costello, Lomasney & deNapoli, Inc. was founded in 1976 to provide professional services in the fields of engineering, computer technology and construction management. The Firm is a New Hampshire Corporation wholly-owned by its principals who are full-time employees.

The three principals have worked together as a design team for almost twenty years and have been responsible for the design of several outstanding projects. These projects include the Water Pollution Control Facility in Manchester, NH, which was selected as the Outstanding Civil Engineering Achievement in New Hampshire, and a highway bridge in Connecticut which received an award from the Prestressed Concrete Institute.

The operation of our firm is based on the philosophy that every project warrants the personal attention of a principal. The principals enjoy an aggregate of three quarters of a century of broad professional experience in every discipline of civil engineering.

Many innovative computer techniques have been developed to assist in planning, design, estimating and drafting of engineering projects and have been successfully applied to achieve the most cost effective solution for the client.

The following is a selected list of representative projects that the Firm has been responsible for:

<u>Project</u>	<u>Client</u>
Fire Protection Plan	U. S. Navy
Interceptor Sewers	Manchester, NH
Pretreatment Plant and Pumping Station	Pandora Industries
Conversion of Incinerator to Administration Building	Manchester, NH
Pretreatment Plant	Prevue Products
Sewers & Drains, Construction Administration	Manchester, NH
Cattle Shelter	Granite State Packing Co.
Solid Waste Management Program	Manchester, NH

Building Investigation	John W. Merchants Corp.
Wastewater Pretreatment	Wm. F. Schonland Sons, Inc.
Drainage Review	Tel Labs, Inc.
Oil Spill Plan	Pandora Industries
Landfill Study	Private Client
Interior Piping Modifications and Pumping	Chester Realty, Manchester
Water Supply Study	Booth Fisheries
Industrial Wastewater Analyses	Artafax Systems
Albuquerque Highway Study	Litchfield, NH
Condominium Development	Roy & Madden, Inc.
Reconstruction of South Willow Street	State of NH
Structural Design	Harvey Construction Co., Inc.
Pier Investigation	Biddeford Pool Yacht Club
Process Piping	Manchester Union Leader
Structural Design	Ingersoll Rand
Rehabilitation of Sewage Pumping Stations	Lowell, MA
Structural Assessment	Davison Construction Co.
Structural Assessment	Venture Construction Co.
Elliot Hospital Structural Design	Architects Four
Hydroelectric Study	Laconia, NH
Structural Design of St. Anselm's Humanities Center	Isaak & Isaak, Architects
City Hall Bell Tower	Manchester, NH
Structural Evaluation of Existing Buildings	Michael B. Ingram, AIA

Pilot Pretreatment Plant	Granite State Packing Co.
Negotiation of Intermunicipal Agreements	Manchester, NH
Effluent Measuring & Monitoring	Booth Fisheries
Refuse Shredding Plant	Manchester, NH
Mausoleum - Construction Administration	Manchester, NH
Sea Wall	Messrs. McHugh & Howe Wells, ME
Rehabilitation of Public Works Garage	Manchester, NH
Pump Testing Facility	Combustion Engineering-KSB Pump Company
Traffic Building Addition	Manchester, NH
Structural Assessment of Concord Prison Tower	Alan Yeaton, Architect
Building Structural Assessment	Blanchard-Stebbins, Inc.
Central Boiler Plant	Manchester, NH
Air Pollution Program	Prevue Products
Sewerage System and Pumping Station	Hudson, NH
Structural Design of Medical Office Building	Isaak & Isaak, Architects
Expert Witness	McLane, Graf, Greene, Raulerson & Middleton
Urban Street Improvements, Hooksett, NH	State of NH
Urban Street Improvements, Goffstown, NH	State of NH
Dam Repair, Penstock Replacement	State of NH
Retaining Walls	Whitehall Construction Co.
Expert Witness	Manchester, NH

Subdivision Review	Town of Hudson, NH
Bridge Failure Investigation	Insurance Co. of North America
Expert Witness	Craig, Weners, Craig & McDowell
Structural Design, Concord YMCA	Michael B. Ingram, AIA
Urban Street Design Edward J. Roy Drive	Richard D. Roy
Building Failure Investigation	Rent-a-Space
Drainage Problem Investigation	Insurance Co. of North America
Drainage Problem Investigation	McLane, Graf, Green, Raulerson & Middleton
Repairs to Existing Sewers	Newton, MA
Treatment Plant Rehabilitation	Hillsborough House of Correction
Grenier Field Industrial Park Extension	Manchester Housing Authority
Water System Investigation	Merchants Savings Bank
Environmental Landfill and Hazardous Waste Analysis	Grassy Knolls Associates
Site Improvement Program	L.L.&S. Associates
Granite Street Access Ramps	Manchester, N.H.
400 Unit Condominium	Private Client
Waste Tire Fuel Plant	Private Client
Expert Witness	Hudson, N.H.
Emergency Response Plans	Seabrook Nuclear Power Plant
Lincoln Street School Park	City of Manchester
Water Pollution Abatement Program	City of Manchester

Daniel J. Costello, Martin R. Lomasney and Paul A. deNapoli, who are the principals of COSTELLO, LOMASNEY & deNAPOLI, INC., were the "design team" for consulting firms for 17 years of their professional employment and were in responsible charge or in personal direction of the following completed projects:

