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**U. S. NAVY INFRASTRUCTURE:  
PLANNING, BUDGETING AND ACQUISITION AT  
NAVAL SUBMARINE BASE NEW LONDON**

by

Brian K. Moore, EIT

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Submitted to the Department of Civil and Environmental Engineering  
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Signature of Author.....  
Department of Civil and Environmental Engineering  
August 8, 1997

Certified by.....  
John B. Miller, Ph. D.  
Assistant Professor, Department of Civil and Environmental Engineering  
Thesis Supervisor

Accepted by.....  
Joseph M. Sussman  
Chairman, Department Committee of Graduate Studies

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**ABSTRACT**

The U. S. Navy today faces a problem typical of government facilities owners worldwide. In an austere financing environment, it is becoming increasingly difficult to operate and maintain the Navy's inventory of shore facilities. U. S. Naval Submarine Base New London (SUBASENLON) is the focus for the following discussion of naval planning, budgeting and acquisition of facilities. It is one of several bases on the East Coast vital to the survival of a strong Navy. Home to 23 nuclear attack submarines and a host of support facilities valued at nearly \$800 million, SUBASENLON is a microcosm of government infrastructure decision-making. The base has a facilities master plan, complete with a twenty-year capital improvement portfolio, but it will likely never come to fruition without a new method of budgeting and acquisition.

Governments and municipalities worldwide are trying many methods that provide increased flexibility and additional financial tools to support facilities engineers in their mission. A selection of these is presented in this thesis to provide some context for the study of the SUBASENLON system for planning, budgeting and acquisition of its facilities portfolio. An analysis of the system, including a survey of federal acquisition regulations, reveals many shortcomings and leads to a discussion of potential improvements. There is a restricted range of procurement vehicles available to aid in the rehabilitation and construction of facilities, and the focus among national and Navy leadership has been on reforming the acquisition process. The thesis proposes a "core base model" for accomplishment of a long-range infrastructure plan at SUBASENLON and other large Navy shore installations. This model is based on the belief that a more consistent and coherent national and naval policy is needed to support current and future facilities inventory.

Thesis supervisor: John B. Miller, Ph.D.

Title: Assistant Professor of Civil and Environmental Engineering

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## **AUTHOR**

Brian K. Moore is a Lieutenant Commander in the U. S. Navy Civil Engineer Corps. He received his commission and a Bachelor of Science in Mechanical Engineering in 1986 from the United States Naval Academy at Annapolis, Maryland. He received Naval Flight Officer wings in 1988 and served three years with Carrier Airborne Early Warning Squadron 127 as an E-2C mission commander, flying from USS Coral Sea (CV-43). He then taught mathematics and physics, while coaching track and cross-country, at the Naval Academy Preparatory School in Newport, Rhode Island. Following a transfer to the Civil Engineer Corps, he served as Assistant Staff Civil Engineer and Assistant Resident Officer in Charge of Construction at Naval Air Station Oceana in Virginia Beach, Virginia. He is currently Assistant Public Works Officer at Naval Submarine Base New London, in Groton, Connecticut. LCDR Moore is a registered Engineer-in-Training in the state of Maryland.

## TABLE OF CONTENTS

<b>ACKNOWLEDGEMENTS</b>	<b>3</b>
<b>AUTHOR</b>	<b>3</b>
<b>TABLE OF FIGURES</b>	<b>6</b>
<b>1 INTRODUCTION – CONTEXT FOR DISCUSSION AND ANALYSIS</b>	<b>7</b>
1.1 BACKGROUND	9
1.1.1 <i>History of quadrants and their use in U. S.</i>	9
1.1.2 <i>Engineering Systems Integration</i>	14
1.1.3 <i>Contract Type, Project Delivery Method, and Their Relative Advantages</i>	15
1.2 EXAMPLES OF ALTERNATIVE STRATEGIES BY GOVERNMENT	26
1.2.1 <i>Hong Kong</i>	27
1.2.2 <i>Canada</i>	29
1.2.3 <i>U. S. Water</i>	32
1.2.4 <i>U. S. Roads</i>	38
1.2.5 <i>U. S. Multi-modal</i>	41
1.3 CONSTRUCTION INDUSTRY TRANSFORMATION	44
<b>2 CASE STUDY: SUBASE NEW LONDON</b>	<b>47</b>
2.1 HISTORY/GEOGRAPHY	47
2.1.1 <i>Mission &amp; functions</i>	50
2.1.2 <i>Facilities summary</i>	51
2.1.3 <i>Facilities Statistics</i>	55
2.2 1996 MASTER PLAN--GROTON 2020	59
2.2.1 <i>General Requirements</i>	60
2.2.2 <i>Opportunities and Constraints</i>	60
2.2.3 <i>Planning Assumptions for Groton 2020</i>	63
2.2.4 <i>New capital improvements plan</i>	67
<b>3 CURRENT PROCESSES</b>	<b>69</b>
3.1 FRAMEWORK FOR DECISION MAKING	69
3.1.1 <i>Organization of Navy</i>	69
3.1.2 <i>Facilities organizations at SUBASE</i>	72
3.2 PLANNING	75
3.2.1 <i>Shore Facilities Planning System</i>	76
3.2.2 <i>Installations Planning</i>	78
3.2.3 <i>Maintenance &amp; Repair</i>	79
3.3 BUDGETING	98
3.3.1 <i>Important terminology</i>	99
3.3.2 <i>Authorizations and Appropriations</i>	99
3.3.3 <i>Cycle (BY, CY, PY)</i>	100
3.3.4 <i>Local budgeting</i>	101
3.4 ACQUISITION – HOW DO WE GET WHAT WE NEED?	104
3.4.1 <i>FAR requirements</i>	105
3.4.2 <i>Contracting tools available</i>	106
<b>4 ANALYSIS</b>	<b>114</b>
4.1 RESULTS OF ABOVE PLANNING, BUDGETING AND ACQUISITION SYSTEM	114
4.1.1 <i>Segmentation of the “program” from the beginning of planning</i>	114
4.1.2 <i>Discrete value measurement</i>	115
4.1.3 <i>No way to minimize lifecycle cost</i>	116

4.1.4	<i>No innovation</i>	117
4.1.5	<i>Ability to execute attracts funds</i>	117
4.1.6	<i>Waste design funds and time—design process diagram</i>	118
4.1.7	<i>Design strategy</i>	120
4.1.8	<i>Year end dump tough on industry and government</i>	120
4.1.9	<i>Shortage of funds slows change order processing and extends construction time</i>	123
4.1.10	<i>Disconnect between planning and budgeting</i>	124
4.1.11	<i>Effort directed at clearing hurdles and gamesmanship</i>	126
4.2	CAUSES OF ADVERSE RESULTS	127
4.2.1	<i>Planning</i>	127
4.2.2	<i>Programming, budgeting and decision making</i>	129
4.2.3	<i>Acquisition</i>	134
4.3	ACQUISITION REFORM: ONLY ONE PART OF THE PUZZLE	136
4.3.1	<i>BOS-JOC – job order contract for small projects</i>	137
4.3.2	<i>Regional Contracts</i>	137
4.3.3	<i>RAC</i>	138
4.3.4	<i>PPV</i>	138
4.3.5	<i>Open base and franchising</i>	139
4.3.6	<i>Utilities partnerships</i>	139
4.3.7	<i>Credit cards</i>	140
4.3.8	<i>Streamlining</i>	140
4.3.9	<i>New MILCON process</i>	140
4.3.10	<i>Summary</i>	140
<b>5</b>	<b>PROPOSED PROCESS</b>	<b>142</b>
5.1	CHARACTERISTICS	142
5.1.1	<i>Discipline--resist attempts to change constantly</i>	142
5.1.2	<i>Efficient delivery process</i>	142
5.1.3	<i>Lifecycle cost minimization</i>	142
5.1.4	<i>Smooth capital budgeting at Core Naval Facilities</i>	143
5.1.5	<i>Confidence in plan and execution</i>	143
5.1.6	<i>Sustainable base infrastructure</i>	143
5.1.7	<i>Aggregate vs. Discrete project analysis</i>	144
5.1.8	<i>Ability to really <b>manage</b> portfolio</i>	144
5.2	THE CORE BASE MODEL	145
5.2.1	<i>Organization and decision making</i>	146
5.2.2	<i>Programming</i>	152
5.2.3	<i>Acquisition</i>	154
5.2.4	<i>Cutting costs</i>	156
<b>6</b>	<b>CONCLUSION</b>	<b>159</b>
6.1	CLIMATE	159
6.2	OPTIONS—CORE BASE MODEL	160
	<b>BIBLIOGRAPHY</b>	<b>162</b>

## TABLE OF FIGURES

Figure 1 Miller's framework for analysis .....	11
Figure 2 The history of U. S. infrastructure strategy .....	12
Figure 3 Table of Construction Contracting Method Components .....	15
Figure 4 Project Drivers versus Organization Matrix .....	21
Figure 5 Owner Sophistication Graph .....	22
Figure 6 Owner Involvement Graph .....	23
Figure 7 Method Selection Flowchart .....	26
Figure 8 Hong Kong Infrastructure Process Alignment .....	27
Figure 9 Trends in Infrastructure Finance (US and HK) .....	28
Figure 10 Schematic View of RTC site .....	42
Figure 11 BOT Provision of RTC .....	44
Figure 12 Regional Map .....	48
Figure 13 Investment Categories .....	51
Figure 14 Base Map .....	54
Figure 15 FY97 SUBASE Budget Synopsis .....	56
Figure 16 SUBASE AIS History 1988-1996 .....	57
Figure 17 SUBASE Maintenance & Repair Investment 1988-1996 .....	58
Figure 18 Ultimate Land Use Plan including ESQD Arcs .....	61
Figure 19 Zoning Plan .....	65
Figure 20 2020 Plan Goals .....	66
Figure 21 Responsibilities of Commanding Officers .....	71
Figure 22 Responsibilities of NAVFAC .....	71
Figure 23 Public Works Organization .....	73
Figure 24 Level of Influence on Project Costs Graph .....	75
Figure 25 Planning Products .....	78
Figure 26 Facilities Project Approval & Funding .....	85
Figure 27 M&R vs. Replacement investment .....	88
Figure 28 Real Property Maintenance Funding .....	90
Figure 29 Fiscal Requirements for 3 budgets .....	101
Figure 30 Design Process Diagram .....	119

## Chapter 1

### INTRODUCTION – CONTEXT FOR DISCUSSION AND ANALYSIS

The focus of this paper is the U. S. Naval Submarine Base New London (SUBASENLON), in Groton, Connecticut. The base is a microcosm of government facilities decision-making, providing an insightful setting for the study of public capital investment processes. The Commanding Officer (CO) of the base is one of millions of facility owners in the world facing short- and long-term infrastructure decisions. The decisions are bounded by financial, technical and temporal considerations. It is instructive to analyze the environment within which SUBASENLON exists, and to briefly summarize some planning and delivery methods and philosophies of other public and private facilities owners throughout the United States and the rest of the world.

The residential homeowner may choose whether to upgrade his heating system, replace a roof, or invest in an addition to accommodate new family members. Any of these actions may require the expenditure of several thousand dollars, and can be performed using any number of different methods, each with different sets of considerations. He is free to choose among the available products and services within his budget. If he happens to be handy or has an engineering background, he may only purchase raw materials, then manufacture and install whatever he needs. Or he may hire a general contractor to do the work on a time and materials basis or for a fixed price. If savvy (or overconfident) in the administration of small construction contracts, he may hire several trades himself, scheduling and supervising the work himself. Each project is likely to be one of a kind, the homeowner unlikely to work with a particular contractor more than a few

times. If the owner has a list of desired projects, they are prioritized and accomplished in the order decided on by the owner himself. The homeowner is constrained only by his desires, expertise and budget.

DuPont operates and maintains billions of dollars of infrastructure assets around the world, and faces capital investment decisions involving millions each year. It has a group of experienced facilities professionals to manage its facilities, which has at its disposal many different contracting vehicles and a fairly sizeable budget. It must consider the direction of the company, the state of existing facility assets, the wishes of the company leadership and stockholders, international politics and a multitude of other issues. A system of planning and capital rationing models guide the actions of the group, and life cycle cost is a major consideration. There are company regulations governing acceptable methods of procurement, and contractors are usually chosen based on past performance and price. Procurement actions are subject to scrutiny within the corporation, but not by more restrictive public procurement regulations.

The homeowner and private corporation described above represent two ends of the private facilities procurement spectrum. The public arena is governed by a more restrictive framework of regulations. Although public and private facilities can be almost identical in terms of function, appearance, and decision-making considerations, the processes for obtaining them are generally less flexible and more circuitous. These processes are the subjects of reams of legislation and government regulation, making the task of obtaining infrastructure more challenging in the public sector. Public sector owners and facilities managers are responsible for being good stewards of the public tax dollar and the environment, and generally face scrutiny on more levels than the private owner.



Other government owners struggle with many of the same issues, and some have developed alternative tools with which to procure facilities construction, upgrades, operations and maintenance. These tools are introduced in the following paragraphs, and they provide an interesting array of choices and lessons to be considered by SUBASENLON and Navy decision-makers. The chapters that follow describe in detail how one public owner, SUBASENLON, deals with the challenge of operating and maintaining an expensive complex of facilities infrastructure with scarce capital and operating funds, while navigating the convoluted federal acquisition regulations. These processes are evaluated within the global environment and compared to a proposed set of unconstrained processes. The concluding chapters of the paper provide an alternative planning and capital acquisition system called the “core base model.” Characteristics of the model, and its potential benefits, are described in relation to the SUBASENLON facilities decision-makers.

## 1.1 Background

### 1.1.1 History of quadrants and their use in U. S.

The history of infrastructure development in the United States holds some clues for facility owners in the late twentieth century for taking advantage of any number of ways to fulfill infrastructure needs. Professor John Miller, of the Department of Civil Engineering at MIT, has studied problems in infrastructure development and offers two interrelated tools for facilities planners for the 21<sup>st</sup>

century. One is a framework for thinking about delivery methods, and the other is the concept of Engineering Systems Integration.<sup>1</sup>

#### 1.1.1.1 A crisis in American infrastructure

Miller suggests that there are many reasons to accept the current state of affairs in our infrastructure base as a crisis. In addition to those commonly proffered in the literature, he offers four more:

- A disappearing act by the Federal Government. Since 1980, federal funding for infrastructure has steadily declined.
- A procurement system unfriendly to technological innovation. Engineers are required to provide design, not performance, specifications that routinely exclude new technologies.
- A complex procurement system tied to direct government finance.

“Large federal grant programs left a segmented design-then-build process that is directly funded by government, replete with detailed rules as to each and every step of the process. Infrastructure development has become a zero-sum game in which *individual projects are turned on or off solely on the basis of available public funds*. Much of the infrastructure debate is devoted to the process by which insufficient public funds are allocated among an excess of public needs. Incredibly, most of our energy is spent on improving this self-defeating allocation process—procurement reform—through even more detailed rules.”

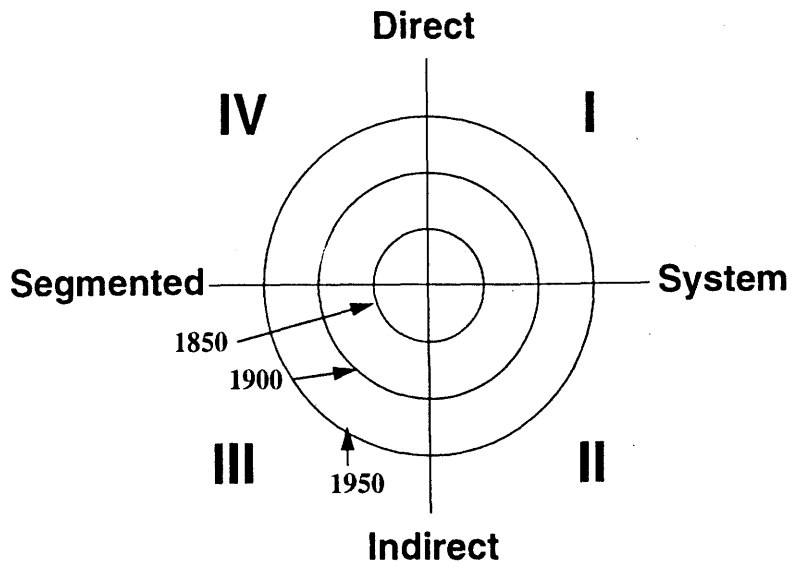
1.1.1.1.1 A hollow ideological debate over the role of government. Will public-private partnerships reduce government O&M costs and provide for all the public’s infrastructure needs? Can the profit motivated, private sector be trusted to properly identify and pursue the public interest? While the argument rages,

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<sup>1</sup> Miller, John. “Toward a New American Infrastructure Development Policy for the 21<sup>st</sup> Century.” *Infrastructure*, Vol. 1, No. 3, pp. 20-25 (1996).

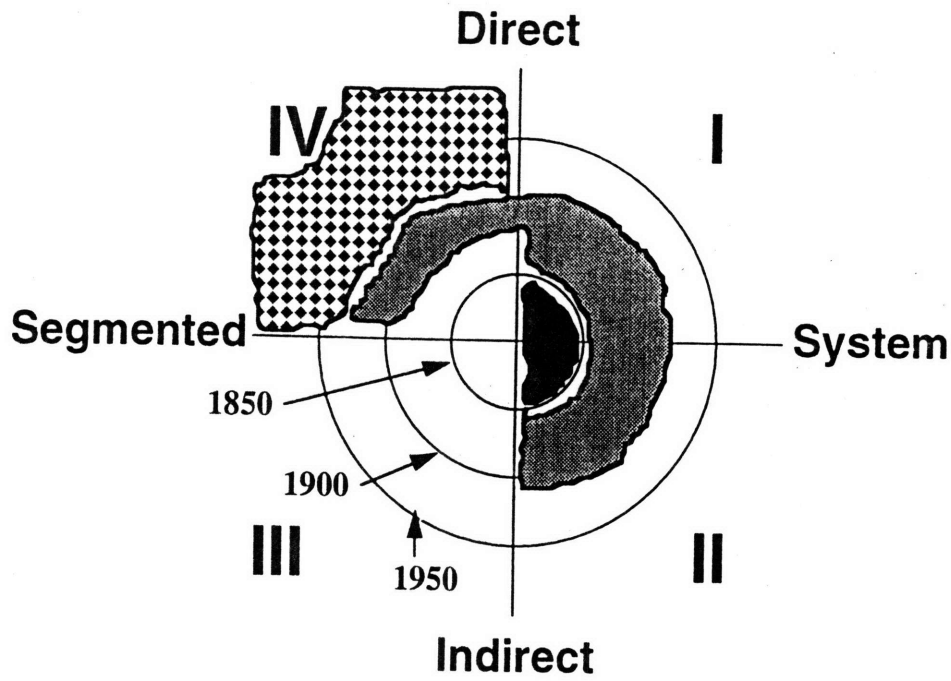
public funding levels have not been sufficient to provide world-class infrastructure to extend the American economy into the global economy.

#### 1.1.1.1.2 Analytical framework



**Figure 1 Miller's framework for analysis**

Figure 1 presents a framework to analyze infrastructure development and project delivery methods. The horizontal axis represents the packaging of projects. Segmented means that the procurement is broken up into its individual facility lifecycle constituents of planning, design, construction, operations, maintenance, and finance, with each part the responsibility of a separate entity. System represents a packaged approach, where the steps are combined into a single procurement for a completed system. The circles add time to the framework. Quadrants are numbered I-IV for convenience.



**Figure 2 The history of U. S. infrastructure strategy**

The history of infrastructure development in America since 1789 is given in figure 2. From 1789 to 1933, the Congress maintained a dual-track strategy for infrastructure development policy. On hundreds of occasions, Congress actively sought private financing for bridges, railroads, telegraph, water, power, and ferries, using delivery methods in Quadrant II. Concurrently, it supported direct funding for river and harbor improvement projects using system delivery methods in Quadrant I, and after 1900, adding segmented methods in Quadrant IV.

Following World War II, several actions skewed the strategy onto a single track. The Armed Services Procurement Act of 1947, the Federal Property and Administrative Services Act of 1949, and the Brooks Architect-Engineers Act of 1972, all drove federal procurement into Quadrant IV. The sequential design-then-build delivery method has been used almost exclusively, with efforts to add design-build and most turnkey methods being only minor variations of the federal commitment to Quadrant IV.

### 1.1.1.2 Foundations for the dual track strategy

#### 1.1.1.2.1 Strategic economic advantage

Congress consistently employed direct and indirect procurement to support projects that produced economic advantage. Sea walls, piers, breakwaters, navigation aids, and buoys were provided directly. Schools, public buildings, and universities throughout the West were provided indirectly, through checkerboard land sales, which more than doubled the value of remaining federal lands.

#### 1.1.1.2.2 Strategic military advantage

To enhance its ability to defend the West, Congress indirectly provided for all the early western railroads to be financed, designed, constructed, and operated in Quadrant II, through checkerboard land grants from 1850-1875.

#### 1.1.1.2.3 Lack of federal and state funding

Direct funding for the Cumberland Road and federal cash support for the Chesapeake and Ohio Canal were disastrous, and turned the Congress away from Quadrant I procurements for such narrow, single use projects. It focused its limited reserves on improvements of a more general nature, such as opening rivers and the Great Lakes to navigation and power production.

#### 1.1.1.2.4 Capital Availability abroad

The Illinois Central Railroad project was financed in London. The transatlantic cable connecting London to New York was jointly franchised in Quadrant II by the American and British governments, to be financed in the European capital markets.

#### 1.1.1.2.5 New technology available at home and abroad

“The dual track strategy allowed government to quickly tap new technology. A Quadrant II franchise from the state of Missouri for design, construction, and finance of (what became) the Eads Bridge across the Mississippi at St. Louis, enabled Andrew Carnegie’s Keystone Company (predecessor to U. S. Steel) to use new steel technology in a long span structure and to finance the project through Junius Morgan in London. Using Quadrant I, Congress directly financed the installation of Winslow Lewis’s patented light magnification system in every American lighthouse. A Quadrant II franchise for private electric power generation enabled the Mississippi River Power Company to finance the largest hydroelectric dam in the world, and the first dam to cross the Mississippi River, at Keokuk, Iowa. Power generated at the dam was presold to the City of St. Louis, which facilitated *local* project financing.”<sup>2</sup>

#### 1.1.2 Engineering Systems Integration

Professor Miller suggests that a new civil engineering discipline, called Engineering Systems Integration, is being created at the center of the ideological debate over the relative merits of privatization. Engineering Systems Integration treats both the choice of project delivery and the project finance method as variables to be considered by the civil engineer in the development, comparison, and description of infrastructure alternatives for clients. The new discipline not only accepts, but is based upon, the premise that these variables permit, rather than

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<sup>2</sup> Miller, John. “Toward a New American Infrastructure Development Policy for the 21<sup>st</sup> Century.” *Infrastructure*, Vol. 1, No. 3, pp. 20-25 (1996).

preclude, a robust, innovative mixture of technology, engineering and construction techniques, and new capital sources to meet urgent infrastructure needs.<sup>3</sup>

### 1.1.3 Contract Type, Project Delivery Method, and Their Relative Advantages

Gordon provides an excellent primer on the variety and types of contracting vehicles.<sup>4</sup> He proposed an organized way for infrastructure owners to eliminate inappropriate delivery methods for particular projects, the key being compatibility of methods to projects and owners. While the contracting landscape is complex, and each project is unique, it is instructive to summarize the key features of Gordon's model. The model divides contracting method into four parts--scope, organization, contract, and award.

Scope	Separate Design and Construction			Design-Build	Design-Build-Finance	
Organization	General Contractor	Construction Manager	Multiple Primes	Design-Build Team	Turnkey Team	BOT Team
Contract	Lump Sum Unit Price Cost Plus GMP	Fixed fee Cost Plus GMP	Lump Sum Unit Price Cost Plus GMP	Lump Sum Unit Price Cost Plus GMP	Lump Sum GMP	Unique to Project
Award	Bid Cap Negotiate Qual & Pric Time & Pric Q, T, P	Bid Negotiate Qual & Pric Time & Pric Q, T, P	Bid Cap Negotiate Qual & Pric Time & Pric Q, T, P	Bid Cap Negotiate Qual & Pric Time & Pric Q, T, P Design & Pric	Bid Cap Negotiate Qual & Pric Time & Pric Q, T, P Design & Pric	Bid Negotiate Qual & Pric Time & Pric Q, T & P Des & Pric

**Figure 3 Table of Construction Contracting Method Components**

<sup>3</sup> Miller, John. "Engineering Systems Integration for Civil Engineering Infrastructure Projects", Public Infrastructure Development Systems, Course Reader, Massachusetts Institute of Technology, pp. 303-328, 1997.

<sup>4</sup> Gordon, Christopher. "Choosing Appropriate Construction Contracting Method," Journal of Construction Engineering and Management, Vol. 120, No. 1, pp. 196-210, March 1994.

### 1.1.3.1 Definitions

#### 1.1.3.1.1 Scope

Scope is defined as the portion of the project tasks—design, construction, and finance—that is assigned to the contractor. A rough estimate of the cost range, schedule needs and design parameters of the project is required before analysis of the appropriate vehicle can begin. Scope for the procurement is a by-product of the type of organization selected to perform the work.

#### 1.1.3.1.2 Organization

Organization is the business entity with whom the owner holds a construction contract. While combinations are possible, the basic types of organizations are:

- General contractor. A single business entity acting as the contractor in complete and sole charge of the field operations, including the marshaling and allocation of manpower, equipment, and materials.
- Construction manager. A single business entity acting as a consultant to the owner/project manager, either for a fixed fee or a fee as a percentage of construction cost.
- Multiple prime contractors. More than one contractor holding contracts with the owner to perform specific types of work on the same project. The owner is responsible for the overall project management and coordination, replacing a general contractor or construction manager.
- Design-build team. A single business entity that performs both the design and construction of a project. The team can be one company or a partnership of firms.



- Turnkey team. One business entity that performs design, construction, and construction financing of the project. Payment is made at project completion (when the contractor turns over the “key” to the facility.)
- Build-Operate-Transfer Team. One business entity that performs the design, construction, construction and long-term financing, and temporary (commonly up to 35 years) operation of the project. At the end of the contract period, operation is transferred to the owner.

#### 1.1.3.1.3 Contract

Contract in this context refers to the payment arrangement between owner and contractor. The following contract types can be divided into two groups—fixed price and reimbursable.

- Lump sum. The contractor agrees to perform the stipulated work in exchange for a fixed sum of money. The lump sum commonly includes all labor, materials, field overhead, company home office overhead and profit.
- Unit price. The contractor agrees to be paid a set cost per unit of each item, such as per-cubic-yard of excavation. The actual total amount paid is based on the actual measured units constructed on the project. The unit price usually includes all labor, materials, field overhead, company home office overhead and profit.

Sometimes, overhead is paid separately.

- Cost-plus. The contractor is reimbursed the cost of doing the work, including labor, materials, and project overhead, plus a fee which includes home office overhead and profit. The fee can be a fixed or adjustable sum.
- Guaranteed Maximum Price. The contractor is reimbursed the cost of doing the work, as in a cost-plus contract, up to a prearranged maximum amount. Once that price is reached, the contractor must finish the project at no additional cost to

the owner. If the job is finished under the maximum price, there is often a sharing of the cost difference between the owner and contractor as an incentive to the contractor for cost control.

- Fixed fee. A cost-plus contract with a fixed fee.

#### 1.1.3.1.4 Award

The method used to select the contractor and/or the price. Types include:

- Competitive bid. (Sometimes called sealed bid.) A contractor is selected by the lowest price proposal, in market competition.
- Cap. A fixed price is set by the owner against which contractors propose a level of quality and options for the project.
- Negotiation. The price and/or contractor is determined by negotiation between the owner and one or more contractors.
- Qualification and Price Proposal. The contractor is competitively selected based on qualification and price. The process is often quantified with a ranking formula.
- Time and Price Proposal. The contractor is competitively selected based on the proposed schedule and price.
- Qualification, Time and Price Proposal. The contractor is competitively selected base on its qualification, proposed schedule and price.
- Design and Price Proposal. The contractor is competitively selected based on proposed design and price.

#### 1.1.3.2 Traditional vs. Alternative Strategies

The vehicle commonly known as the "traditional" construction contracting method in the United States became dominant in the last fifty years. The lump-sum,

competitive bid, segmented design-bid-build method.<sup>5</sup> Advantages to owners include complete control over design, a fiduciary relationship with the designer to monitor the contractor, a single source of construction, a known total price before construction starts, price competition, and impartial selection. This method is appropriate when the scope and design are well defined and unlikely to change, and the standard time schedule is adequate. Technological development, maturation of the construction industry, lengthening approval processes and an austere funding climate indicate that other contracting methods should be considered for some projects.

Designers are also becoming more removed from the construction process, both by their conservative risk strategies and the increasingly time-consuming requirements to improve their technical design expertise. Their ability to monitor construction for the owner is diminishing.

A related concern is the adversarial relationships often created by the zero-sum-game nature of the low bid process. The multitude of alternative strategies, shown in Figure 3, that have evolved in response to the limitations of the traditional method can have some of the following advantages:

- Shortening the duration of the project by overlapping design and construction (fast-tracking) and/or eliminating bidding time.
- Providing flexibility for changes during construction, without paying a premium for it.
- Creating more designer/contractor teamwork by reducing adversarial

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<sup>5</sup> Over the full life span of the United States it is neither traditional, nor dominant.

relationships.

- Allowing the contractor to participate in the design process, thus augmenting the designer's construction experience, for such tasks as value engineering, constructibility analysis, and cost estimating. The total cost of the project can be affected much more during the design phase than after construction has begun.
- Providing incentives for the contractor to save the owner money.
- Providing alternative financing options.

#### 1.1.3.3 Selection: Compatibility of Methods to Projects and Owners

Selection of an appropriate contracting vehicle is not an exact science.

However, there is an organized way to eliminate the inappropriate choices so that final selection can be optimized. The following paragraphs describe one method for narrowing the myriad options to just a few.

##### 1.1.3.3.1 Organization

The capabilities of the owner, the nature of the project and the climate of the industry and market all affect the choice of organization.

##### 1.1.3.3.1.1 Project drivers

- Time constraints. Owners must weigh the advantages of soonest possible completion with its cost. Technical and regulatory feasibility will impact this analysis.
- Flexibility needs. Strategy and definability determine flexibility requirements. If the owner is not the final user of the facility, in residential construction for example, his strategy may be to plan for changes to be made during construction. Definability is a function of complexity, size and finality of the owner's design decisions. Some owners are unable to make construction documents final because of indecisiveness,

permit requirements, market fluctuations, time constraints, or unknown site conditions.

- Preconstruction service needs. The owner and designer have to decide how important it is to obtain the contractor’s input with regard to value engineering, cost estimating and constructibility.
- Design process interaction. Owners must assess how much creative input and control they want to have over the design of the project. Design-build, Turnkey, or Build-Operate-Transfer organizations, where design is included, owners have less control over the details of the design.
- Financial constraints. The owner must decide if the project can be more efficiently financed, either for the short- or long-term, by the owner or contractor.

Once the owner has assessed these project drivers, Figure 4 can be used as a first “filter” to eliminate inappropriate methods. A check mark in the column of a particular organization/contract type, indicates compatibility. The column with check marks in each of the rows representing the selected project drivers would be an appropriate method. If no organization satisfies the project drivers, a conflict of needs exists, and the owner should modify expectations of the project.

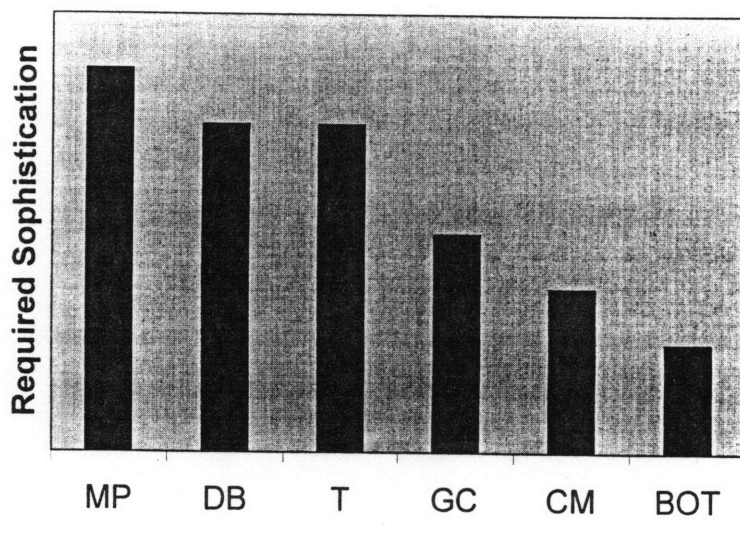
DRIVERS/ORGS	GCFP	GC-R	CM	MP	DBFP	DB-R	T-FP	T-R	BOT
Fast-track Schedule		√	√	√	√	√	√	√	√
Sequential Schedule	√	√	√	√	√	√	√	√	√
More Flexibility		√	√	√		√		√	
Less Flexibility	√	√	√	√	√	√	√	√	√
Pre-con Advice Needed		√	√		√	√	√	√	√
No Pre-con Advice Needed	√	√	√	√	√	√	√	√	√
Design Interaction	√	√	√	√		√		√	
Less Design Interaction	√	√	√	√	√	√	√	√	√
Construction Financing Needed							√	√	√
Permanent Financing Needed									√
Owner Financing	√	√	√	√	√	√			

**Figure 4 Project Drivers versus Organization Matrix**

### 1.1.3.3.1.2 Owner drivers

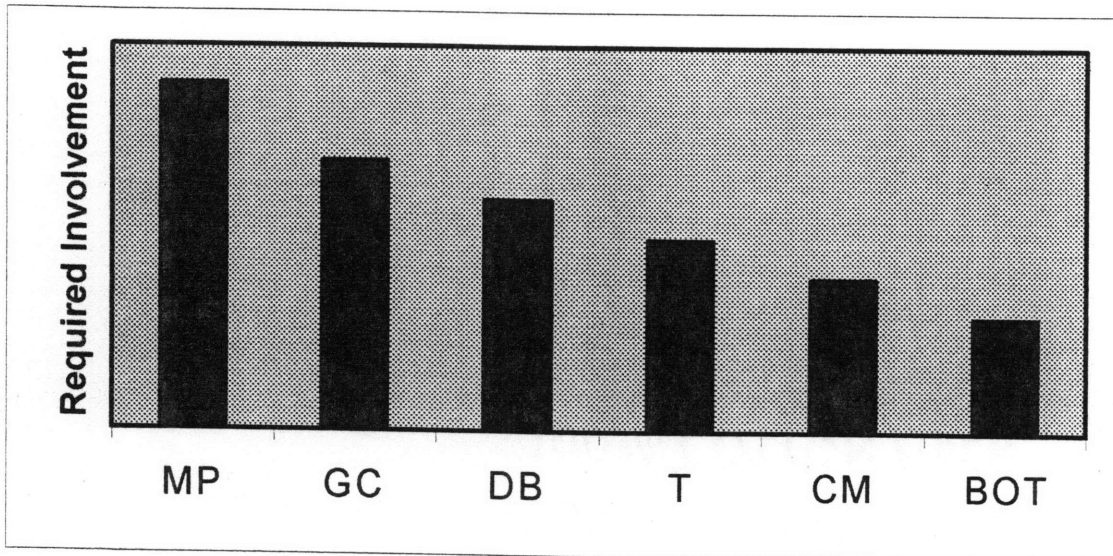
If the project driver exercise identified more than one appropriate organization, the next step is to analyze the owner's individual capabilities.

- Construction capabilities. This owner driver might also be called expertise. How sophisticated is the owner in dealing with the construction process? How much advice does the owner need? Relative required sophistication, as a function of project organization, is shown in Figure 5.



**Figure 5 Owner Sophistication Graph**

- Current capabilities. This is more of a manpower question, and is closely related to construction capabilities. How much staffing is available to procure and monitor the project? Relative required owner involvement is illustrated in Figure 6. If the owner does not have permanent staffing to support a particular organization, he might be willing to hire a project-specific force.



| On-site | Contract Monitoring | Administration |

**Figure 6 Owner Involvement Graph**

- Risk aversion. The amount of financial risk the owner is willing or allowed to bear is important in determining contract type. Many public owners, for example, are allowed to bear very little risk of the final project cost.
- Restrictions on methods. These could be laws requiring public owners to bid all jobs, or state laws against private owners using design-build.
- Other external forces. The owner may want to select a particular contractor because of specific expertise or for political reasons.