NAME AND TYPE OF PROJECT	LOCATION	ESTIMATED CONSTRUCTION COST
<u>HIGHWAYS</u>		
West Virginia Turnpike Interstate Highway Design	Charleston, WV	Unknown
Massachusetts Turnpike Interstate Highway Design	Millbury, MA	Unknown
Massachusetts Turnpike Interstate Highway Design	Auburn, MA	Unknown
Connecticut Toll Road Design	Stamford, CT	Unknown
Scarboro Connection Interstate Highway Design	Scarboro, ME	Unknown
Inner-Belt Location Study	Boston, MA	\$280,000,000
I-91 (Rte. 5) Interstate Highway Design	Enfield, CT	\$ 6,000,000
Route 2 Location Study	Concord, MA	\$ 7,000,000
Washington Park Urban Renewal - Preliminary Design	Boston, MA	\$ 18,000,000
I-84 Interstate Highway Design	West Hartford, CT	\$ 21,000,000
Route 295 Interstate Highway Design	Cumberland, RI	\$ 5,000,000
Route I-10 Interstate Highway Design	New Orleans, LA	\$ 20,000,000
Route 8 State Highway Design	Naugatuck, CT	\$ 30,000,000
Routes 8 and 25 State Highway Design	Bridgeport, CT	\$ 8,000,000

NAME AND TYPE OF PROJECT	LOCATION	ESTIMATED CONSTRUCTION COST
<u>HIGHWAYS (Continued)</u>		
Routes 72 and 10 State Highway Design	Plainville, CT	\$ 36,000,000
Route 7 State Highway Design	Brookfield/New Milford, CT	\$ 13,000,000
New Jersey Turnpike Widening Design	Newark, NJ	\$ 22,000,000
<u>ENVIRONMENTAL</u>		
Sanitary Sewers	Lowell, MA	\$ 800,000
3 MGD Sewage Pumping Station	Lowell, MA	\$ 400,000
Interceptor Relocation	Plainville, CT	\$ 100,000
Sanitary Sewerage System	Lowell, MA	\$ 800,000
Interceptor, Phase I	Manchester, NH	\$ 1,500,000
26 MGD Secondary Treatment Plant	Manchester, NH	\$ 18,000,000
14 MGD Sewage Pumping Station	Manchester, NH	\$ 700,000
Pollution Abatement Program Study	Manchester, NH	\$ 40,000,000
Sanitary Sewerage System	Manchester, NH	\$ 1,000,000
Sewer Use Ordinance	Manchester, NH	not applicable
Operations and Maintenance Manual	Manchester, NH	not applicable
Sanitary Sewers	Manchester, NH	\$ 750,000
3 MGD Sewage Pumping Station	Manchester, NH	\$ 250,000

NAME AND TYPE OF PROJECT	LOCATION	ESTIMATED CONSTRUCTION COST
<u>ENVIRONMENTAL</u> (Continued)		
Interceptor, Amoskeag Millyard	Manchester, NH	\$ 3,500,000
Sanitary Sewers, Amoskeag Millyard	Manchester, NH	\$ 1,100,000
150 MGD Sewage Pumping Station	Manchester, NH	\$ 7,000,000
Interceptor, Phase III	Manchester, NH	\$ 6,000,000
Sanitary/Storm Separation Program Study	Manchester, NH	\$17,000,000
Regional Sewerage Facilities Study	Greater Manchester, NH	\$46,000,000
Regional Water Supply and Distribution Study	Greater Manchester, NH	\$24,000,000
Tannery Waste Pretreatment Facilities	Manchester, NH	\$ 1,100,000
Slaughterhouse Pretreatment Facilities	Manchester, NH	\$ 600,000
Regional Sewerage Facilities	Stamford, CT	\$12,000,000
20 MGD Secondary Treatment Plant	Stamford, CT	\$12,000,000
60 MGD Sewage Pumping Station	Stamford, CT	\$ 1,200,000
Operations and Maintenance Manual	Stamford, CT	not applicable
Intermunicipal Agreements	Stamford, CT	not applicable
3 MGD Secondary Treatment Plant	Wells, ME	\$ 4,000,000
Sewerage System	Wells, ME	\$ 7,000,000
Ocean Outfall	Wells, ME	\$ 800,000

NAME AND TYPE OF PROJECT	LOCATION	ESTIMATED CONSTRUCTION COST
<u>INDUSTRIAL BUILDINGS, URBAN RENEWAL AND INDUSTRIAL PARKS</u>		
New York Streets	Boston, MA	Unknown
Worcester Controls Expansion, Worcester Industrial Park	Worcester, MA	\$ 450,000
Study of Three Industrial Parks	Lowell, MA	Unknown
Washington Park (Study)	Boston, MA	Unknown
Industrial Park	Lowell, MA	\$3,000,000
West End Redevelopment	Boston, MA	Unknown
Industrial Park (Study)	Gloucester, MA	Unknown
Waterbury Co., Inc. Expansion Biddeford Industrial Park	Biddeford, ME	\$ 300,000
Northern Canal Redevelopment	Lowell, MA	\$1,500,000
Charles River Arcade	Dedham, MA	Unknown
Industrial Park	New Bedford, MA	Unknown
Major Housing Development	Manchester, NH	In Progress
Arrow Armature Expansion	Hudson, MA	\$ 400,000



REFERENCES

The principals of Costello, Lomasney & deNapoli, Inc. and the design team have been providing professional services similar to those required for this project for many years. The following list of Officials who are familiar with our capabilities on past projects, has been included for your use as a reference:

City of Manchester, New Hampshire

John F. Grogan, Planning Director  
908 Elm Street  
Manchester, New Hampshire 03101  
625-8911

Theodore S. MacLeod, P.E., Public Works Director  
227 Maple Street  
Manchester, New Hampshire 03103  
669-3535

Robert R. Rivard, Chairman, Manchester Highway Commission  
227 Maple Street  
Manchester, New Hampshire 03103  
669-3535

State of New Hampshire, Department of Public Works & Highways

John A. Clements, P.E., Commissioner  
P.O. Box 483, Hazen Drive  
Concord, New Hampshire 03301  
271-3734

State of New Hampshire, Department of Public Works & Highways

Russell A. Davis, P.E., Consultant Supervisor Engineer  
P.O. Box 483, Hazen Drive  
Concord, New Hampshire 03301  
271-2466