#### 1.1.3.3.1.3 Market drivers

Market drivers should be assessed so that the owner might understand the financial and industry climate into which the project will fit.

- Availability of contractors. Is the local contractor mix sufficient to accomplish the work? Are contractors familiar with, and willing to work under, the chosen organizational structure?

- Current state of the market. The owner must decide how competitive the market is at the time. This can affect timing and packaging of the project, if bidding is to be used.
- Package size of the project. The owner must decide how to package the project to obtain maximum efficiency and market competition. If necessary, small projects can be combined with others, and large projects can be broken down into smaller packages.

#### 1.1.3.3.2 Contract

The owner's contract decision should revolve around risk allocation. Optimizing the cost of the project will depend on properly assessing the risk, allocating the risks, and ensuring that each party properly manages the risks allocated to them.

##### 1.1.3.3.2.1 Assessing risk

Owners must look at the project drivers, flexibility in particular, to assess risk. Lack of final and/or complete information at the time of award creates the financial risk in the total project cost.

##### 1.1.3.3.2.2 Allocating risk

A balancing of risk should be sought between the owner and his contractor or designer in order to utilize the incentive value of bearing risk while minimizing a contingency charged for accepting the risk. A company's efficiency in handling risk is based on its power to control the risk, its possible reward for controlling the risk, and its financial position to assume risk.



#### 1.1.3.3.2.3 Managing risk

Once the contractor and owner have agreed what risk each will bear, and have established the contract, they both must prepare to manage that risk to minimize cost expense. For example, cost reimbursable contracts demand a knowledgeable organization to carefully monitor and audit the project. Incentives built into contracts can also play an important role in maximizing efficiency.

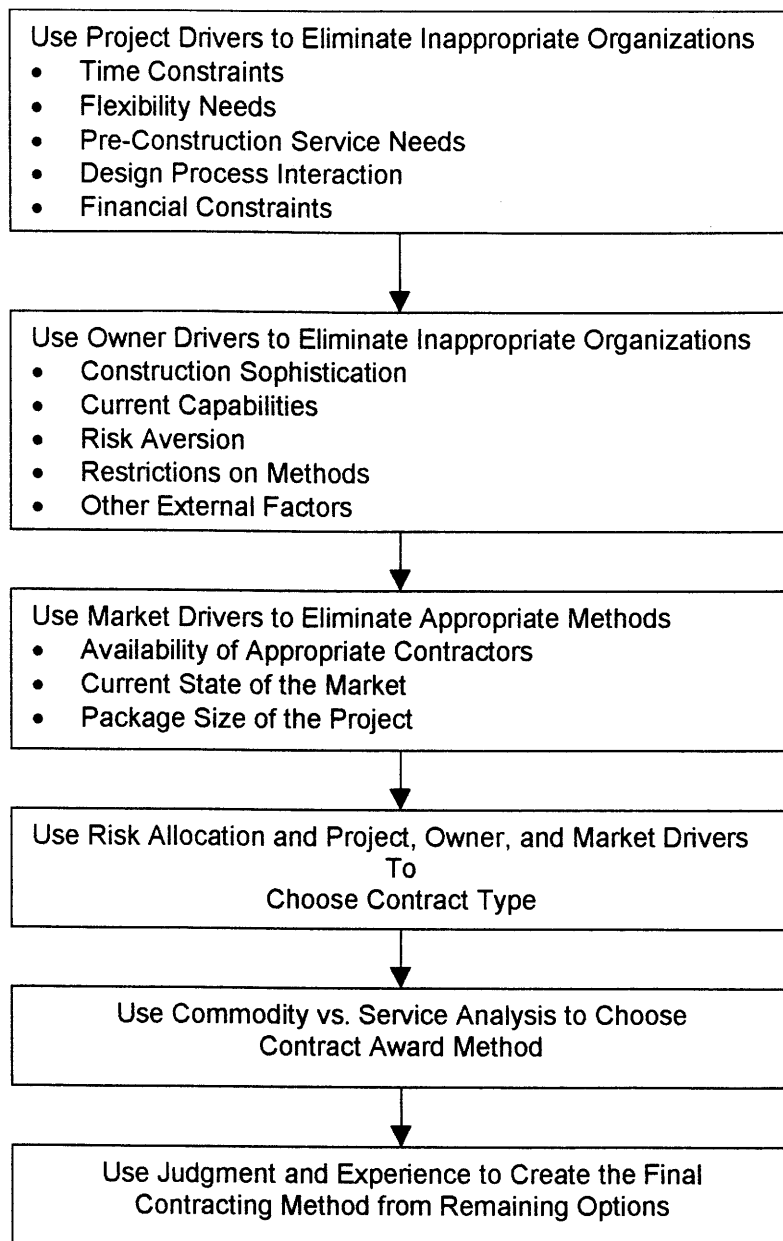
#### 1.1.3.3.3 Award

The issue here is the perception of construction as service or commodity. Construction can be either or both, with the nature of the project determining the most appropriate description. The key to determining a successful award method is isolating the two types of products—commodities and services—and awarding each in an appropriate way; *commodities should be awarded with bidding, while services, if needed, should be awarded with multiparameter bidding or negotiation, both of which value contractors' qualifications.*

Owners should also be aware of restrictions on award method. These include minority and small business goals or requirements, a minimum percentage of work to be done by the contractor's own forces, prevailing wage rules and local resident hiring rules.

#### 1.1.3.4 Conclusion

A careful selection of contracting method can produce cost savings for owners, designers and contractors, and a much more harmonious construction process. Figure 7 illustrates Gordon's method for selection.



**Figure 7 Method Selection Flowchart**

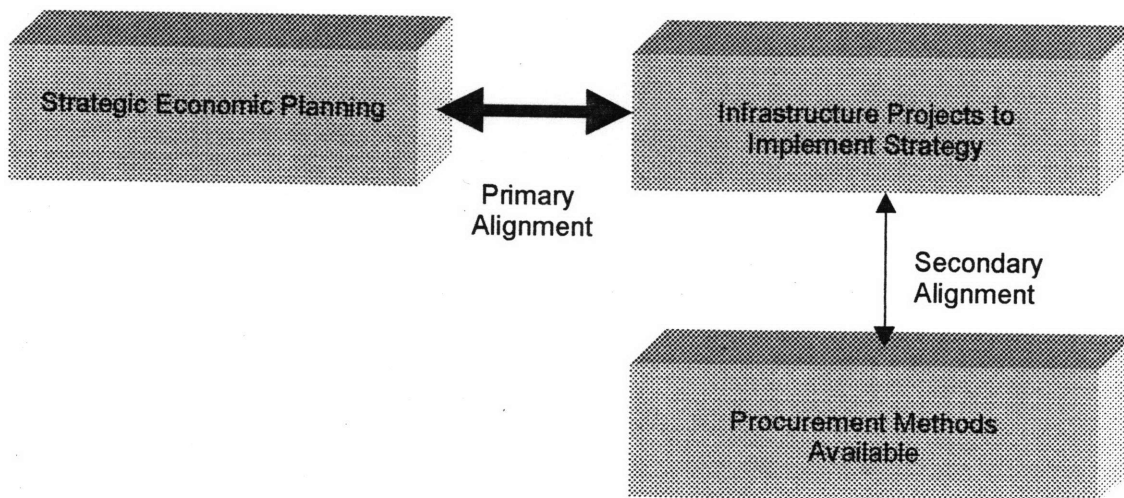
1.2 Examples of alternative strategies by government

The following sections describe the experiences of several government entities in procuring facilities infrastructure. Each case study offers a set of considerations either directly or indirectly transferable to the SUBASENLON environment.

### 1.2.1 Hong Kong

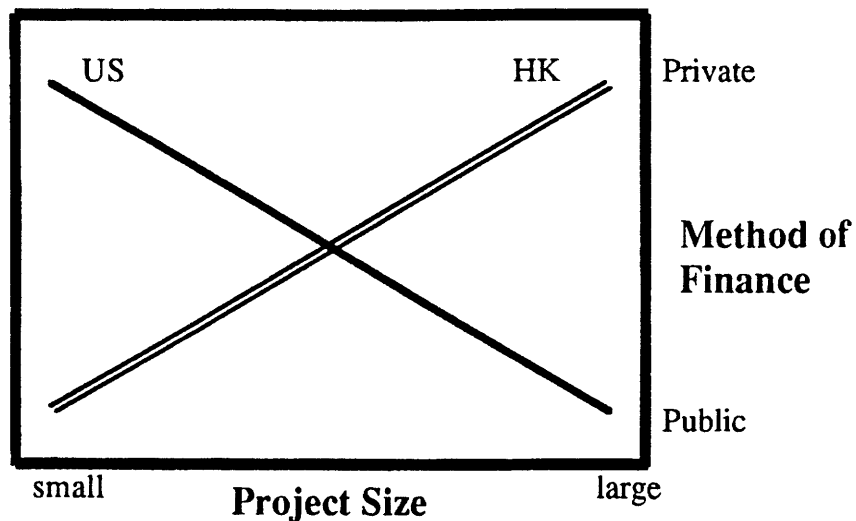
Hong Kong offers an interesting look at infrastructure procurement philosophy, and there are many lessons that can be learned from that country's success. Although SUBASENLON has no requirement for what would commonly be called a "major" infrastructure project, the Hong Kong model offers some insights to Navy planners. Miller studied 80 major infrastructure projects procured by the government of Hong Kong since 1984. He found a completely different philosophy regarding the role of government in delivering infrastructure than that presently at work in the United States.

In Hong Kong, infrastructure development and improvement is assumed to be a necessary catalyst for economic development. During the past thirty years Hong Kong has implemented an evolving "strategic plan" for infrastructure, which is aimed at achieving an integrated whole; economic goals were meshed with infrastructure requirements resulting in a synergistic process of development. The process looked out at the current and potential roles of Hong Kong in its environment, South China and the Far East.



**Figure 8 Hong Kong Infrastructure Process Alignment**

In an interesting contrast with recent U. S. federal government infrastructure philosophy, the Hong Kong government prefers to directly fund projects which require only modest financial commitment. Larger projects are sent to the private sector for financing. Government is presumed less efficient than the private sector, and by using the strategy shown in figure 2, the projects can be tested in private capital markets (i. e. multiple private sector bids can confirm the wisdom of the expenditure.)



**Figure 9 Trends in Infrastructure Finance (US and HK)**

A third key component of Hong Kong's infrastructure strategy is the approach to competition, which is different from that taken in the United States in at least three important ways. It is introduced later in project development, after conceptual design. Competition is conducted on a broader basis, and includes completion of design, value-engineering, construction, commissioning, warranty repair. It can also include operations and maintenance for the useful life of the facility, financing and risks associated with revenue. Also,

“competition is used in Hong Kong to obtain the best value to the government: that is high quality facilities at the earliest possible time for the least overall project cycle cost.”

In Hong Kong, use of Build-Operate-Transfer (BOT), Design-Build-Operate (DBO), and Design-Build (DB) delivery methods has substantially reduced procurement time while maintaining or improving quality.

## 1.2.2 Canada

### 1.2.2.1 Northumberland

The Northumberland Strait Bridge, connecting Prince Edward Island (PEI) with New Brunswick (NB), Canada, was a project initiated by Public Works and Government Services Canada in 1986. The goals of this BOT project were well defined at the start, with particular attention paid to financial and risk considerations. The approach adopted by the government will serve as a model for other government agencies worldwide.

The idea for creating a fixed crossing over the strait is over 100 years old. A ferry service has been operating between PEI and NB as a provision of the establishment of the Canadian confederation since 1873. Government expenditure on this service had been rather unpredictable and steadily increasing throughout its life. In 1992 the government spent C\$42 Million subsidizing these ferry operations, a rate which was rising at a rate 15%-20% higher than inflation. Another important issue was the stagnation of economic conditions on PEI as a result of having only ferry service; trucks importing goods were constrained by ferry operating windows and the shelf life of the products themselves. Establishment of a fixed link would provide more flexibility for the import and export of goods to the island, as well as have a positive effect on tourism.

In 1986 the government began a BOT process, inviting the private sector to contribute design, construction, financing and operations for a fixed crossing, in exchange for a government commitment to contribute C\$42 Million per year for the 35-year term of the agreement. Preliminary engineering studies indicated that between C\$700M and C\$1B would be required to construct a bridge. Very early in the procurement process, the Public Works and Government Services Department conducted detailed financial analysis to determine the likely bond discount rate necessary to finance the project in the private sector. Only after this analysis was complete and private sector financing determined to be viable, did the procurement move forward. Thus, government and private financing contributions were known quantities before the process was mature and the government had taken irreversible actions.

The procurement was conducted in three stages. The Stage I invitation process resulted in seven proposals, six for a bridge and one for a tunnel. In Stage II, the proposals were technically analyzed against the advertised evaluation criteria, which were aimed at assessing the capabilities of the proposers. Three shortlisted proposals were evaluated for financial strength in Stage III, resulting in selection of Strait Crossing Development, Inc. (SCDI) as the chosen franchisee/developer.

The contract made provisions for fare increases scaled to inflation. It included potential increases in maintenance costs as well. No guarantees were made regarding numbers of users, but an essential part of the deal was a promise by the government to discontinue ferry operations once the bridge was operational. The government encouraged timely completion by stipulating that the successful franchisee would be required to operate the ferry service from the scheduled construction completion date until actual construction completion; liquidated

damages, per se, were not included. Cash flow distribution precedence was mandated to preserve the interests of the government and investors; reserve funds were established to ensure appropriate levels of maintenance, and equity contributions to the joint venture were to be distributed last. There was no arbitrary limit placed on the developer's rate of return.

This type of procurement process was new to the Canadian government, and should be a model for consideration by U. S. government agencies. The government set a simple goal, planned well, made guarantees only where absolutely necessary and set up the procurement to deal with risk and reward appropriately. As we will see later in this paper, government is not always so adroit.

#### 1.2.2.2 Hwy 407

The goals of the Canadian government for this BOT toll road development project around Toronto, Ontario, were not as well conceived as in the Northumberland project. The government's goals, as stated in the Request for Proposal (RFP), were:

- Faster and cheaper delivery of the road
- Minimum financial government commitment
- Fair price, good quality for user
- Utilize a strategic partnership
- Provide public policy flexibility (e. g. HOV, etc.)
- Equity contribution by the developer

Unfortunately, the procurement was not conducted so as to achieve the stated goals. The government placed all risk on the developer, specifically reserving the right to modify the local highway system as it chose (which removed the

developer's exclusive rights to the route.) Predicted traffic volumes were provided in the specifications, and were required to be used in the financial proposals, but the government did not guarantee their accuracy. The government never conducted financial planning, so it did not know how much the highway would or should cost. Nor was the developer given a tax exemption for use in obtaining bonds to finance the project. Developer equity was not an evaluation criterion. The developer was asked to propose a method by which it would be regulated by the government, and also to provide revenue sharing with the government in case of early construction completion. The developers were to provide irrevocable, 90-day guaranteed proposals, but the Crown could alter, cancel or accept only certain portions of any proposal.

Given the incoherence of the RFP, it is no wonder that the government found the proposed costs of development to be higher than if the project were government financed. The RFP was revoked, the requirements unbundled (i. e., design, construction and operations were separated), and the government financed the entire project. Few of the government's original goals were achieved.

### 1.2.3 U. S. Water

Water may be the most critical of human needs. Even in today's modern world, three out of four people on the planet do not have a water supply that meets U. S. EPA quality standards. One in five Americans drinks water contaminated with heavy metals. Water borne disease is the leading cause of death in the world. It is little wonder that governments want to control the quantity and quality of the water supply. Water is one of the most public commodities.<sup>6</sup>

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<sup>6</sup> Robert Joseph, Wheelabrator EOS, class lecture at MIT, February 26, 1997.



The U. S. EPA funded \$60B in water related construction in the 1970's, providing 75% of the necessary funds, while states funded 15% and municipalities picked up only 10%. Despite the expenditures, which were anticipated to solve the problem, the present need is \$137B. Where will the money come from?

However, water and wastewater treatment need not be the sole property of government. While the enforcement of government water regulations is likely to always be a government function, operations need not be. In the long term, it appears that a partnership between government and industry, with government providing the policing function and the private sector providing new technology and profit driven efficiency, may be successful. Along with the infusion of private dollars, such partnerships can help communities meet new clean water regulations, while encouraging long term environmental compliance through firm deadlines specified in contracts.

President Bush's Executive Order 12803, of 1992, provides for public-private partnerships, resulting in the following advantages for municipalities:

- Scheduled capital investments
- Off-balance-sheet financing of expansions and upgrades
- Guaranteed user rates
- Private activity bond financing for future expansion
- Expansion of a community's debt capacity

In large U. S. cities like Atlanta, San Diego, Seattle, Phoenix, and Buffalo, as well as smaller ones like Wilmington, Delaware and Cranston, Rhode Island, governments are seeking such arrangements through procurement contracts often referred to as "partnerships." Private firms are promising lower user rates and modern management methods to those municipalities facing aging infrastructures,

shrinking budgets and tight water regulations. Transferring operational responsibilities of these plants to private environmental firms in a few cities has freed up municipal funds for other urgent needs. Industry forecasters predict that by 2020 municipalities will have outsourced about 50% of their water and wastewater operations.<sup>7</sup>

### 1.2.3.1 Indianapolis

The mayor of Indianapolis, The Honorable Stephen Goldsmith, has a reputation for being an innovator in managing government.<sup>8</sup> His efforts as mayor were on reducing government spending, cutting bureaucracy, limiting taxes, and reducing counter-productive regulations, while improving the quality of services to residents with more innovative, responsive programs. In 1993, he ordered a study by the city's Public Works Department to look into contracting the operations of wastewater treatment in the city. A consultant was hired and given the following mandate: 1) establish a baseline and 20 year projection for the revenues and expenditures of the facilities; 2) determine the value of the existing assets; and 3) define alternatives to generate new revenue for wastewater capital improvements such as sale, lease, public/private venture or expanded service. The consultants considered the following arrangements:

- Enhanced City Ownership and Operation
- Contract Operation with continued City Ownership
- Establishment of an Independent Authority
- Establishment of a Not-for-Profit Corporation
- Sale or Lease with an Operating Contract for Service
- Establishment of an Investor-Owned Utility

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<sup>7</sup> "Public Water in Private Hands," Civil Engineering, p. 49, January 1997.

Based upon the consultant's assessment, Mayor Goldsmith's staff concluded that a contract operation with continued city ownership was the best option. They decided to advertise the operations contract with the maximum five years allowable by Federal law. (Longer leases are legal, but tax-exempt financing is lost.) Executive Order #12803 reduces federal barriers to sale or long-term lease by state and local governments of infrastructure facilities funded in part by federal grants. This order is aimed at giving flexibility to governments for facilities investments, and may be considered an outgrowth of present fiscal realities.

The solicitation took only six months, and nine proposals were received. They were evaluated using the following criteria: financial strength of the proposal based on Net Present Value; technical abilities; experience; and specific additional proposals. Technical risk was evaluated on a subjective point-scale, while the NPV analysis was objective, allowing the subjective and objective results to be evaluated side-by-side; the cost of a set of intangible benefits could therefore be determined. The city had already evaluated the status quo alternative, and therefore had a measurement tool for judging success of the competition. The decision making process developed by Indianapolis was thoughtful and well developed. The city followed the blueprint for competition quickly but deliberately, never returning to a previous decision point based upon contents of any proposal.

#### 1.2.3.2 Charlotte

When a government considers outsourcing or privatization of an existing

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<sup>8</sup> Miller, John and Hansen, Maia. "Indianapolis Waste Water Treatment Works," Case study for Public Infrastructure Development Systems, Massachusetts Institute of Technology, 1997.

function, job retention by public servants is always a key issue.<sup>9</sup> In Charlotte, North Carolina this political reality allowed a consortium of government employees to compete for their own jobs with the private sector. As opposed to the Indianapolis project, where the decision to privatize was made in the beginning of the procurement, Charlotte planners developed a public/private competition. The employees of the Charlotte Mecklenburg Utilities Department (CMUD) would be allowed to compete for the operations and maintenance of two wastewater treatment facilities.

Wheelabrator EOS, of Hampton, New Hampshire, proposed in early 1995 to buy one of three major wastewater treatment facilities in Mecklenburg County. Executive Order 12803 had made the sale of municipal infrastructure to a private company simpler and less costly. In analyzing Wheelabrator's proposal, the city came up with a list of reasons to privatize: 1) the inability to raise capital easily, especially in small cities; 2) financial crises in large cities; and 3) labor union problems. While these reasons are certainly not comprehensive, they provided the basis for rejection of the unsolicited proposal. I would suggest at least three other reasons to consider privatization: 1) improve operational efficiency; 2) trade uncertain and fluctuating expenses for guaranteed contract expenses to allow for better planning; 3) shrink government by allowing the private sector to provide public goods if it can.

The city remained, however, interested in the idea of competition for operations and maintenance of their water and wastewater systems. They had even established a taskforce, called the "Competition / Privatization Advisory Committee,"

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<sup>9</sup> Miller, John and Hansen, Maia. "Managed Public/Private Competition for Waste Water Treatment Works," Case study for Public Infrastructure Development Systems, Massachusetts Institute of Technology, 1997.

to identify potential for competition in government functions. The advisory committee defined its main goals for competition:

- To determine the most cost effective contractor
- To establish a level playing field between private and public proposers
- To allow for meaningful proposer input
- To develop and utilize objective evaluation criteria
- To involve Citizen Advisory Boards as a resource

A detailed analysis of these goals is not necessary to understand that these are process based, rather than outcome based, goals. Competition is not used here as a tool, but as an end product.

Highlights of the bidding process included:

- CMUD acted as bidder and evaluator of bids. Even though an imaginary wall was erected between the two groups, this created a specter of unfairness
- The bidding team for CMUD developed a 10-month optimization project to bring itself in line with operations at privately operated plants, prior to bid submission. Private competitors therefore did not know what they were competing for; which functions in the plant were necessary and which weren't.
- No contract would be required if CMUD won the competition; they would be held to a "Memorandum of Understanding" only.
- CMUD was not held to the same insurance requirements of the private sector competitors.
- CMUD overhead was impossible to quantify accurately.
- Evaluation criteria and differences between them for CMUD and private proposers were never discussed in detail.

Some proposers felt this competition was not conducted on a level playing field, and they would not compete again under the same circumstances. Charlotte did not seem to draw a baseline before competition to be able to judge the outcome of the competition. In the end, they used the private sector to spur the government employees to develop their most efficient organization.

#### 1.2.4 U. S. Roads

##### 1.2.4.1 AB680 and Washington State toll roads

In the mid-1980s the state of California faced a problem that has become commonplace in the United States in the last two decades.<sup>10</sup> Rapid immigration into the state from other countries and a westward movement of the American population had resulted in the burgeoning growth of civil infrastructure. Even with intense investment, state and local capital budgets could not keep pace with new construction and maintenance needs of the highway system in particular. The legislature could no longer afford to fund road transportation using gasoline taxes, registration fees and federal aid alone. The political landscape was making the idea of additional taxes more unpalatable to Californians than almost any other group in this country. Sustainable financing methods were hotly debated in the late eighties, with bond authorizations, real estate impact fees and sales taxes being at the forefront of the discussion.

In 1988, Bob Poole, of the Reason Foundation, proposed that the private sector be allowed to build toll roads primarily to ease congestion in the metropolitan areas around the state. If citizens would not allow the government to finance roads

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<sup>10</sup> Miller, John and Agarwal, Om. "The Santa Ana Viaduct Express (SAVE)," Case study for Public Infrastructure Development Systems, Massachusetts Institute of Technology, 1997.

directly, maybe they could stomach user fees in the form of tolls. The California Department of Transportation (Caltrans) and numerous other California groups backed the idea, and in 1989 Assembly Bill 680 (AB 680) was enacted. It allowed Caltrans to solicit proposals and enter agreements with private entities for the construction, lease, and operation of up to four demonstration projects.

Certain elements of AB 680 are germane to this paper. Probably the most important of these is that Caltrans did not define which projects would be developed, the proposers did; although Caltrans shared its database of needed road projects with the private sector, there was no explicit definition of what constituted an acceptable project. One of the criteria for acceptable proposals was zero investment by the state, requiring each project to be financially self-sufficient. Legislators did not explicitly state goals for the project; details of the agreements were left in the hands of administrators, Caltrans in this case. The solicitation process required pre-qualification by submission of "conceptual proposals", the proposers being judged on experience, financial strength, ability to work cooperatively with government agencies and the public, personnel qualifications, management approach, and familiarity with electronic toll collection systems. Selection was based on the following criteria, and point totals were assigned to each criterion as if they could be measured objectively:

- Transportation service provided as a result of the proposal
- Degree to which proposal encourages economic prosperity and makes overall good business sense
- Degree of local support for proposal
- Relative ease of implementation
- Relative experience on similar projects

- Degree to which state environmental and energy goals are supported
- Degree to which non toll revenues support proposal costs
- Degree of technical innovation
- Degree of proposal's support for achieving the civil rights objectives of the State regarding utilization of Minority and Women Owned Business Enterprise

It is interesting to note that many of the listed criteria were judged based upon the project chosen rather than the technical merit of the proposal itself. Direct competition between developers on a single project was obtained only once under this legislation. The other three projects were selected based upon a single proposal. The state did not decide up front which of its projects would be most successful under this system of solicitation. It depended on the developers to determine scope, and it judged proposals on an incoherent list of criteria, many of which had nothing to do with the inferred objectives of the legislation.

A similar effort was undertaken recently in Washington State, in which six projects were accepted by the state DOT. Only one of the six is still in progress, the other five having been abandoned for various reasons. The type of legislation enacted in California and Washington is indicative of the current nature of infrastructure development. Government does not have the money to construct, operate and maintain needed infrastructure, and it has turned to the private sector for financing. Unfortunately, in these two examples, state governments have deferred far more than just the financing to the private sector. Planning activities usually conducted by government regarding project choice, scope, competition and public acceptance have been left to developers. Therefore, "success" of the demonstration project solicitation process cannot be measured.



The key to the type of privatization efforts shown above is to find the balance between minimum defined criteria and minimum amorphous subjective criteria to leave a window for developers to innovate and be creative.

#### 1.2.5 U. S. Multi-modal

The Massachusetts Port Authority (Massport) owns and operates an array of land areas in the Boston region, most of which is transportation related. These include Logan Airport, Hanscom Air Field, the fish piers and several parcels of land in South Boston, and the Tobin Toll Bridge. Massport is a quasi-government agency that is bound by many of the regulations (procurement for instance) other government agencies must adhere to. But it is not publicly funded; it is self-sustaining. Even with cumbersome facility acquisition regulations, Massport is innovative in its approach to projects.

##### 1.2.5.1 Woburn

The Regional Transportation Center (RTC), in suburban Woburn, MA, is being constructed as a combination shuttle and train stop.<sup>11</sup> The RTC is just northwest of the junction of routes I-95 and I-93, and is immediately adjacent to the North-South Amtrak/Commuter Rail Line from Boston. The Massachusetts Highway Department (MHD) plans to construct a new interchange directly linking the RTC to I-93. Other key elements of the center include a new commuter rail station with parking, a Massport Logan Express Bus terminal and parking, and an MHD park and ride facility. On top of, or beneath if you prefer, all that is the Industri-Plex Superfund site, which has lain dormant for well over a decade pending resolution of clean-up

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<sup>11</sup> Miller, John B., *Engineering Systems Integration for Civil Engineering Infrastructure Projects*, Journal of Management in Engineering, ASCE, Sep/Oct 1997 (In Press).

issues. Massport purchased the land for \$1 and was granted a waiver from federal Superfund law such that it could never be named a responsible party for environmental cleanup.

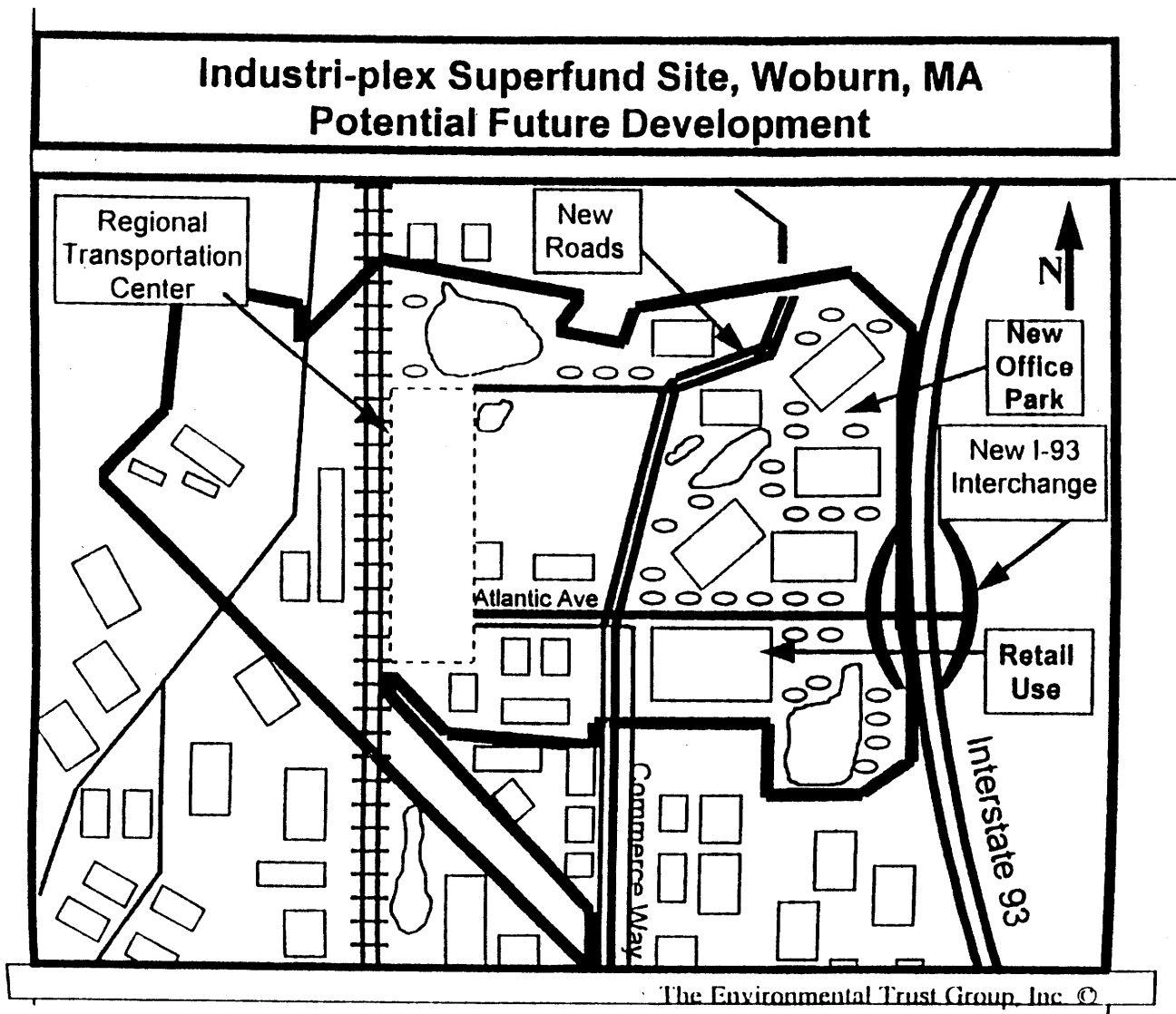
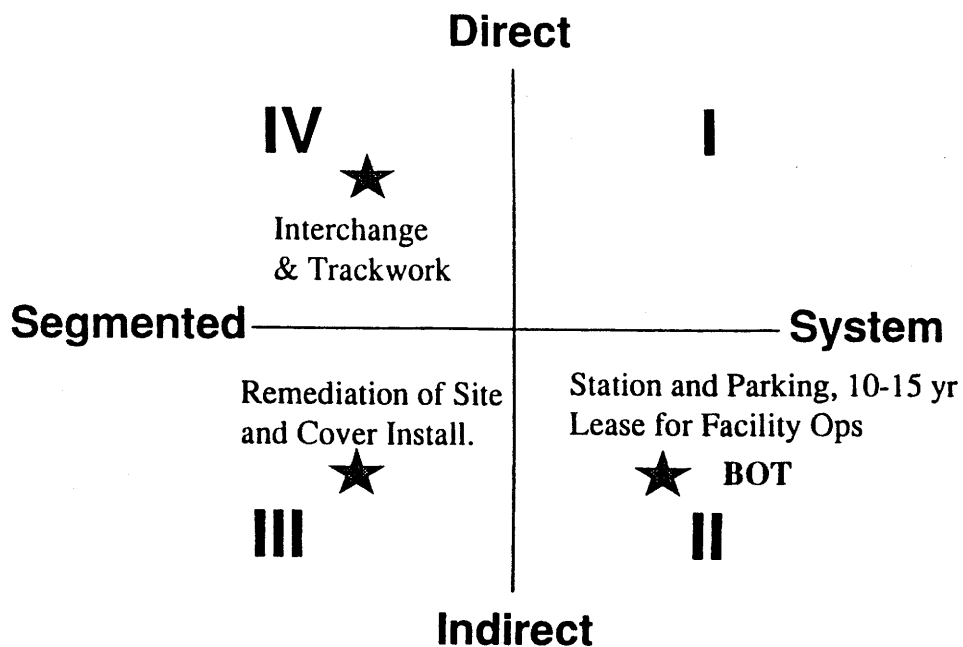


Figure 10 Schematic View of RTC site

Massport could not count on federal or state funds to finance this series of projects, but it took the overall lead among the three agencies involved. Private investment was sought and a portfolio management drill followed. The site was just south of what might become prime commercial development real estate. Massport investigated many different combinations for procurement of the projects, at least two of which looked like Figure 11. One very similar to this was selected.



**Figure 11 BOT Provision of RTC**

### 1.3 Construction Industry Transformation

Bechtel Corporation is one of the foremost infrastructure construction and development firms in the world. It has observed the changing nature of the industry and is conforming its management structure to compete. The perception within Bechtel is that government legislation is providing a wider aperture to allow private participation in public infrastructure development.<sup>12</sup> Change in the construction sector is allowing this legislative trend.

Construction has always been a flow down project business, where owners determine project objectives and scope, let designers design, builders build, and operators operate. Traditionally, the owner has been responsible for financing. The following list of the new roles of industry players illustrates the change taking place in

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<sup>12</sup> Lillywhite, Jack, Vice President, Bechtel Corporation. Lecture at Massachusetts Institute of Technology, March 1997.

construction:

- Contractors are Operators—Bechtel Enterprises; Dragados (Spain toll roads)
- Owners are Engineers—Duke Power
- Engineers are Owners—Parsons Brinkerhoff (CA SR 125 toll project)
- Contractors are Banks—Bechtel
- Suppliers are Operators—Adtranz; Daimmler Benz; ABB

Relationships are becoming dynamic and flexible, and owners now have a wider range of contract vehicles and sources of expertise.

Lillywhite cites the Lump Sum Turnkey (LSTK) delivery method as being a catalyst for change in the industry relationships. It is more risky, requires substantial up front investment and intense management attention. Some types (including BOT) also require long term financing and operations capability. Development costs become part of contractor construction costs. Letters of credit and performance guarantees (based on liquid assets) now provide a cheaper alternative to surety bonds for large contractors. A new paradigm has been created in the wake of LSTK.

Lillywhite suggests that the construction industry of the early twenty first century will see continuing change. More capital will be available; profit and risk will make the U. S. popular for international contractors; strategic consortia seeking LSTK work will continue to form; further allocation of market and revenue risk will be shifted to contractors. Markets ripe for private sector investment will be: municipal and state services; transportation; leisure, entertainment and theme parks; operations and maintenance contract services; education and public safety. In order to compete, U. S. construction contractors must: make people number one; recruit, train and retain quality personnel; operate smarter and cheaper; be innovative and

financially savvy.