Richard A. Aliotti, P.E., Assistant Design Engineer  
P.O. Box 483, Hazen Drive  
Concord, New Hampshire 03301  
271-2230

Southern New Hampshire Planning Commission

Moni Sharma, Executive Director  
815 Elm Street  
Manchester, New Hampshire 03101  
669-4664

Town of Hudson, New Hampshire

Robert A. Perreault, Jr., P.E., Town Engineer  
12 School Street  
Hudson, New Hampshire 03051  
889-1882

**STANDARD FORM (SF) 254**  
 Architect-Engineer and Related Services Questionnaire

1. Firm Name / Business Address:

Costello, Lomasney & deNapoli, Inc.  
 115 Middle Street  
 Manchester, NH 03101

1a. Submittal is for  Parent Company  Branch Office

2. Year Present Firm Established:  
 1976

3. Date Prepared:  
 1-4-83

4. Type of Ownership:

4a. Minority Owned  yes  no

5. Name of Parent Company, if any:

Not Applicable

5a. Former Firm Name(s), if any, and Year(s) Established:

RKMA (1976-1978)

6. Names of not more than Two Principals to Contact: Title / Telephone

- 1) Martin R. Lomasney, Vice President (603) 668-8223
- 2) Daniel J. Costello, President (603) 668-8223

7. Present Offices: City / State / Telephone / No. Personnel Each Office

115 Middle Street  
 Manchester, NH 03101  
 (603) 668-8223  
 (38 persons)

Kearsarge House  
 104 Congress Street  
 Portsmouth, NH 03801  
 (603) 436-6711  
 (6 persons)

7a. Total Personnel 44

8. Personnel by Discipline:

<u>10</u> Administrative	_____	Electrical Engineers	_____	Oceanographers	_____
<u>1</u> Architects	_____	Estimators	_____	<u>1</u> Planners: Urban/Regional	_____
_____ Chemical Engineers	_____	Geologists	_____	<u>4</u> Sanitary Engineers	_____
<u>7</u> Civil Engineers	_____	Hydrologists	_____	Soils Engineers	_____
<u>9</u> Construction Inspectors	_____	Interior Designers	_____	<u>1</u> Specification Writers	_____
<u>5</u> Draftsmen	_____	Landscape Architects	_____	<u>2</u> Structural Engineers	_____
_____ Ecologists	_____	Mechanical Engineers	_____	<u>1</u> Surveyors	_____
_____ Economists	_____	Mining Engineers	_____	<u>4</u> Transportation Engineers	_____

9. Summary of Professional Services Fees

Received: (insert index number)

Last 5 Years (most recent year first)

Direct Federal contract work, including overseas  
 All other domestic work  
 All other foreign work\*

19 82	19 81	19 80	19 79	19 78
0	0	0	0	0
5	4	3	3	3
0	0	0	0	0

\*Firms interested in foreign work, but without such experience, check here:

INDEX Ranges of Professional Services Fees

- 1. Less than \$100,000
- 2. \$100,000 to \$250,000
- 3. \$250,000 to \$500,000
- 4. \$500,000 to \$1 million
- 5. \$1 million to \$2 million
- 6. \$2 million to \$5 million
- 7. \$5 million to \$10 million
- 8. \$10 million or greater

10. Profile of Firm's Project Experience, Last 5 Years

Profile Code	Number of Projects	Total Gross Fees (in thousands)	Profile Code	Number of Projects	Total Gross Fees (in thousands)	Profile Code	Number of Projects	Total Gross Fees (in thousands)	Profile Code	Number of Projects	Total Gross Fees (in thousands)
1) 011	1	1	11) 050	1	90	21) 107	1	1	21) 107	1	1
2) 012	1	9	12) 052	3	51	22) 113	2	4	22) 113	2	4
3) 015	1	52	13) 054	2	3	23) 201	9	40	23) 201	9	40
4) 017	4	21	14) 071	1	679	24)			24)		
5) 021	6	390	15) 072	2	138	25)			25)		
6) 029	1	20	16) 088	1	6	26)			26)		
7) 035	1	9	17) 096	22	1423	27)			27)		
8) 036	1	12	18) 099	5	361	28)			28)		
9) 046	4	1229	19) 101	10	14	29)			29)		
10) 047	1	5	20) 104	4	29	30)			30)		

11. Project Examples, Last 5 Years

Profile Code	"P", "C", "JV", or "IE"	Project Name and Location	Owner Name and Address	Cost of Work (in thousands)	Completion Date (Actual or Estimated)
011	P	1 Bridge Investigation Bedford, NH	Insurance Company of North America Bedford, NH	NA	NA
012	P	2 Mausoleum Manchester, NH	Manchester Cemetary Department Manchester, NH	1,000	1979 (A)
015	P	3 Intermunicipal Agreements Manchester, NH	City of Manchester, NH	NA	NA
017	P	4 Building Investigation Manchester, NH	John W. Merchant Corp. Bedford, NH	NA	NA
021	P	5 Construction Administration - Sewer Hudson, NH	Town of Hudson, NH	3,000	1983 (E)
021	C	6 Construction Administration Services, Riverfront Park Project Manchester, NH	Manchester Parks & Recreation Dept. Manchester, NH	555	1983 (E)
029	C	7 St. Anselm's Building Goffstown, NH	St. Anselm's College Goffstown, NH	1,500	1981