## Chapter 2

### CASE STUDY: SUBBASE NEW LONDON

#### 2.1 History/Geography

The Naval Submarine Base New London lies within the two Connecticut townships of Ledyard and Groton, on the Atlantic seacoast approximately midway between New York and Boston. The base began as a Navy Yard in 1872 on 112 acres of land presented to the Navy by the State of Connecticut in an effort to help the Navy transition from sail to steam. The facility at New London served as a naval shipyard that held five ships including two Civil War ships. In 1875 it became a coaling station and a new T-shaped wharf was constructed. Prior to World War I it remained practically inactive and was slated for disposal in the Navy Appropriations Bill of 1912. Only an impassioned speech by Edwin Higgins of Norwich, Connecticut saved the site for future growth of the Navy. In 1916, the Naval Yard New London became Naval Submarine Base New London.<sup>13</sup>

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<sup>13</sup> Naval Submarine Base New London, Unofficial Directory, MARCOA Publishing, Inc., San Diego, CA, 1996.

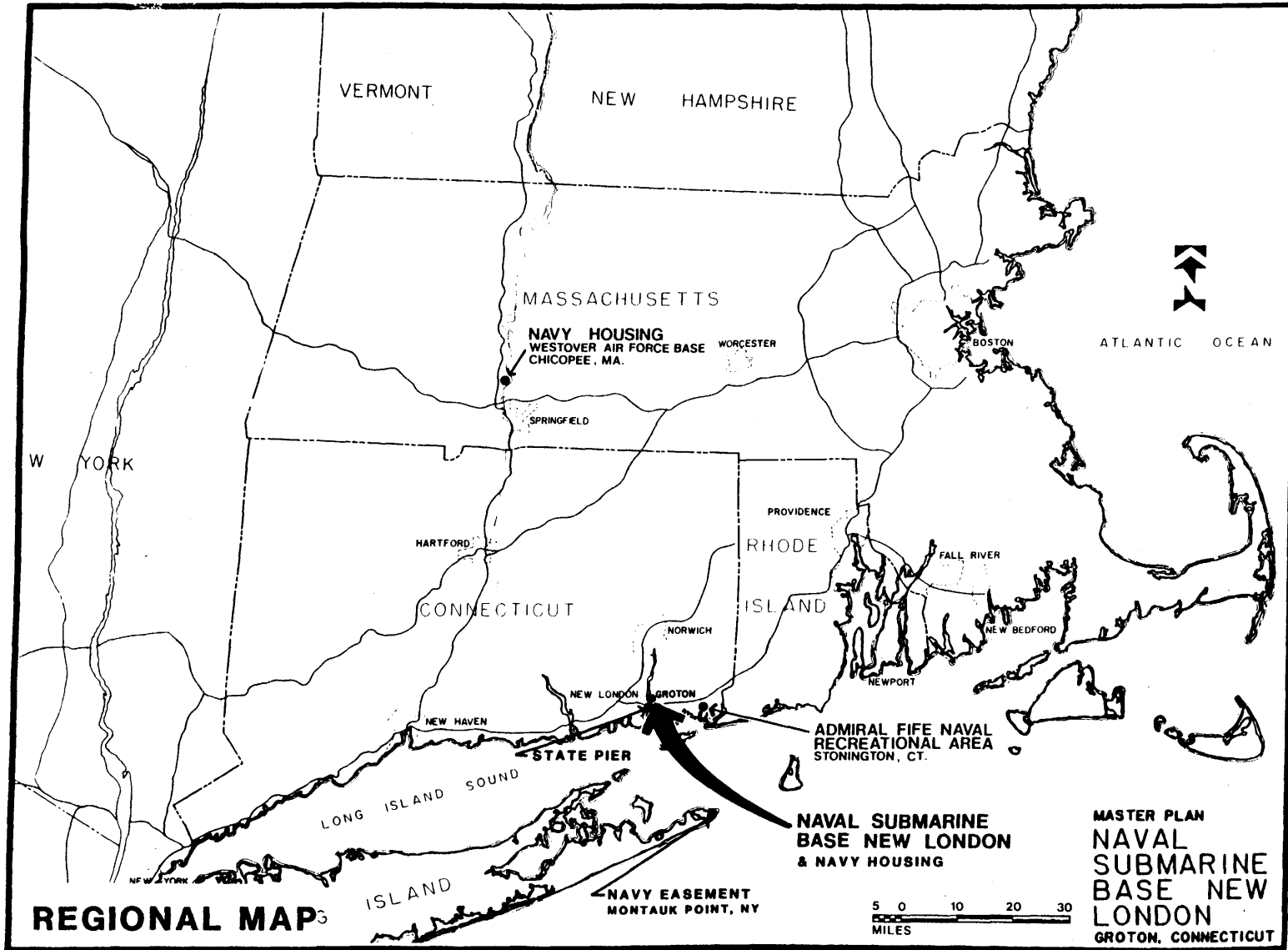


Figure 12 Regional Map



America's entry into World War I caused facilities at the base to be greatly expanded. Between October 1917 and October 1918, 81 buildings were either completed or under construction, 6 piers were added, and the T-pier removed. In 1917, the Submarine School was established and over 10,000 sailors and officers were trained for duty in America's Silent Service during the war. In 1918, the Naval Hospital was activated as a dispensary. During the 1920's and 30's, the base activity slowed considerably, but during that time much was learned about submarine rescue operations and the Submarine School curriculum expanded to include this new knowledge. During the Great Depression, the base encountered a surge of facilities growth as the base became involved in the Works Progress Administration (WPA) program to create jobs, and 26 new buildings were constructed. World War II saw the construction of almost 200 additional buildings, and the base expanded from 112 to 497 acres.<sup>14</sup>

The Submarine Base, including all non-contiguous areas, encompasses 1,412 acres of land. The main base area of 547 acres is used principally for operational and direct support facilities while the remaining areas are used for housing and community support. The base is comprised of approximately 1,583 structures, 1300 of which are family housing, containing over 5.8 million square feet of floor space, and 14 piers with the capability of providing adequate berthing and support for assigned submarines plus numerous other support craft.<sup>15</sup>

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<sup>14</sup> Submarine Base New London Master Plan, Naval Facilities Engineering Command, Department of the Navy, Chief of Naval Operations, Washington, DC, p. 4-43, 1987.

<sup>15</sup> Submarine Base New London Master Plan, Naval Facilities Engineering Command, Department of the Navy, Chief of Naval Operations, Washington, DC, p. 8-1, 1987.

### 2.1.1 Mission & functions

The mission of the submarine base is to support the operational needs of 23 Atlantic Fleet submarines, and to support the administrative and quality of life requirements of military and civilian employees of the base and their families. Core mission subcategories include:

- Training
- Boat maintenance
- Fleet Operations

Core mission support is divided into:

- Community support
- Medical
- Supply
- Housing

For the purposes of facilities planning, the base infrastructure is categorized by functional area, each area being an important part of base mission accomplishment. The functional areas, called investment categories in military facilities parlance, are shown in Figure 13. The investment categories are further subdivided into category codes.<sup>16</sup>

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<sup>16</sup> Chief of Naval Operations Instruction 11010.23C, March 1976.

- 01 Aviation Operation Facilities
- 02 Communication Operation Facilities
- 03 Waterfront Operation Facilities
- 04 Other Operation Facilities
- 05 Training Facilities
- 06 Aviation Maintenance & Production
- 07 Shipyard Maintenance & Production
- 08 Other Maintenance & Production
- 09 Research, Development, Test & Evaluation (RDT&E)
- 10 POL Supply/Storage
- 11 Ammunition Supply/Storage
- 12 Other Supply/Storage
- 13 Medical
- 14 Administrative
- 15 Troop Housing/Messing
- 16 Other Personnel Support/Services
- 17 Utilities
- 18 Real Estate & Ground Structure

### **Figure 13 Investment Categories**

#### 2.1.2 Facilities summary

##### 2.1.2.1 Operational and Training Facilities

The majority of the operational and training facilities are adequate.<sup>17</sup> Most of the piers are in good condition, however piers 2, 6, and 31 require upgrades, and piers 1 and 4 require replacement. Several piers are too narrow or have inadequate structural support to allow the use of large cranes on them, hampering repair efforts.

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<sup>17</sup> Master Plan, Naval Submarine Base New London, 1987.

#### 2.1.2.2 Maintenance Facilities

Shop maintenance facilities number 26 buildings, of which 21 were constructed prior to 1945. About half of the buildings are inadequate for their present use.

#### 2.1.2.3 Research, Development, Testing & Evaluation

These four buildings are considered adequate.

#### 2.1.2.4 Supply Facilities

There are 15 supply buildings, most of which were built before World War II. Less than a third of them need major renovation. The base has over 20,000 SF of magazine storage space for high explosives.

#### 2.1.2.5 Medical Facilities

The dental clinic occupies 12,946 SF, and the medical facilities are located in five buildings with almost 150,000 SF. The facilities are considered adequate with some substandard storage areas.

#### 2.1.2.6 Administrative Facilities

Administrative functions are conducted in 17 buildings totaling over 300,000 SF.

#### 2.1.2.7 Housing and Community Facilities

There are 13 barracks buildings with a capacity of about 4500 enlisted personnel. The enlisted dining facility can accommodate 2,000. There is space in three other buildings to billet just over 100 transient officers. A public private venture in the early 1990's resulted in construction of a Susse Chalet hotel across the street

from the Bachelor Officers Quarters (BOQ) with space for another 130 personnel (this building is operated and maintained by the hotel company.)

SUBASE maintains a full compliment of support facilities including a fire station, police station, child day care center, chapel and post office. These buildings are in various states of repair, most of which accommodate the intended use; however, the child care center is not large enough for the current demand. Other community support facilities include the commissary, Navy exchange, thrift shop, bowling alley, golf course, ball fields, gymnasium, indoor pool, hobby shop and theater. The vast majority of these facilities are adequate, although not modern. The five housing areas are located off base, but within three miles of the main gate. The average age of the 1300 units is just over 30 years. At any given time, at least one group of housing units is in need of rehabilitation or repair.

#### 2.1.2.8 Map

Figure 14 is a base map, giving the reader a guide to use in following the facilities discussion.

**BLDG. ACTIVITY**

- 1 Commander Submarine Group TWO
- 2 Fleet Recreation Coordinator
- 3 Commander Submarine Development Squadron TWELVE
- 16 Lower Base Exchange and Cafeteria
- 17 SERVMART
- 29 Transportation Office
- 80 Commander Submarine Squadron TWO
- 83 Personnel Support Detachment, ID Cards, Family Service Center, Welcome Aboard Center, Retired Affairs, Red Cross, SATO, Continuing Education, Military Personnel Department
- 84 Naval Submarine School Administrative Offices
- 86 Naval Undersea Medical Institute
- 87 Supply Department
- 88 Ballou Hall (Submarine School Training Facility)
- 89 Commanding Officer, Naval Submarine Support Facility, New London CAAC/NADSAP
- 96 Naval Investigative Service
- 108 Navy Exchange Uniform Shop, Laundry
- 120 Swimming Pool
- 135 Public Works Department
- 137 Housing, Housing Referral, Personal Property, Naval Legal Service Office, Public Affairs Office, The DOLPHIN Newspaper, SUBASE, NILON Administration Services
- 138 Commanding Officer, Naval Submarine Base, New London, Comptroller, Staff Judge Advocate, Civilian Personnel, Security (Auto decals/contractor passes), Base Telecommunications and EEO
- 148 Naval Submarine Medical Research Laboratory

**BLDG. ACTIVITY**

- 152 Pennington Hall (Submarine School Training Facility)
- 154 Dispensary (Military Sick Call)
- 164 Dealey Center — Movie Theater, Credit Union, Bank, Burger King, Library, Newsstand, Recreational Services Offices, ITT, Chaplains' Office, Post Office, Dockside Mail, Barber Shop, NAF Personnel Office
- 166 Correctional Custody Unit
- 168 Chapel on the Thames
- 169 Morton Hall Gymnasium
- 223 Tavern by the Green
- 341 Branch Dental Clinic
- 426 Cromwell Hall (Submarine School Training Facility)
- 427 English Hall (Submarine School Training Facility)
- 428 Navy Exchange Gasoline Station
- 437 Fife Hall (Submarine School Training Facility)
- 439 Submarine Group TWO (Grenfell Hall)
- 440 Enlisted Mess (OPEN), D'Allesandro Hall
- 446 Cross Hall (The Dolph-Inn, Galley)
- 449 Naval Hospital
- 451 Construction Battalion Unit 414
- 460 Hobby Shop and Garage
- 461 Equipment Rental, Package Store and Redemption Center
- 462 Security Force Department (Police, Traffic Court, Security Manager)
- 465 Vahsen Hall (Submarine School Training Facility)
- 474 Lewis Hall (Submarine School Training Facility)

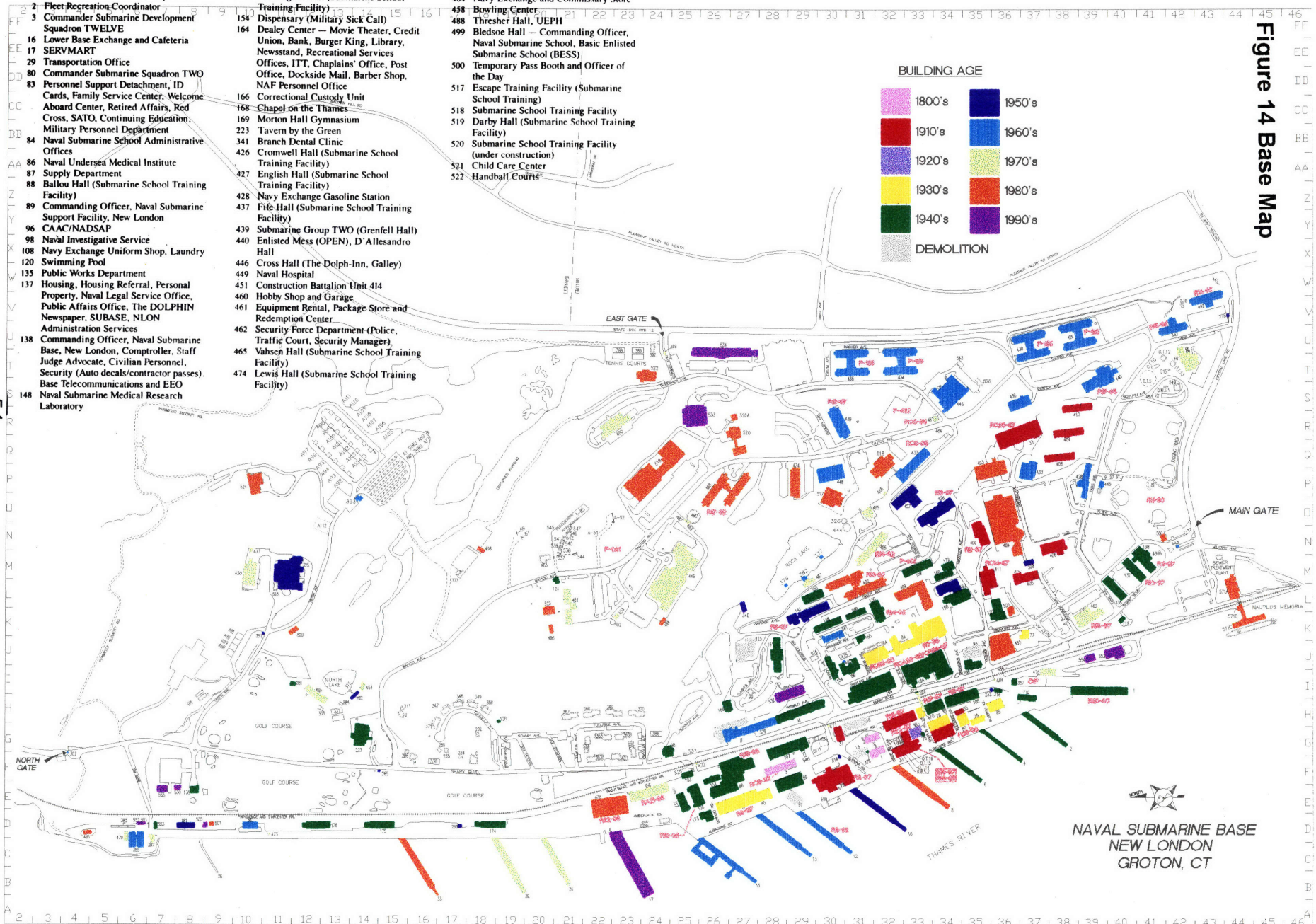
**BLDG. ACTIVITY**

- 484 Navy Exchange and Commissary Store
- 488 Bowling Center
- 488 Thresher Hall, UEPH
- 499 Bledsoe Hall — Commanding Officer, Naval Submarine School, Basic Enlisted Submarine School (BESS)
- 500 Temporary Pass Booth and Officer of the Day
- 517 Escape Training Facility (Submarine School Training)
- 518 Submarine School Training Facility
- 519 Darby Hall (Submarine School Training Facility)
- 520 Submarine School Training Facility (under construction)
- 521 Child Care Center
- 522 Handball Courts

**BUILDING AGE**

	1800's		1950's
	1910's		1960's
	1920's		1970's
	1930's		1980's
	1940's		1990's
	DEMOLITION		

**Figure 14 Base Map**



  
**NAVAL SUBMARINE BASE**  
**NEW LONDON**  
**GROTON, CT**

## 2.1.3 Facilities Statistics

### 2.1.3.1 Facilities portion of base budget

The FY97 budget for SUBASE, allotted to the base by the Commander-in-Chief, U. S. Atlantic Fleet (CLF), the major claimant, is \$38.5M. These funds are from the O&MN account, and are earmarked for operations and maintenance of the base. About 60% of the budget is for labor to pay the salaries of the civilian employees. (Military salaries are not paid out of base funds, and military personnel are assigned to the base based on history and periodic human resources audits performed by superior commands.) This budget is for the SUBASE only; it does not include the submarine squadrons, submarine maintenance, Submarine school, the hospital, housing, or any of the other 56 tenant commands on the base.

There are 23 different budget lines in the SUBASE budget. Only eleven contain more than \$0.5M. Figure 15 shows the significant budget lines.

Public Safety (Security)	\$3.1M
Transportation	\$1.9M
Maintenance of real property	\$6.8M
Utilities	\$12.7M
Engineering	\$2.5M
Administration	\$0.6M
Comptroller	\$2.6M
Environmental	\$1.4M
Morale, Welfare and Recreation	\$2.3M
Information Technology	\$1.1M
Submarine Group Two	\$1.3M
Other	\$2.2M

**Figure 15 FY97 SUBASE Budget Synopsis**

It is significant to note that of the \$38.5M budget, the public works officer (PWO) controls \$22.9M (Transportation, MRP, Utilities, and Engineering).

Maintenance of real property consumes about 18% of the base budget. This does not include new construction or repair projects funded directly by MILCON or special project funds from the major claimants.

#### 2.1.3.2 AIS

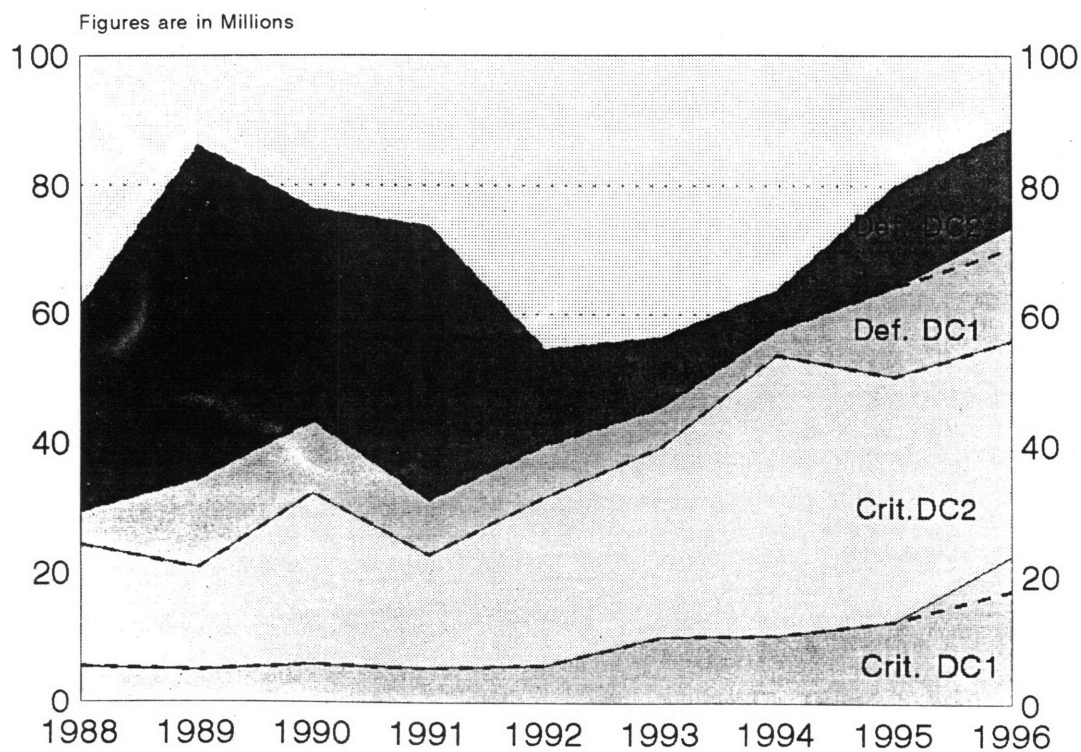
The Annual Inspection Summary (AIS), described in greater detail later, provides a summary of facilities deficiencies. The latest AIS (FY96) shows almost \$90M in critical and deferrable maintenance and repair required to bring the base



facilities up to standard condition. Figure 16 displays graphically the history of the base backlog since 1988.

This measurement system is not perfect. It is dependent on the inspector's classification of an item, and the standards may change from year to year. However, the graph is useful for trend analysis. There are four categories of deficiencies shown:

- Crit. DC1 are critical deficiencies within the funding authority of the CO (<\$500,000 after 1995, <\$200,000 before.) The dashed line represents the CO funding authority before 1995.
- Crit. DC2 are critical deficiencies outside the funding authority of the CO
- Def. DC1 are deferrable deficiencies within the funding authority of the CO
- Def. DC2 are deferrable deficiencies outside the funding authority of the CO



Based on \$500K Special Project Authorization

**Figure 16 SUBASE AIS History 1988-1996**

The trend is clearly up and to the right. It indicates that investment in maintenance and repair has been unacceptably low to maintain a sustainable base infrastructure. The AIS has grown while SUBASE has invested increasing amounts on maintenance and repair since 1988. Figure 17 shows this trend, which represents funds expended from the base budget for facilities maintenance and repair; it does not include special projects.

## MAINTENANCE & REPAIR

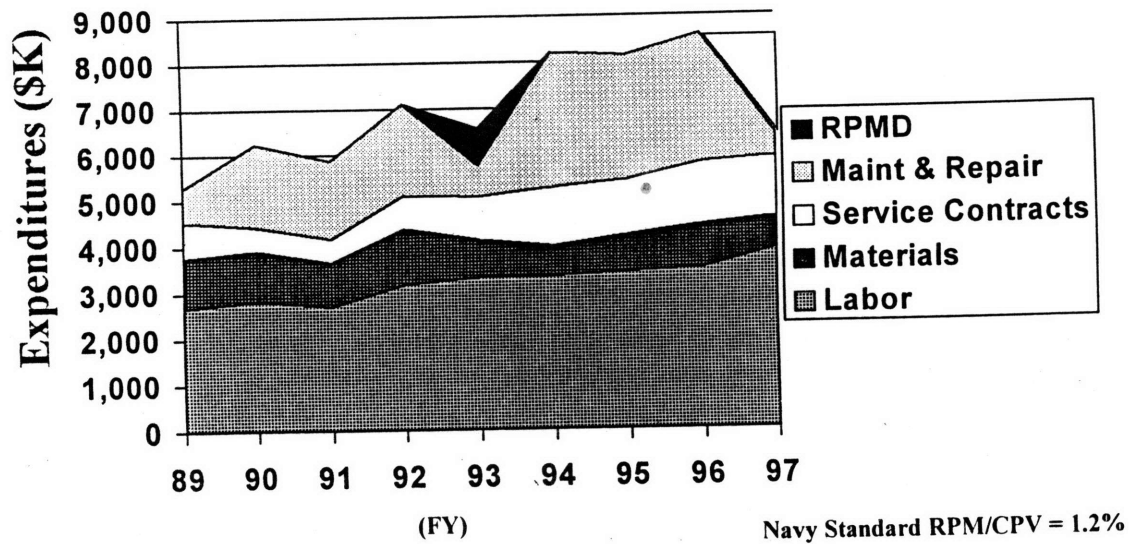


Figure 17 SUBASE Maintenance & Repair Investment 1988-1996

## 2.2 1996 master plan--**Groton 2020**

In 1987, the base contracted for a master planning effort. The resulting master plan guided the base through some significant changes in mission between 1987 and 1996. That time period saw the loss of all homeported ballistic missile submarines, the construction of a new Navy Exchange and Commissary building, construction of a natural gas fired turbine generator, major electrical system upgrades, and several areas of new housing construction and existing housing improvements. It included a capital Improvements Plan (CIP) to address all of the deficiencies in space, condition and functional capability.

As the funding climate developed, the BRAC process was born, missions were either added or deleted, and the CIP became outdated. Some projects that were justified and fully developed, although possibly only partially designed, had to be discarded. The master planning process guidance provided by NAVFAC allows for an update to the plan every six years. In the case of SUBASE, the last complete master plan was done in 1987, with an aborted update attempt made in 1994. In 1996, after the final round of BRAC, the base embarked on a new course for its facilities. The CIP which arose out of this effort was named "Groton 2020." The new master plan was merely an updated version of the 1987 document in the areas of geography, background and purpose, but with a new vision for space utilization. The following paragraphs provide a synopsis of the Groton 2020 plan.

## 2.2.1 General Requirements

The 1996 version of the Base Facilities Requirements (BFR), which documents space needs by function, identified the following four broad facilities conditions:

- Considerable deficiency of bachelor quarters
- Slight deficiency of support facilities
- Slight excess of training facilities
- Slight deficiency in administrative and medical facilities

## 2.2.2 Opportunities and Constraints

### 2.2.2.1 Explosive Safety Quantity Distance (ESQD) Arcs

ESQD arcs are depicted in Figure 18 and represent areas inside which Navy regulations prohibit normal administrative operations or housing because of proximity to explosives. About 230 of 645 acres inside the main base area is constrained by these arcs. Only vital operational activities may be conducted in these areas; functions that can be performed elsewhere must be outside of the arcs.

Figure 18 Ultimate Land Use Plan including ESOD Arcs

LEGEND

- Personnel Support
- Recreation/Open Space/Buffer
- Encumbered/Environmentally Constrained
- Housing
- Training
- Industrial
- Operations
- Road



61

#### 2.2.2.2 Steep Slopes

The base is built upon an undulating landscape, with elevations between sea level and 234 Mean Sea Level. A large portion of the base contains slopes greater than 15%, with a 30% slope considered unsuitable for construction. For planning purposes, slopes of 20%-30% are considered undesirable for building. Most of the relatively flat land available for construction has already been developed.

#### 2.2.2.3 Wetlands

A large area of wetlands was created on the northern edge of the base in 1957 from dredge spoils. This contaminated site is currently being capped, and recreation of wetlands adjacent to the cap is being performed. Development in the new wetland area would require further mitigation.

#### 2.2.2.4 Flood Plain

As with most Navy bases, the 100-year flood plain covers a considerable portion of the fully developed waterfront area. Over the years the flood hazard associated with this has become an acceptable risk. In addition to the flood plain, coastal zone management regulations apply to the land areas within 500 feet of the waterfront.

#### 2.2.2.5 Conclusion

Analysis of the natural and man-made constraints at SUBASE reveals a few areas where development is possible. Of these, some areas contain minor constraints like rock outcroppings and steep slopes. Other potential development

areas include sites that are under-developed or sites with substandard buildings.

These sites should be the focus of future development at SUBASE.

### 2.2.3 Planning Assumptions for Groton 2020

The master planning effort began with a list of assumptions which guided planners in developing goals and objectives. The assumptions are listed below:

- 5 year Special Projects and MILCON program description
- 10 year Capital Improvements Plan
- 20 year zoning plan
- Submarine customer base and Submarine School course loading to continue at current levels
- Effective parking plan needed
- Floodplain restrictions and ESQD arcs will continue to restrict base development
- No significant encroachment issues exist
- Consolidate similar functions wherever practical

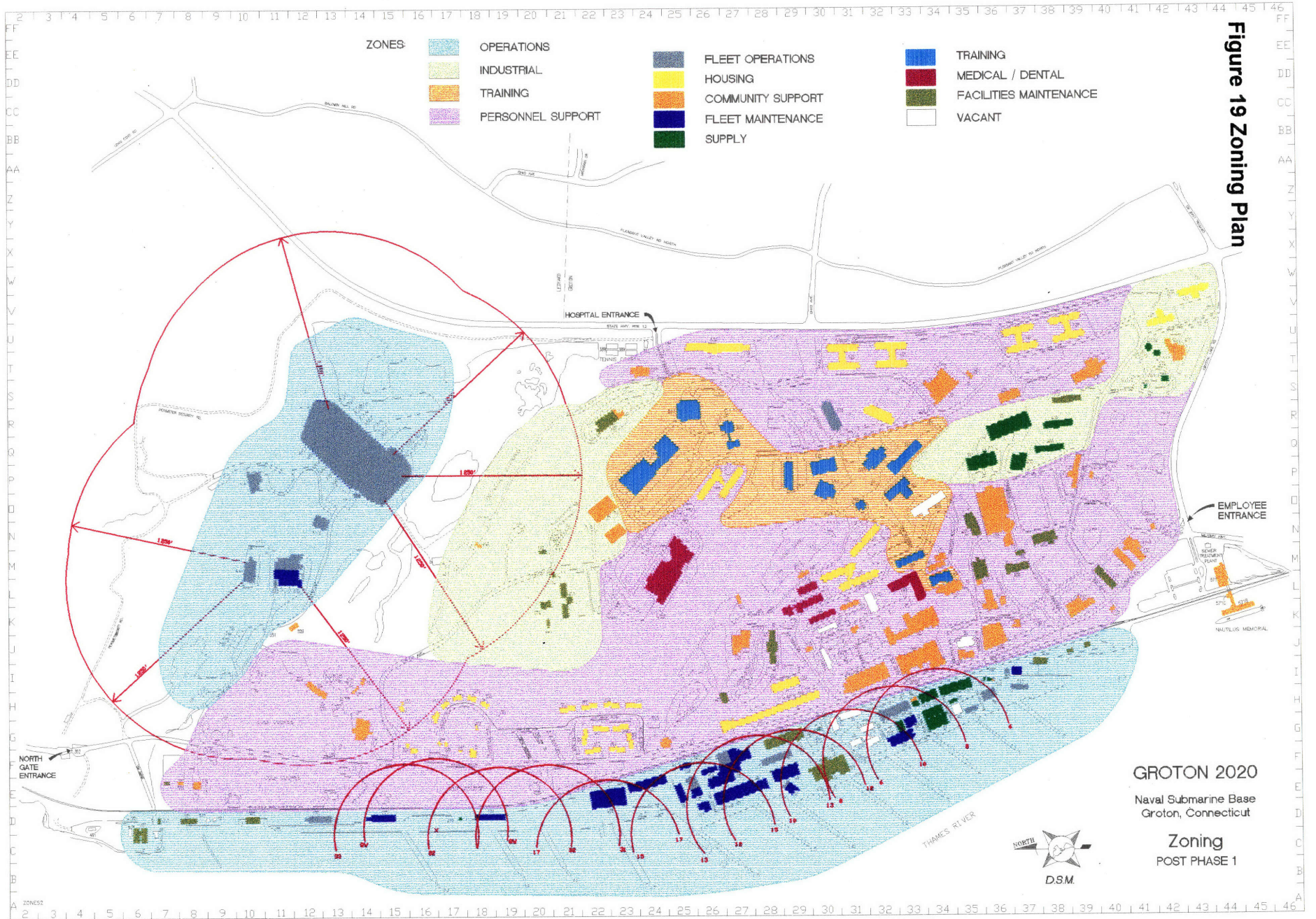
#### 2.2.3.1 Ultimate Land Use Plan and Zoning Plan

The Ultimate Land Use Plan and Zoning Plan, Figure 18 and Figure 19, present a picture of proposed consolidation of functions on SUBASE. The Zoning Plan divides the base into four broad zones and shows where the conflicts are presently located. The Ultimate Land Use Plan provides a long term vision of seven more specific categories of facilities, and includes housing and some recreation and open “green” space. The proposed traffic circulation pattern is also shown on the Ultimate Land Use Map, which includes both the existing and proposed roads identified in the CIP.

Key recommendations included in the proposed Land Use Plan include the following:

- Consolidation of the storage and supply facilities into two general areas: one near the truck gate and one adjacent to the ESQD arcs.
- Maintain discrete housing areas that include several new building sites, including the present location of building 125 and adjacent to building 534.
- Using the existing recreation facilities and undevelopable areas to create a network of open space that helps to define land uses, buffers incompatible uses, and provide for a trail network linking the recreation facilities and the core campus areas.
- Maintain the community support facilities in a central location and remove or buffer the incompatible use adjacent to the community support facilities.
- Continued removal of inappropriate land uses on lower base and from under the ESQD arcs, including the transportation facilities, fire station, and shipping and receiving functions.
- Develop the areas in the Public Transportation Arcs for recreation and parking uses.





### 2.2.3.2 Goals

The 2020 Plan revolves around a set of goals, divided below into four major categories, from which the CIP is an outgrowth.

## GROTON 2020 GOALS

### **OPERATIONAL/MAINTENANCE**

- Establish capability to handle 23 SSN 688/SEAWOLF/ New Attack submarines
- Establish video tele-conferencing capability
- Consolidate/streamline Emergency Control Center
- Build Controlled Industrial Facility
- Consolidate Supply Department/Warehousing off lower base

### **RECREATION**

- Expand golf course to 18 holes
- Build an indoor athletic/recreation facility
- Expand/improve marina and marina office

### **TRAINING**

- Develop a training/conference center
- Develop new attack submarine training facility
- Consolidate Submarine School buildings to make training more efficient
- Renovate Naval Undersea Medical Institute building rather than constructing new building in inappropriate space

### **SUPPORT**

- Standardize direction and name signs
- Standardize base exterior colors
- Landscape all entrances
- Expand Nautilus Museum to include auditorium
- Incorporate TRI-CARE service center into hospital complex
- Install fiber optics network
- Refurbish single/married housing on 7 year plan
- Consolidate/replace Military Medicine and Dental Clinics

**Figure 20 2020 Plan Goals**

## 2.2.4 New capital improvements plan

The Capital Improvements Plan (CIP) is a forward look at the portfolio of MILCON and Special Projects required to mold base facilities to the goals and objectives of the long range master plan. The CIP is a dynamic instrument that is sensitive to changes in resource levels and program assignments and can be changed to accommodate new missions and unforeseen conditions.

A three-phase plan was developed during the Master Plan Update, described below. The phase one projects, proposed to occur between 1997 and 2002, have been developed and reviewed in considerable detail. Only a general scope and specific location have been developed for the later phases. Essential to the accomplishment of the 2020 CIP is a demolition plan.

### 2.2.4.1.1.1 Phase I: 1997-2001 portfolio

The first phase of the plan focuses on consolidation to relieve congestion on lower base and improve operational efficiency. Phase I total investment is \$75M.

- Hazardous Materials Warehouse--\$3.4M
- Bachelor Enlisted Quarters Upgrade--\$10.8M
- Controlled Industrial Facility--\$18.3M
- NUMI Renovation--\$2.5M
- Child Development Center--\$3.4M
- Consolidate Submarine School--\$4M
- Combined Medical/Dental Clinic--\$8M
- Submarine Berth Upgrade--\$9M
- Supply Operation Facility--\$10M
- Demolition (Various)--\$5M

#### 2.2.4.1.1.2 Phase II: 2002-2010 portfolio

Zoning efficiency, upgrade of training facilities and further congestion relief is emphasized in Phase II. Total investment is \$65M.