035	C	8	Addition to YMCA Concord, NH	YMCA Concord, NH	2,000	1982 (A)
036	P	9	Fire Protection Survey Searsport, ME	U.S. Navy Searsport, ME	NA	NA
046	P	10	Urban Street Improvements Hooksett and Goffstown, NH	NH Department of Public Works & Highways Concord, NH	1,300	1984 (E)
046	P	11	South Willow Street Manchester, NH	NH Department of Public Works & Highways Concord, NH	6,000	1986 (E)
046	P	12	Granite Street Ramps Manchester, NH	Manchester Highway Department Manchester, NH	8,000	1983 (E)
047	P	13	Bell Tower, City Hall Manchester, NH	City of Manchester, NH	200	1980 (A)
050	P	14	Brandenwood Planned Unit Development Concord, NH	Bradford Realty, Inc. Manchester, NH	21,000	1986 (E)
052	P	15	Central Boiler Plant Manchester, NH	Manchester Highway Department Manchester, NH	100	1979 (A)
054	P	16	Jac-Pac Watertown, MA	Granite State Packing Company Manchester, NH	NA	NA
071	P	17	Seabrook Emergency Response Plans Seabrook, NH	NH Civil Defense Agency Concord, NH	NA	NA
072	P	18	Edward J. Roy Drive Manchester, NH	Richard D. Roy Hampton, NH	1,330	1982 (A)
088	P	19	Urban Park Manchester, NH	Manchester Parks & Recreation Dept. Manchester, NH	100	1982 (A)

096	P	20	Facilities Plan Manchester, NH	City of Manchester, NH	NA	NA
096	P	21	Chelmsford Street Pumping Station Lowell, MA	City of Lowell, MA	150	1979 (A)
096	P	22	Water Pollution Abatement Program Manchester, NH	City of Manchester, NH	42,000	1989 (E)
096	P	23	Princeton Boulevard Station Lowell, MA	City of Lowell, MA	112	1983 (E)
099	P	24	Solid Waste Facility - Phase II Manchester, NH	City of Manchester, NH	10,000	Unknown
099	JV	25	Londonderry Secure Landfill Londonderry, NH	Grassy Knolls Associates Salem, NH	10,000	1983 (E)
101	P	26	Combustion Engineering Storage Tank Newington, NH	Charles Dryer Construction Company Amherst, NH	150	1979 (A)
104	P	27	Hampshire/Flagstone Drainage Hudson, NH	Town of Hudson, NH	500	1983 (E)
107	P	28	Derry Street Traffic Review Hudson, NH	Town of Hudson, NH	NA	NA
113	C	29	Building of R. Theodore, Inc. Manchester, NH	R. Theodore, Inc. Manchester, NH	NA	NA
201	C	30	Expert Witness-Litigation Hudson, NH	Town of Hudson, NH	NA	NA

12. The foregoing is a statement of facts.  
 Signature: Martin R. Lomasney Typed Name and Title: Martin R. Lomasney, Vice President Date: January 4, 1983

**Experiences Profile Code Numbers**  
for use with questions 10 and 11

- 001 Acoustics; Noise Abatement
- 002 Aerial Photogrammetry
- 003 Agricultural Development; Grain Storage; Farm Mechanization
- 004 Air Pollution Control
- 005 Airports; Navais; Airport Lighting; Aircraft Fueling
- 006 Airports; Terminals & Hangars; Freight Handling
- 007 Arctic Facilities
- 008 Auditoriums & Theatres
- 009 Automation; Controls; Instrumentation
- 010 Barracks; Dormitories
- 011 Bridges
- 012 Cemeteries (*Planning & Relocation*)
- 013 Chemical Processing & Storage
- 014 Churches; Chapels
- 015 Codes; Standards; Ordinances
- 016 Cold Storage; Refrigeration; Fast Freeze
- 017 Commercial Buildings (*low rise*); Shopping Centers
- 018 Communications Systems; TV; Microwave
- 019 Computer Facilities; Computer Service
- 020 Conservation and Resource Management
- 021 Construction Management
- 022 Corrosion Control; Cathodic Protection; Electrolysis
- 023 Cost Estimating
- 024 Dams (*Concrete; Arch*)
- 025 Dams (*Earth; Rock*); Dikes; Levees
- 026 Desalination (*Process & Facilities*)
- 027 Dining Halls; Clubs; Restaurants
- 028 Ecological & Archeological Investigations
- 029 Educational Facilities; Classrooms
- 030 Electronics
- 031 Elevators; Escalators; People-Movers
- 032 Energy Conservation; New Energy Sources
- 033 Environmental Impact Studies, Assessments or Statements
- 034 Fallout Shelters; Blast-Resistant Design
- 035 Field Houses; Gyms; Stadiums
- 036 Fire Protection
- 037 Fisheries; Fish Ladders
- 038 Forestry & Forest Products
- 039 Garages; Vehicle Maintenance Facilities; Parking Decks
- 040 Gas Systems (*Propane; Natural, Etc.*)

- 041 Graphic Design
- 042 Harbors; Jetties; Piers; Ship Terminal Facilities
- 043 Heating; Ventilating; Air Conditioning
- 044 Health Systems Planning
- 045 Highrise; Air-Rights-Type Buildings
- 046 Highways; Streets; Airfield Paving; Parking Lots
- 047 Historical Preservation
- 048 Hospitals & Medical Facilities
- 049 Hotels; Motels
- 050 Housing (*Residential, Multi-Family; Apartments; Condominiums*)
- 051 Hydraulics & Pneumatics
- 052 Industrial Buildings; Manufacturing Plants
- 053 Industrial Processes; Quality Control
- 054 Industrial Waste Treatment
- 055 Interior Design; Space Planning
- 056 Irrigation; Drainage
- 057 Judicial and Courtroom Facilities
- 058 Laboratories; Medical Research Facilities
- 059 Landscape Architecture
- 060 Libraries; Museums; Galleries
- 061 Lighting (*Interiors; Display; Theatre, Etc.*)
- 062 Lighting (*Exteriors; Streets; Memorials; Athletic Fields, Etc.*)
- 063 Materials Handling Systems; Conveyors; Sorters
- 064 Metallurgy
- 065 Microclimatology; Tropical Engineering
- 066 Military Design Standards
- 067 Mining & Mineralogy
- 068 Missile Facilities (*Silos; Fuels; Transport*)
- 069 Modular Systems Design; Prefabricated Structures or Components
- 070 Naval Architecture; Off-Shore Platforms
- 071 Nuclear Facilities; Nuclear Shielding
- 072 Office Buildings; Industrial Parks
- 073 Oceanographic Engineering
- 074 Ordnance; Munitions; Special Weapons
- 075 Petroleum Exploration; Refining
- 076 Petroleum and Fuel (*Storage and Distribution*)
- 077 Pipelines (*Cross-Country - Liquid & Gas*)
- 078 Planning (*Community, Regional, Area-wide and State*)
- 079 Planning (*Site, Installation, and Project*)
- 080 Plumbing & Piping Design
- 081 Pneumatic Structures; Air-Support Buildings
- 082 Postal Facilities

- 083 Power Generation, Transmission, Distribution
- 084 Prisons & Correctional Facilities
- 085 Product, Machine & Equipment Design
- 086 Radar; Sonar; Radio & Radar Telescopes
- 087 Railroad; Rapid Transit
- 088 Recreation Facilities (*Parks, Marinas, Etc.*)
- 089 Rehabilitation (*Buildings; Structures; Facilities*)
- 090 Resource Recovery; Recycling
- 091 Radio Frequency Systems & Shieldings
- 092 Rivers; Canals; Waterways; Flood Control
- 093 Safety Engineering; Accident Studies; OSHA Studies
- 094 Security Systems; Intruder & Smoke Detection
- 095 Seismic Designs & Studies
- 096 Sewage Collection, Treatment and Disposal
- 097 Soils & Geologic Studies; Foundations
- 098 Solar Energy Utilization
- 099 Solid Wastes; Incineration; Land Fill
- 100 Special Environments; Clean Rooms, Etc.
- 101 Structural Design; Special Structures
- 102 Surveying; Platting; Mapping; Flood Plain Studies
- 103 Swimming Pools
- 104 Storm Water Handling & Facilities
- 105 Telephone Systems (*Rural; Mobile; Intercom, Etc.*)
- 106 Testing & Inspection Services
- 107 Traffic & Transportation Engineering
- 108 Towers (*Self-Supporting & Guyed Systems*)
- 109 Tunnels & Subways
- 110 Urban Renewal; Community Development
- 111 Utilities (*Gas & Steam*)
- 112 Value Analysis; Life-Cycle Costing
- 113 Warehouses & Depots
- 114 Water Resources; Hydrology; Ground Water
- 115 Water Supply, Treatment and Distribution
- 116 Wind Tunnels; Research/Testing Facilities Design
- 117 Zoning; Land Use Studies
- 201 Expert Witness
- 202
- 203
- 204
- 205

# How did these firms grow in face of a depressed economy?

In the past four or five years, the construction market has declined something like 25%. Nevertheless, a few engineering firms are growing impressively. How three of them did it is profiled in this article. The firms were nominated by ASCE Sections and Branches. Their approaches may provide insights useful to other firms.

**KNEELAND GODFREY, JR., M. ASCE**

Editor

CIVIL ENGINEERING Magazine

## Firm doubles in size during down business cycle

IN THE PAST two years, when civil engineering business in its San Francisco Bay area has been down, the San Leandro firm of Bissell and Karn has doubled its staff from about 45 people to 90.

Making this possible, says president Richard Karn, were two decisions made four years ago. The firm decided to diversify geographically, adding two offices to its existing two, and to broaden itself in types of engineering work done. Most of its work at the time was in housing-related fields like subdivision development, roads, water and sewer. The housing market is very cyclic, so diversification was needed if the firm was to grow.

The firm practices only in the San Francisco Bay area. But that's a pretty big market, in area and population. Karn says it stretches some 100 mi (30 km) north to south, and its population is some 4½ million. That's more people than in most states. So there was plenty of room for the firm to grow without going very far from home.

As for diversifying types of engineering work undertaken, Bissell & Karn now seeks federal jobs, and commercial and industrial ones.

After interviewing Karn, one concludes that among other keys to the firm's recent spurting growth are these two:

(1) The firm has on board engineers able to lead engineering operations of considerable size. Karn mentions two men in particular—Herb Crowle and Piero Ruggieri.

Crowle is leading the firm's efforts to get federal work. His secret? "Tenacity," Karn says. "He hangs in there, figures out what the federal clients want."

"When we get federal a job, he sees that it's done right. If we do a job well,

that's the best possible marketing approach in seeking another job from that client."

Karn says there's a happy story connected with Crowle's joining the firm. "Herb had retired as public works director for Alameda County. After six months of retirement he called me, said, 'I'm bored—can you use me?' We

could indeed, and what makes the relationship particularly good is that years ago I worked for him for 15 years."

Ruggieri, also one of Bissell & Karn's key newer people, joined the firm in 1977 after working with the Alameda County Flood Control and Water Conservation District (where Karn himself worked earlier) and the Association of Bay Area Governments. He directs work on the firm's biggest job by far—one-third of the 90-man firm's effort is devoted to Hacienda Business Park.

It's a huge project, Karn says—some 850 acres and representing an investment planned ultimately to total \$1½ billion over the next 20 years. Developers are the Prudential Insurance Co. and Callahan Pentz Properties of Pleasanton, CA.

Located in Pleasanton in the southeast quadrant of the Bay area, the mega-development is designed to take spill-over from the "Silicon Valley" light industrial developments to the

Partners in Bissell & Karn, clockwise from upper left, are Robert Crossett, Don Bissell, Piero Ruggieri and Richard Karn (Daily Review photo by Jay Soimonson)





west around San Jose. Silicon Valley is getting filled up with the electronics and computer firms which represent the leading edge of America's high-technology growth. Room to grow was needed, and the Hacienda Business Park will provide some of it.