- Advanced Attack Submarine Training Upgrade--\$1M
- Parking Structure--\$6M
- Indoor Swimming Pool--\$1M
- BEQ Forces Afloat/Galley--\$30M
- Public Works Shops--\$6M
- Pier 15 Drydock Support Facility--\$5M
- Relocate Package Store--\$1M
- Relocate Fire Station--\$2M
- Collocate Squadron HQ--\$11M
- Consolidate Port Services--\$1M

#### 2.2.4.1.1.3 Phase III: 2010-outyears portfolio

The final phase will enhance the quality of working and living conditions.

\$20M is estimated value of phase III.

- BEQ Maintenance and Storage Facility--\$1M
- Base HQ Building--\$6M
- Seabee HQ--\$2M
- Ball Fields and Fieldhouse--\$5M
- 18 Hole Golf Course-\$1M
- Relocate Personnel Support Detachment--\$2.6M
- Consolidated Club--\$6M
- Marina--\$1M

## Chapter 3

### CURRENT PROCESSES

#### 3.1 Framework for Decision Making

##### 3.1.1 Organization of Navy

###### 3.1.1.1 Chief of Naval Operations (CNO)

CNO, the senior military official in the Navy Department, is responsible for programming and budgeting resources needed for the management of shore facilities.<sup>18</sup>

###### 3.1.1.2 Resource Sponsors

Resource sponsors are responsible for planning, programming and budgeting for all appropriations required to support their areas of cognizance. The appropriations include not only military construction (MILCON), but others like operations and maintenance (O&MN), ship construction (SCN) and aircraft procurement (APN); these acronyms are explained in chapter 4 of this paper. Military construction (MILCON) and Operations and Maintenance, Navy (O&MN), are the two appropriations within the scope of this thesis. .

Each Resource Sponsor is in charge of a particular mission area. Their role is to balance competing interests for resources to develop a program that will provide the appropriate amount required in each area of mission effectiveness. An activity, like SUBASE, can have any number of resource sponsors, depending on the mix of tenant commands and their missions. So, resource sponsors are attached to

projects based on the mission it supports, not to a base depending on its broad mission.

### 3.1.1.3 Major Claimants

The major claimant is the next level down in the chain of project planning, programming and budgeting. The major claimants, and sub-major claimants, are commands with broad responsibilities for implementing mission assignments. They make policy, provide guidance and ensure appropriate levels of resources are available to support mission effectiveness in their area. They are responsible for representing their activities' MILCON projects to the appropriate Resource Sponsor. They also provide base operating funds and money for medium sized repair and maintenance projects.

### 3.1.1.4 Activity Commanding Officer

The Activity CO has primary responsibility for the efficient management of activity land and facilities assets. He is required to prepare Base Facility Requirements (BFR) and ensure that planning actions are developed to resolve facility deficiencies and surplus. The CO is responsible for the documentation of projects, both MILCON and Special Project, outside his level of authority.

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<sup>18</sup> Shore Facilities Planning Manual, Naval Facilities Engineering Command Instruction 11010.44E, Change 1, October 1990, Chapter 3.

- maintain base maps
- maintain property records
- prepare BFR
- assist EFD in preparation of Master Plans, EEs, and USAs
- submit site approvals
- liaison with local governments
- implement Base Exterior Architecture Plan (BEAP)

**Figure 21 Responsibilities of Commanding Officers**

### 3.1.1.5 NAVFAC

The Naval Facilities Engineering Command (NAVFACENGCOM) through its four field divisions (EFD) and eight public works centers (PWC), provides technical support to activities within their geographic areas. Additionally, the Commander, Naval Facilities Engineering Command directs the **execution** of the MILCON program.

- Identify facilities and sites for ILS system acquisition
- Publish facility planning standards and criteria
- Provide instruction through courses and seminars
- Prepare Engineering Evaluations (EEs)
- Recommend Utility Technical Studies (UTSs)
- Prepare Facility Energy Plans (FEPs)
- Prepare Facility Requirement Plans (FRPs)
- Prepare and submit Master Plans to CNO for approval
- Prepare Utility System Assessments (USAs)
- Develop methods to identify encroachment
- Maintain databases needed to conduct the planning process
- Provide technical advice and guidance in preparing base maps and BFRs

**Figure 22 Responsibilities of NAVFAC**

The EFDs have primary responsibility for facilities and land use planning, including master planning. Both EFD and PWC provide contract management

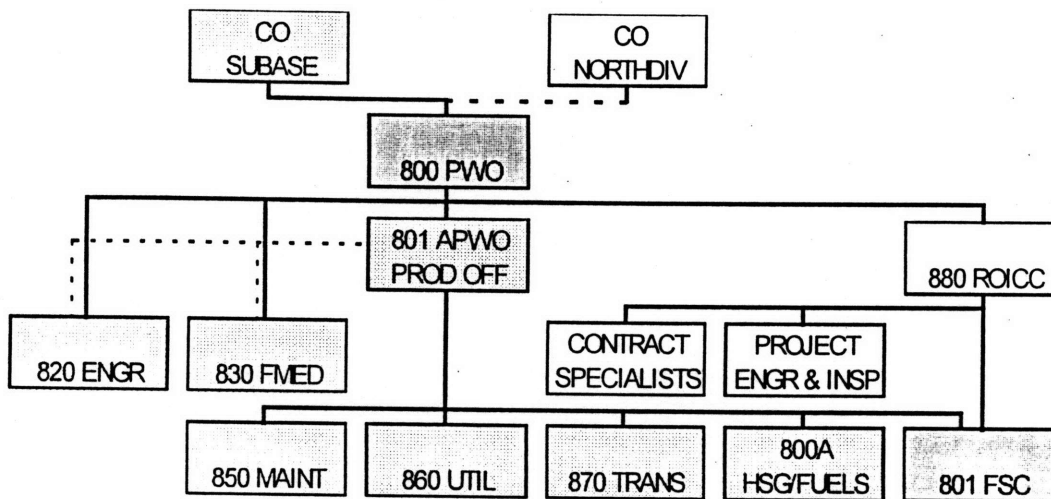
services on a reimbursable basis for activities. EFDs validate MILCON project documentation when the projects are included in the Five Year Defense Plan (FYDP).

### 3.1.2 Facilities organizations at SUBASE

With few exceptions, SUBASE is organized like most Navy bases have historically been organized. The CO is at the top of the chart, assisted by an Executive Officer. Both of these individuals are experienced and qualified submariners, the CO having previously commanded a nuclear submarine. Assisting the military officers in the command suite is a senior civil service Executive Director who handles personnel and business matters primarily, but who also participates in command level decision making. There are a number of departments that carry out the daily functions and missions of the base, led by department heads. One of the senior, and most influential of these is the Public Works Officer (PWO). It may seem unusual, in an organization dominated by a focus on submarines, that an engineer would wield significant organizational power. But one must remember that one of the primary tasks of the base CO is to provide facilities that support the submarine mission. Most CO's have little or no facilities experience when arriving for their two or three year tour. Therefore, they rely on the PWO for advice and counsel regarding their facilities support mission. The PWO is a certified professional engineer, with bachelor's and master's degrees in engineering, and holds the rank of Commander, Civil Engineer Corps. He is assisted by a production officer (the author), a Civil Engineer Corps Lieutenant Commander, who has direct responsibility for maintenance, utilities, transportation and facilities support contracts. At SUBASE, the PWO is "dual-hatted", responsible for both the public works organization and construction contract administration. As the Officer in Charge of



Construction, he holds a contract warrant for contracts of up to \$10M. See Figure 23 for the facilities staff organization chart.



**Figure 23 Public Works Organization**

### 3.1.2.1 Public works

The Public Works Department is made up of six divisions:

- **Engineering.** Provides project designs; planning; creates and manages project documentation; maintains property records; and provides engineering consultation. 15 civilian personnel assigned.
- **Maintenance.** Provides trade labor and expertise for correction of minor facilities deficiencies. 80 civilian personnel assigned.

- Facilities Management Engineering. Prepares and tracks budget; interfaces with other departments and tenant commands on base, incorporating their work requests into the maintenance action plan; plans, estimates and controls maintenance division workload. 20 civilian personnel and five military personnel assigned.
- Transportation. Manages a fleet of 450 small, medium and large vehicles; repairs and maintains vehicles; provides longshoring, crane and rigging support to the waterfront and maintenance divisions; provides snow removal for the main base. 40 civilian personnel and five military personnel assigned.
- Utilities. Operates the main 25 megawatt power station, supplying supplemental electrical power and low pressure steam to base facilities; coordinates with local utility companies; maintains a 24 hour watch to accept and direct "trouble calls" for repair work. 35 civilian personnel assigned.
- Facilities Support Contracts. This division is part of both the PWD and the construction contracts office. It provides contract award and administration of small delivery order contracts. 10 civilian and 7 military personnel assigned.

#### 3.1.2.2 Construction contracting

Construction and repair contracts of \$25,000 to \$10M can be awarded and administered by the Resident Officer in Charge of Construction (ROICC), at SUBASE a CEC Lieutenant Commander. Higher value contracts are awarded at the EFD and transferred to the ROICC office for administration. The office is made up of contract specialists, project engineers and project inspectors, with 20 civilian and 8 military officers assigned.

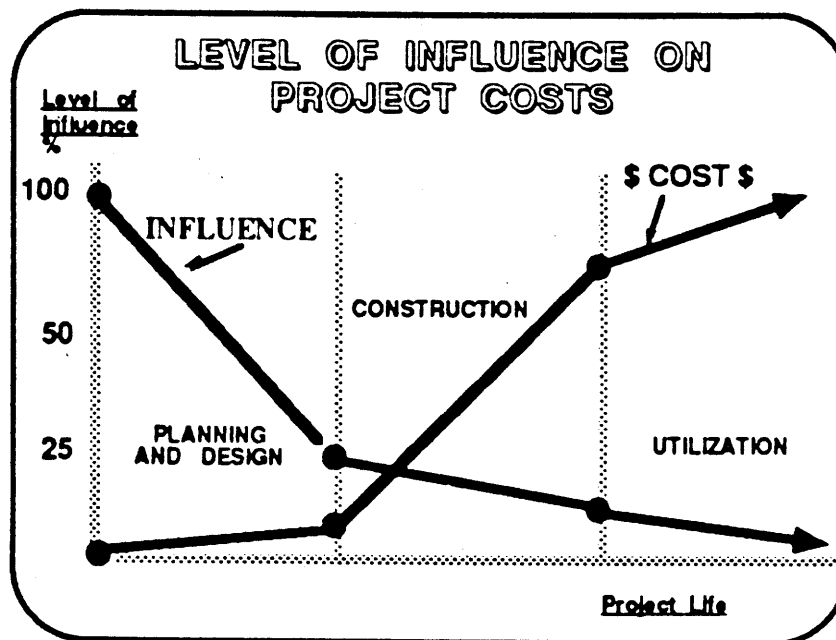
### 3.2 Planning

“If you don’t know where you’re going, you will probably end up somewhere else.” – Laurence J. Peter

“We must ask where we are and whither we are tending.” – Abraham Lincoln

“Our plans miscarry because they have no aim. When a man does not know what harbor he is making for, no wind is the right wind.” – Seneca

Sustainable infrastructure requires a good plan. Civil engineers are all familiar with the following figure, which illustrates the significant influence of planning on life cycle cost of infrastructure projects.



**Figure 24 Level of Influence on Project Costs Graph**

In the Navy, the planning process is complex and based upon specific guidance. The Chief of Naval Operations establishes policy for facilities matters by way of an instruction that describes the responsibilities of each major echelon of command in the Navy organization.<sup>19</sup> The applicable instruction governs the entire

<sup>19</sup> Chief of Naval Operations Instruction 11000.16A.

Shore Activity Land and Facility Planning process. It is based upon the premise that the management of land and shore facilities is an inherent command responsibility.

### 3.2.1 Shore Facilities Planning System

Requirements planning is also called the Shore Facilities Planning System (SFPS), and it is the "micro", piece-by-piece approach to planning and utilization of Navy real property (i.e., land and facilities.) There are five phases in the SFPS, shown below.<sup>20</sup>

- Facility Requirements
- Assets Evaluation
- Analysis, Concepts and Proposals
- Implementation
- Quality Assurance

#### 3.2.1.1 Facility Requirements phase

Basic Facility Requirements (BFR), are the minimum facilities (by investment and category code) necessary for the base to perform its mission. Requirements are standardized throughout the Navy by means of the Planning Criteria Manual (NAVFAC P-80). A planner will enter the manual with category code and personnel loading as input, and the manual will return the required amount of square footage to support the mission as output. The basic premise of the SFPS is that you plan for and utilize only the minimum facilities that are in direct support of the mission. The BFR is a listing of what the base **should** have.

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<sup>20</sup> "Guide to Public Works Management," Naval School, Civil Engineer Corps Officers, Port Hueneme, CA, 1992, Chapter 6.

### 3.2.1.2 Assets Evaluation phase

Assets evaluation includes inspection and evaluation of the facility assets of the base by category code. Not only is the size of the assets evaluated, but also the existing physical condition, functional adequacy, compliance with applicable safety and siting criteria, and their potential alternate uses. Assets evaluation is done on a periodic basis by the EFD, and is usually updated in conjunction with the master planning cycle.

### 3.2.1.3 Analysis, Concepts and Proposals phase

In this phase, facilities planners propose actions to be taken to balance needs with assets to satisfy facility surpluses and deficiencies. The collection of actions is called the Facilities Requirements Plan (FRP). The FRP will propose a method to resolve the surplus or deficiency, or correct the “substandard” or “inadequate” condition of the facility.

### 3.2.1.4 Implementation phase

Implementation in this context means using one of the prescribed methods that would ultimately lead to construction, conversion or demolition so that a balance of needs and assets is reached. Many times, the FRP will propose a Military Construction (MILCON) project, Special Project, or locally (base) authorized project. There are however other methods which should be considered first, like conversion to another category code, transfer to another activity with a deficiency, or disposal.

### 3.2.1.5 Quality Assurance phase

The QA phase of the SFPS is an ongoing effort to keep track of the myriad databases, planning documents and action plans to keep the base moving toward an

adequate combination of infrastructure assets. Changes in mission and funding climate occur almost continuously, and the facilities professionals at the base Public Works Department, Staff Civil Engineer offices, EFD and major claimant staffs all work together to update requirements and projects.

### 3.2.2 Installations Planning

Requirements Planning was defined as a “micro” look at individual facility needs – each individual need by specific category code. Installations Planning, on the other hand, is a bigger picture look at how the individual requirements come together. Master Planning is one critical portion of Installations Planning, and the one we will focus some significant attention upon, but it is accompanied by a laundry list of other types of plans provided by NAVFACENGC.COM.

- Activity Master Plans, including
  - Land Use Plans
  - Capital Improvements Plans
  - Facility Requirements Plans
- Regional Profiles
- Naval Systems Studies
- Base Exterior Architecture Plans (BEAP)
- Integrated Logistics Studies
- Environmental Assessments and Statements
- Special Planning Studies
- Natural Resources Management Plans
- Land Use Compatibility Studies
- Air Installation Compatible Use Zones Studies
- Traffic Studies

#### **Figure 25 Planning Products**

Each base develops and maintains only those services applicable to its missions and facilities. The Public Works Officer determines, from an historical perspective, which ones are required and ensures they are current.

### 3.2.3 Maintenance & Repair

There is a parallel system of facilities planning that operates alongside the Shore Facilities Planning System and the Installations Planning system. The “Facilities Management System”, consists of the functions that must be performed to maintain and operated the base on a daily basis: Maintenance and Repair; Minor Construction; Operation of Utilities; and other engineering services (refuse collection, custodial services, fire protection, and technical engineering.)<sup>21</sup> It is not a planning system, per se, but it adds a critical component to the other two planning systems. SFPS and Installations Planning balance functional requirements with existing spaces to produce a list of new facilities and improvements. Facilities Management adds the necessary repair and maintenance projects required to keep the existing infrastructure operable. The Facilities Management System uses a “total resource” concept—use all available manpower, machines and materials to accomplish the facilities support mission.

The Maintenance and Repair (M&R) program begins with identification of the activity’s deficiencies, what needs to be fixed, as opposed to space deficiencies. The inspection results provide the key input to the activity’s Maintenance Action Plan (MAP) and Long Range Maintenance Plan (LRMP). The MAP includes work that should be performed within the current year, and the LRMP extends to the unconstrained requirements of the next four years. Both plans are fiscally unconstrained, but both can be readily transformed into a spending plan when funding is known and M&R requirements are prioritized.

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<sup>21</sup> “Guide to Public Works Management,” Naval School, Civil Engineer Corps Officers, Port Hueneme, CA, 1992, p. 9-1, 1992.

### 3.2.3.1 Identify--Inspect and Report

#### 3.2.3.1.1 Continuous inspection program

There are four types of inspection controlled by the base Public Works Department or Staff Civil Engineer office:<sup>22</sup>

- **Operator Inspections.** This is usually equipment specific and oriented to day to day operations. The individual who routinely uses the equipment, air compressor or hydraulic lift for instance, conducts a regular inspection and reports discrepancies beyond his capability to repair through the appropriate regular work channels.
- **Preventive Maintenance Inspection.** This is also equipment oriented, but usually applies to high value, long lead-time machinery like transformers and HVAC equipment. On many bases, this type of inspection is neglected in an austere funding environment.
- **Planned Control Inspection.** This type of inspection is the backbone of the inspection system and provides about 75% of the information necessary to formulate repair and improvement projects and report facility condition up the chain of command. It is typically conducted by either public works planner/estimators or contracted out (on a reimbursable basis within the Navy) to the EFD or local Public Works Center. Control inspectors in structural, painting, roofing, electrical and mechanical systems conduct these inspections on a cyclical, scheduled basis. Inspector's reports provide data for inclusion in local M&R plans and claimant- and MILCON- funded projects.

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<sup>22</sup> "Guide to Public Works Management," Naval School, Civil Engineer Corps Officers, Port Hueneme, CA, 1992, p. 9-4 – 9-6, 1992.



- Specialized and Other Inspection. These are inspections performed by those outside the local facilities groups, including fire, safety, elevator, and military zone inspections. Reported breakdowns are also a form of impromptu inspection.