Bissell & Karn is playing a central role here. Doing the civil engineering, of course—the surveying, mapping, streets, storm drainage, water and sewer. But the role is bigger. Says Karn, "In effect we civil engineers are the project coordinators for the developers. We even opened up an office in the same building and immediately adjacent to the developer. We're not offi-

cially the prime professional. Other firms include three architect firms, a landscape architect firm, two geotechnical firms, two traffic engineering and an environmental engineering firm (handling special wastewater problems). Nevertheless we're coordinators. We were brought in first—we've been on the job for 10 years, beginning with contacts with public agencies that must provide the public infrastructure.

A development of this size will naturally have a heavy impact on the surrounding communities. The developers are taking great pains to minimize this. They're doing a beautiful job anticipating and minimizing traffic impacts

(these seem to be the #1 concern)," says Karn.

"Traffic volumes and trip distances will be cut also because this is more than the usual industrial and office development. It's conceived as more like a complete city—that is, everything except housing. In addition to the core construction (light industrial) it is planned to have restaurants, offices, shops. However, these non-industrial developments will be provided primarily to serve the core developments. That is, they were not conceived as a regional office park or regional shopping center. Only a mile or two away is a major regional shopping center."

## New Hampshire firm grows from 7 employees to 43 in six years

It all started, recalls partner Martin Lomasney, about eight years ago when he and his two partners left a Boston consulting engineering firm.

It had been acquired by Peabody Galion, a conglomerate with interests in manufacturing and other businesses. With coworkers Dan Costello and Paul deNapoli, Lomasney left because he felt an engineering firm ought to be independent, that professionals should work for themselves.

In 1976 the three men formed Costello, Lomasney & deNapoli Inc., headquartered in Manchester, NH. The firm grew modestly in its first four years, from seven people to 11.

In looking for business in those days the partners relied heavily on the *Commerce Business Daily*, which lists engineering projects for which the U.S. government seeks designers.

Recalls Lomasney, "In our first four years we spent thousands of dollars seeking jobs identified via the *Daily*. We got one small Navy job.

"We concluded there was no way we could compete with the larger, older firms in terms of number and variety of projects designed and number of years in the business.

"We decided to spend our time and money on serving the client rather than preparing proposals."

That formula is one key reason the firm has quadrupled in size since 1980, from 11 people to 45.

What does Lomasney mean by "serving the client"? Some insights:

The discouraging trend today, Lomasney says, is increasingly to bid for design jobs, though often that term is not used. To get jobs, engineering firms feel they must sharpen their pencils. Lower fees sometimes mean you must

give less service. Not always does giving the client exactly what he asks for, no more and no less, optimally serve his interests.

"We give clients an awful lot of service. We give service they hope for but don't always get. For example, sometimes the client's imperfect understanding of the problem does not lead him to ask for exactly what he needs.

"Sometimes our approach means we make no profit on the first job. But often it leads to repeat business."

As an example of the type of "extra service" Lomasney cites a hypothetical case: The client is under a court clean-up edict, in a case brought by EPA, that could cost the client \$10,000 a day for noncompliance.

Because Lomasney's firm is new and small, its partners are also its top technical men. They sometimes serve their client as confidential consultants, helping his management find a strategy to get through a tough period.

### Doing 5 to 7 years work in 3

"Doing the impossible"—or what would have been impossible if normal

procedures were followed—is illustrated by the case of an off-ramp to downtown Manchester from the F. E. Everett Turnpike.

A developer proposed to construct a \$40 million redevelopment project in the downtown. Such a big economic boost was very welcome in this largest New Hampshire city. The developer said a new off-ramp from the Turnpike would be necessary if he were to go ahead. (Total cost of the ramp was to be \$6 million.)

The state highway department said that would take 5 to 7 years. Retorted the developer, we can't wait that long—we'll take our development elsewhere or not build it.

Solution: rather than wait for the state, the city paid for the engineering. A special law was enacted providing the money. The city hired Lomasney's firm and now, he says, rather than seven years the job will take less than three.

Why the four year time difference? Lomasney says one reason is this: Normally on New Hampshire state highway jobs design alone takes three years. One assumes other delays occur



Partners in Costello, Lomasney & deNapoli Inc. are shown left to right in that order

because projects are queued up waiting for state and federal construction dollars—there are more projects awaiting funding than there are dollars. Here, state and city put the Manchester project at the head of the line.

A third example of exceptional service that Lomasney cites is the development of evacuation plans for citizens living near the state's Seabrook nuclear power plant. "Our fee was one of the highest of eight submitted by firms seeking the work. Yet the New Hampshire and Massachusetts state Civil Defense agencies agreed we should get the work.

"What won it for us: We proposed to orient the study not only toward technical considerations—which highway, which town could handle how many evacuees, how long does it take. We

also took into account the needs and concerns of people. We agreed to open an office in the emergency planning zone, meet with the citizens of each community, work to take into account the views of citizens in the 24 affected towns.

"We were told this Seabrook contract may be one of the few of its kind in the country where a civil engineering firm got the lead role. Normally a planning firm lands it.

"Another reason we got the job was that we're a New Hampshire firm. Clients prefer a local engineering firm, just as they usually want a local MD or local attorney. In the case of engineering jobs, moving a project forward through local or state bodies is often a key requirement, and a local firm can best do this."

#### Involved in public affairs

The Costello Lomasney deNapoli firm is now one of the state's largest, Lomasney reports. The partners are active in public affairs locally, he says, and this has two benefits: (1) gives something back to the community (many of the volunteer jobs, the partners were asked to take), and (2) brings the firm's name more prominently before the public.

Paul deNapoli is on the state Safety Board. Dan Costello is chairman of the Board of Health in his hometown of Acton, MS, and active in Boy Scouts. And Lomasney is a trustee for the New Hampshire symphony, on the Board of Appeals of the Manchester building department, and the state engineer registration board.

## Firm grows from three people to 12 in first two years

Just 2½ years old, the Oakland, CA firm of Vickerman Zachary Miller, engineers and architects, has already grown from three professionals to 12 and to \$1 million a year in fees. Not bad, in a San Francisco Bay area where civil engineering work is thought to be down more than 50% in the last two years.

Partner J. M. Zachary says this growth results from aggressive marketing, use of sophisticated engineering aids, and a businesslike approach.

• *Aggressive marketing.* Says Zachary, "Our marketing philosophy is quite different from that traditional in engineering firms, which is 'sell only when not busy.' We sell in all times, busy and slow. We're selling even now, when we have almost more work than we can handle."

(Nevertheless, Zachary does say that 75-80% of their work comes as repeat jobs from satisfied clients.)

In marketing, the senior engineers have specific marketing targets—prospective clients, former ones and present ones. In common with other firms interviewed for this article, Zachary says, "Our biggest problem is to take PE's and turn them into salesmen. You don't get any work unless you sell yourself. Our PR consultant Wes Starratt and market research consultant Randy Shores persuaded us that jobs wouldn't come without our seeking them. In a previous firm one of my partners was told, 'If you do a good job of design, the projects will come.' We've since passed that firm in sales."

"The biggest problem with engineers," Zachary says, "is they're afraid to ask present clients, 'If we do a good job for you, may we have another?'"

Otherwise, if someone else courts our client and we take that client for granted, we may lose his next job."

Three areas of specialization were chosen: marine jobs, industrial and commercial. Each of the three partners spends most of his time in one of those segments.

Market researcher Shores is helpful in further narrowing the number of prospective clients to contact. Says Zachary, "We asked Randy, 'Research ports for us.' He identified 105 of them. Then he determined which are stagnant, which growing. We're going after the

latter."

Shores also makes annual forecasts of each market segment. He looks for national and regional trends. Additionally, Shores advises on credit management. He analyses risk in financing and determines whether or not the risk is worth the market's potential.

• *Sophisticated engineering aids.* The firm believes in multiplying the effectiveness of its engineers by providing them with all the help that is cost-effective.

Zachary reports this measure of firm productivity: In 1980 the industry aver-

Principals in Vickerman Zachary Miller firm are, from left, Robert G. Miller, M. John Vickerman Jr. (president) and J. Michael Zachary. (Tonsing Associates photo)



## Trends in size, U.S. heavy construction industry

Of the following two tables, one giving units in dollars and the other in tons, perhaps the latter is the more meaningful, because inflation in construction costs is eliminated. Comparing 1978 and 1982 figures, Table 2 shows: structural steel shipments down 25%, portland cement shipments down 22%, and asphalt cement tonnage down 27%.

In light of these declines in construction volume, the stories of growth of firms profiled in the accompanying article are all the more remarkable.

**Table 1. Contract awards in heavy construction, current dollars**

	1978	1979	1980	1981	1982 (9 mo.) 1981)
Heavy construction (water, sewer, transp., utilities, earthmoving, irrigation, etc.) in billions	\$27.3	\$34.4	\$26.4	\$25.9	\$20.7 (+2% vs 1981)
Nonresidential building	23.6	27.6	33.3	36.3	27.7 (-2% vs. 1981)

Notes on Table 1 data: The nonresidential building data exclude projects under \$500,000, and the heavy construction data, those under \$100,000. (Data from McGraw-Hill.) Data are in current dollars, and historically, CE has been told, inflation in construction costs has been something like twice that of the consumer price index.

**Table 2. Trends in tonnages sold (millions) of three construction materials, U.S. construction industry**

	1978	1979	1980	1981	1982 (est.)
Hot rolled steel	5.5	5.8	5.2	5.1	4.1
Portland Cement	83	83	74	70	65
Asphalt Cement	35	35	30	25.5	25.5

(Data supplied by, respectively, American Institute of Steel Construction, Portland Cement Association, and Asphalt Institute)

age of annual fees per employee was \$33,000. In 1982 the vzm firm will have billed \$83,000 per employee. And they do it with lower fee levels than some, Zachary says.

A computer-aided drafting (CAD) system is used. It is not located in-house, and the firm doesn't have enough work for it to keep it busy full-time. But the partners knew an engineer who wanted to get in the CAD business. So they helped him start it, and they make use of his services.

The CAD system has been found to pay off only where the same drafting details are to be used repetitively. An example is gasoline tanks for industrial plants. Drawings for each of these take two sheets of paper. The CAD system turns them out in minutes, compared with many draftsman-hours if done manually.

Stored in the CAD system's computer are some 40 details such as this. Among these are structural details—for example connection plates. The firm has stored in its CAD four or five of these. To draw a given connection detail an engineer picks the one closest to the detail needed, has the CAD plot it, and modifies it manually. Zachary says this approach takes less than half an hour, vs. four to six hours if done manually.

Manual drafting also gets the firm's attention. Zachary says some drafters are fast, some slow on structural design. It seems that some draftsmen enjoy doing structural work, others don't. Since the firm discovered this, it has tried to give each draftsman only the type of work he likes to do. Result is higher draftsman productivity.

Another cost-cutter being used is a "vacuum frame," which copies engi-

neering drawings at lower cost than alternatives.

Naturally, computers are among the tools used. Three desk-top computers are available in-house, and used not only for engineering structural analysis but also accounting, budgeting, project management and even marketing.

The project management (PM) package of computer programs is the stand-out. Zachary says, "We get four to five calls a month to see our PM system." It tells the project engineer a job's progress, each week or month, in time and in budget. It also tells him at a glance whether a given task is in the project scope or out. (The client will say, "I don't have time to get all the permits. Will you do it?") Has the client agreed to pay for this or not?)

• *Businesslike approach.* Careful attention is paid to business forecasting, to budgeting, and to monitoring costs. The firm does five and 10 year sales forecasts. It makes one year forecasts of each market nationally, and of the overall business climate in the Bay area. It makes a six-month forecast of the work load of each engineer (job by job). And it makes a cash-flow forecast. (This last answers the question, will we be able to buy another computer next year?)

The firm tracks many financial ratios—rate of return on assets, return on equity, on revenue, and several others. "Without all these financial data, since our firm is so young and so small we might have been unable to get the financing we got," Zachary says.

In today's down economy, many clients are late in paying fees, pay only part of their fee or don't pay at all.

Aggressiveness in going after late

fees pays off, the vzm firm has found. Says Zachary, "We're not afraid to use a collection agency, even go to court to collect fees if we're treated poorly. And this posture pays off. Initially we thought we'd lose clients by our bold approach—surprisingly we gained them. Clients know we're organized. They know we'll do a good job—because we can afford to because we're getting paid. They know we will not cut corners. We know our image in clients' eyes is very good—we conduct image surveys, and they tell us this."

An acid test came recently with a client whose fee was 90 days late. Recalls Zachary, "We kept meeting with him. We even withheld delivery of some design drawings. He was so mad, he said we were blackmailing him. And then two months later he brought two new projects to us! I think he would have lost respect for us if we were a marshmallow. But we took a firm stance, and he came to know we were good businessmen—he respected us."

Zachary reports these measures of fee-collection efficiency: 18 months ago the mean lag before payment of fee in the industry was 30 days; today it is 60 days. But the vzm firm's lag has risen from 30 days only to 42 days.

Zachary holds a BS in industrial engineering and a masters in business administration. Prior to helping form the firm he was manager of construction for the region's \$1½ billion BART (Bay Area Rapid Transit) rail project. John Vickerman, a registered civil engineer and licensed architect, was a principal in an AE firm. Bob Miller is a licensed civil engineer and registered structural engineer and was an associate in another AE firm.

COMPUTER APPLICATIONS

PARTIAL LIST OF COMPUTER PROGRAMS

CURRENTLY BEING USED BY

COSTELLO, LOMASNEY & de NAPOLI, INC.

HORGEO - A horizontal geometry program for computations involving coordinated points.

VERGEO - A vertical geometry program specifically written for computing deck elevations of a bridge. The bridge can be curved or partly curved. The program can be used on any profile and cross-section including vertical curves and super-elevation transitions. The program also will compute the elevation of deck forms at any point, considering deflection due to the concrete. Finally, the program computes the elevation of the bridge seat including compensation for conic correction.

VERTCL - Vertical clearance at a bridge structure.

WWLAY - Wing wall layout.

TRAV - Balancing a survey traverse.

SLAB - Design of reinforced concrete bridge slab.

BEAM - Design of composite rolled section for bridge stringers.

GIRDER - Design of composite plate girders for bridge stringers.

- GRLIST - Tabulation of girder designs including plate sizes, location of changes in plates, stiffeners and schedule of stud shear connectors. Program retrieves input from data file of designs from GIRDER.
- COL - Design of a circular or rectangular concrete column by the working stress cracked column method.
- SPDFT - Design of individual spread footing.
- PILEFT - Design of individual pile footing.
- TPIER - Design of a concrete "T" pier.
- WALABT - Design of cantilevered bridge abutment and wing walls on soil, rock or pile foundations.
- WWLIST - Tabulation of dimensions and reinforcing steel for wing walls and abutments designed by WALABT. Input for this program is retrieved from WALABT run.
- PLABT - Plot of bridge abutments and wing walls. Plots plan and elevations. Input for plan coordinates are retrieved from HORGE0 run and dimensions for abutments and wing walls are retrieved from WALABT run.

- PLBRX - Plot of typical bridge cross-section.
- CULV - Design of a box culvert.
- SEW - Design of sewer line. Numerous trials can be run in sequence, program will carry forward intercepted flow and check for elevation of intercepted pipe.
- PLSEW - Plot of SEW design with all lettering - ready for photo copy.
- SEWTR - Design the components of a sewage treatment plant.
- PUMP - Program to select most efficient pump to meet a given criteria. Performance curve data for preselected pumps are part of the program.
- HDCB - Gutter flow analysis for locating catch basins for highway drainage design.
- HDPIPE - Design of pipe network for the above catch basins.
- HDEST - Estimate of quantities for above pipe network and catch basins.
- PLHD - Plot of above pipe network in profile and cross-section.

DRAIN  
& EST

- Programs to analyze an existing combined sewerage system.

Program will find the storm frequency that each pipe is capable of passing. If the system is not capable of passing a predetermined rainfall, it will proceed to design a proposed combined system, a storm sewer system and a sanitary sewer system.

The EST program will perform a cost effective analysis of all alternatives. It also computes the cost of rehabilitation of the existing system, if it is retained, based on the age and type of pipe as variable functions.

BID - A text program used to prepare the bid proposed forms and the bid summary after bids are received.

CASHFL - Plot of cash flow for the municipality on a multi-contract program where contracts start at different times and are wholly or partially eligible for Federal and State funds. Program of each contract is based on an imperical curve of the construction industry.

HYDCLV - Hydraulic analysis of culverts.

HYDPRO - Hydraulic profile.



HYDNET - A non-proprietary computer program available to Costello, Lomasney & deNapoli for hydraulic analysis of water distribution systems. In evaluating a pipe network, the engineer needs the capability to solve for various combinations of unknowns under many loading conditions. HYDNET takes full advantage of the Newton-Raphson method to solve directly for combinations of unknowns which include heads, consumption, pipe diameters, or pipe lengths. HYDNET allows incorporation of pumps, valves, and other elements into the network without recourse to external procedures.