#### 3.2.3.1.2 Annual Inspection Summary

Once all of the facility deficiencies have been identified (of course this activity is never actually finished), the data must be sorted into reports which will justify budget requests. The most important of these reports is the Annual Inspection Summary (AIS). The AIS, as it stands alone, is not a database, but an annual report of unfunded maintenance and repair requirements and an estimate of cost for correction. It is sorted primarily by Investment Category. The second sort is by urgency of correction: critical or deferrable. In order to classify a deficiency as critical, it must involve one of the following:

- Catastrophic environmental impact
- Loss of primary mission
- Serious safety or health hazard
- Quality of life issue

Of course, there is some room for disagreement in this classification, but since this report is carefully scrutinized at several levels, most Public Works Officers know what deficiencies are universally accepted as critical and play by the established rules of the game—their credibility depends on it.

### 3.2.3.1.3 BASEREP – Shore Base Readiness Reporting System

The BASEREP is a mission-oriented report that measures, in the opinion of the Commanding Officer, the readiness of his/her command to meet its mission.<sup>23</sup> In cases where unsatisfactory readiness exists, the report helps provide justification for MILCON projects, increased personnel manning or additional O&MN funding. It is broken up into three major categories: Personnel, Facilities (quantity & condition), and Major Equipment (quantity & quality). The base must assign a readiness rating in all three categories for each mission area. These are:

- C1: Fully met mission requirements
- C2: Substantially met mission requirements with only minor difficulty
- C3: Only marginally met mission requirements, but with major difficulty
- C4: Has not met mission requirements

With the average age of naval facilities approaching 50 years, conditions are continuing to deteriorate and the funds available for maintenance and repair are also decreasing. The BASEREP is used in the budget process by all command levels to establish trends and develop comparisons throughout the command. The AIS is a major contributor to the report and must support the final BASEREP ratings. This will influence the claimant staff in its resource allocations. The Resource Sponsors are also provided summary BASEREP data for those activities in its sponsorship during each budget cycle.

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<sup>23</sup> "Guide to Public Works Management," Naval School, Civil Engineer Corps Officers, Port Hueneme, CA, 1992, Chapter 12, 1992.

### 3.2.3.2 Classify

As deficiencies are collected and sorted into projects, one of the most important steps is classification by type of work; we will see why later. The types of work are Construction, Repair, Maintenance and Equipment Installation.<sup>24</sup> In order to properly classify work you must know more than what work is to be accomplished. There are two other basic questions that must be answered. Why is the work being done? Why is it being done now?

Painting, for example can be classified as Construction, Repair, Maintenance or Equipment Installation. If you are painting a newly constructed wall, the painting work is Construction. If you are re-painting an existing wall for preservation, it would be Maintenance. Re-painting the wall after repairs is Repair, and painting incidental to installation of equipment is Equipment Installation work.

The following are definitions of work:<sup>25</sup>

- Construction. Erection, installation, or assembly of a new real property facility or improvement to an existing real property facility by conversion, addition, expansion, extension, alteration or relocation. Work related to change, efficiency or capacity is probably Construction. Generally, if the reason for the work is for expanded or changed mission, capacity increases, relocation, or a change in functional use, the work will be properly classified as Construction.
- Repair. Restoration of a real property facility to such condition that it can be effectively utilized for its designated purpose by overhaul, reprocessing, or

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<sup>24</sup> "Guide to Public Works Management," Naval School, Civil Engineer Corps Officers, Port Hueneme, CA, 1992, p. 11-3, 1992.

<sup>25</sup> "Advanced Public Works Management," Student Guide, Naval School, Civil Engineer Corps Officers, Port Hueneme, CA, Section 1624-1, 1996.

replacement of its constituent parts or materials which are damaged or deteriorated to the point where they cannot be economically maintained. Repairs may include modification or addition of building or facility components or materials required for compliance with current safety standards, building codes or environmental regulations. Repairs may include replacement of current materials with substitute materials, providing that the new materials serve the same purpose. Work related to condition is probably Repair. In order to call work repair, normally 1) you must have had the component to begin with, and 2) the work must be done due to its condition.

- **Maintenance.** The recurrent, day-to-day, periodic, or scheduled work required to preserve or restore a real property facility to such a condition that it may be effectively utilized for its designated purpose. Work related to preservation is normally Maintenance. Maintenance, as a general rule, differs from repair because maintenance does not involve replacement of constituent parts of a facility, but is work done to prevent or correct wear and tear, thereby forestalling repair or replacement.

- **Equipment Installation.** Modifications of real property (land or buildings) required solely for the installation of an item of personal property (equipment which could not be used a stand-alone facility).

### 3.2.3.3 Look at Limits & Formulate Projects

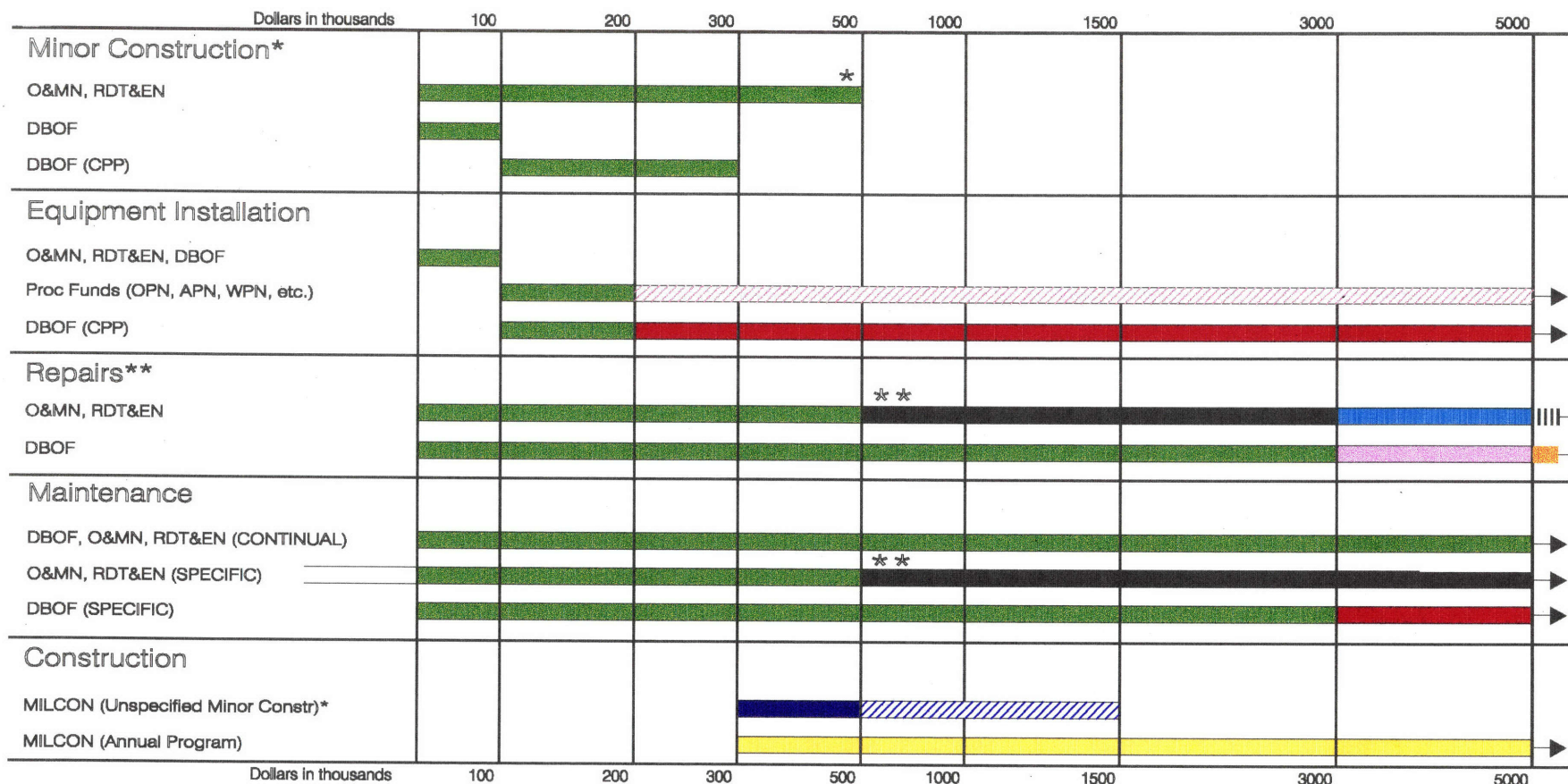
Figure 26 shows why the classification of work is important.<sup>26</sup> All of the project planning, documentation and schedule depends upon where the money for it comes from and who has to approve it.

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<sup>26</sup> "Advanced Public Works Management," Student Guide, Naval School, Civil Engineer Corps Officers, Port Hueneme, CA, 1992, Section 1624-2.

# Facility Projects Monetary Limits by fund source

Figure 26 Facilities Project Approval & Funding



\*Cost limit is \$1.0M (\$3.0M for MILCON) for construction project solely to correct life-, health-, safety-threatening deficiency.

- |   |  |
|---|--|
| <span style="display: inline-block; width: 15px; height: 10px; background-color: green; border: 1px solid black;"></span> CO approves & funds   | <span style="display: inline-block; width: 15px; height: 10px; background-color: yellow; border: 1px solid black;"></span> Congress approves & funds   |
| <span style="display: inline-block; width: 15px; height: 10px; background-color: red; border: 1px solid black;"></span> Major claimant approves & activity funds  | <span style="display: inline-block; width: 15px; height: 10px; background: repeating-linear-gradient(45deg, transparent, transparent 2px, hatched 2px, hatched 4px); border: 1px solid black;"></span> Support agency approves & funds                         |
| <span style="display: inline-block; width: 15px; height: 10px; background-color: black; border: 1px solid black;"></span> Major claimant approves & funds   | <span style="display: inline-block; width: 15px; height: 10px; background-color: pink; border: 1px solid black;"></span> CNO (N44) approves & activity funds   |
| <span style="display: inline-block; width: 15px; height: 10px; background-color: blue; border: 1px solid black;"></span> CNO approves & funds   | <span style="display: inline-block; width: 15px; height: 10px; background: repeating-linear-gradient(90deg, transparent, transparent 2px, vertical-lines 2px, vertical-lines 4px); border: 1px solid black;"></span> ASN (I&E) approves & major claimant funds |
| <span style="display: inline-block; width: 15px; height: 10px; background: repeating-linear-gradient(45deg, transparent, transparent 2px, diagonal-lines 2px, diagonal-lines 4px); border: 1px solid black;"></span> ASN (I&E) approves & CNO funds | <span style="display: inline-block; width: 15px; height: 10px; background-color: orange; border: 1px solid black;"></span> ASN (I&E) approves & activity funds   |
| <span style="display: inline-block; width: 15px; height: 10px; background-color: blue; border: 1px solid black;"></span> CNO (N44) approves & major claimant funds  |  |

\* CNO Msg. 231840Z Oct. 96

\*\* CINCLANTFLT Msg. 141846Z Nov. 96

\*\*Repair projects over \$200,000 having a cost in excess of 50% of the replacement value of the complete facility must have approval of CNO (N44)

#### 3.2.3.3.1 Incrementation

The approval and funding limitations illustrated by Figure 26 have resulted in attempts, called incrementation, by some commands to subvert the system by packaging projects so as to avoid the limitations.<sup>27</sup> No project may be subdivided to reduce the cost for reasons of circumventing programming and approval requirements. Each project must result in a complete and useable real property facility or improvement to a real property facility. Supplementing MILCON projects after appropriation with O&MN funds is also a form of incrementation. There is other specific guidance provided to commanders, comptrollers and Civil Engineer Corps officers to prevent this type of mistake in budget submissions, but they are not within the scope of this thesis.

#### 3.2.3.3.2 Long Range Maintenance Planning (LRMP)

There is a "right" amount of maintenance and repair investment necessary to minimize total facilities expenditures.<sup>28</sup> Figure 27 represents the theoretical model. The long-range maintenance planning effort should be designed at each base to help approximate this optimum split between maintenance and repair, and capital investment. There are no Navy-wide standards for a LRMP. Broad guidelines are provided in training to facilities managers, and they include:

- Accurately identify the condition of facilities, and from this determine the backlog of maintenance and repair

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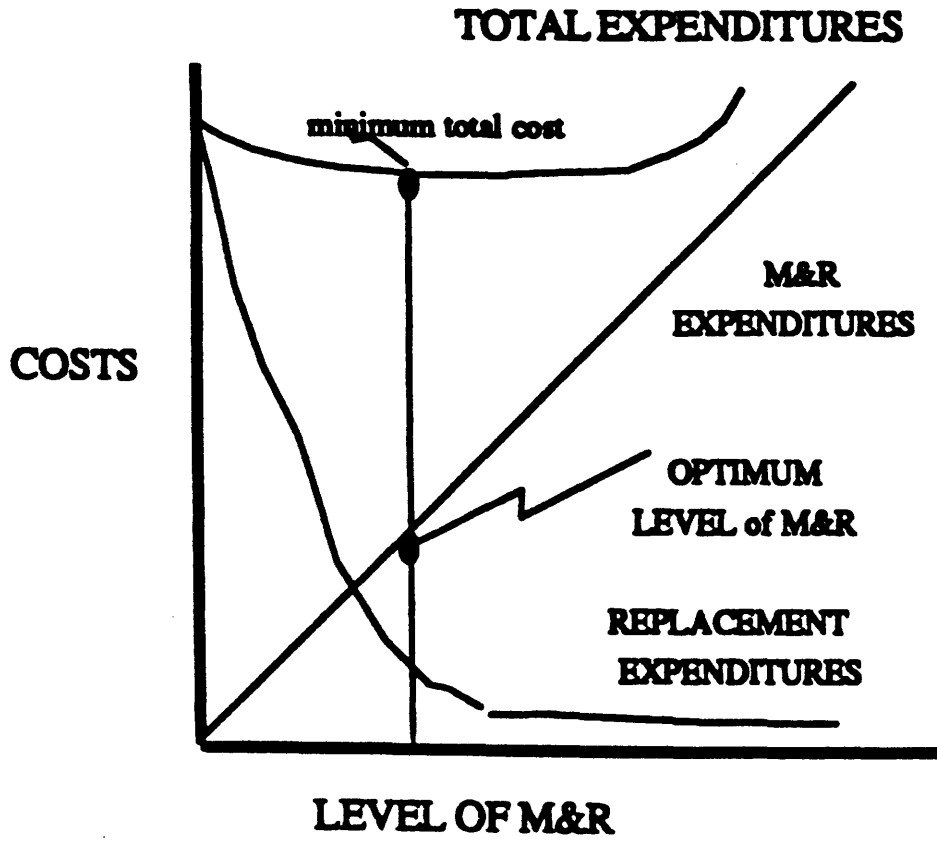
<sup>27</sup> "Advanced Public Works Management," Student Guide, Naval School, Civil Engineer Corps Officers, Port Hueneme, CA, Section 1624-1, 1996.

<sup>28</sup> "Guide to Public Works Management," Naval School, Civil Engineer Corps Officers, Port Hueneme, CA, Chapter 10, 1992.

- Identify and eliminate duplicated or unnecessary work
- Coordinate information presented in various reporting systems such as the AIS, BASEREP, Consolidated MILCON and Special Projects Lists
- Generate reports which permit accurate advance planning of maintenance and repair work or engineering designs and studies
- Develop prioritized MAPs

The guidance seems to be driving toward getting the “right” work accomplished within the given budget constraints. It does not however, solve the problem of too little investment. The LRMP is one of few programs within Navy facilities that is not rigidly controlled and for which there aren’t specific goals and measurements.

Figure 27 M&R vs. Replacement investment





### 3.2.3.3.3 Navy facilities capital investment picture

As of 1995, the Navy possessed \$116B in facilities sitting on 3.7 B acres of land spread among 560 activities worldwide.

“Unfortunately, implementing sound routine maintenance procedures on systems that are worn out or nearing failure due to continued “deferred” maintenance is a cost intensive and near futile task. Good money is thrown after “no money”, as the years of neglect catch up and begin to exact a price.”<sup>29</sup>

Commenting on the condition of DOD facilities, the Defense Base Closure and Realignment Commission stated:

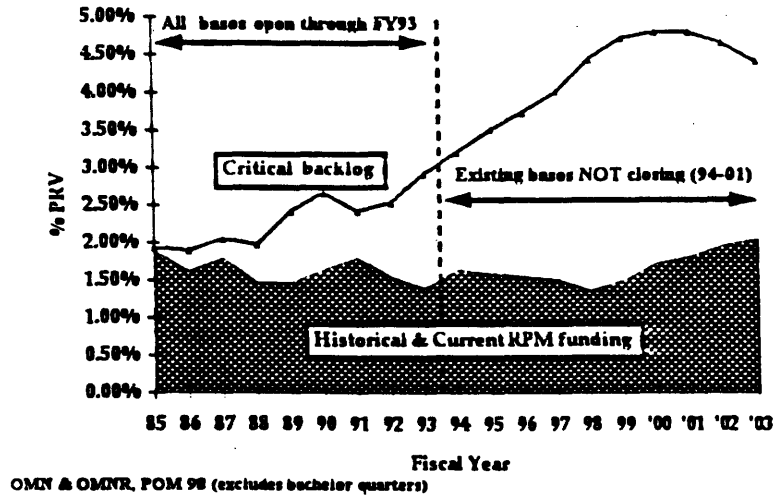
“Substandard base facilities hurt military effectiveness in both operational and human terms. In their visits to military installations, the Commissioners were struck by the number of deteriorating facilities... The data on individual installations provided by the Services showed antiquated structures are common and are not restricted to any single service or mission area. While recognizing that military-construction projects compete for funds with other national defense requirements, the Commission encourages the Department of Defense and the Congress to consider the adverse impact that inadequate living and working conditions have on the performance and retention of personnel.”

FY85 provided the Navy’s high water mark for facility maintenance funding. Since that year the real property maintenance budget has declined as a fraction of total property value. Figure 28 also shows that the backlog of critical maintenance and repair work continues to climb. Note the projected increase in funding supposed to occur in FY99 and after, and its corresponding effect on the critical backlog. Time will tell if this predicted commitment becomes reality.

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<sup>29</sup> “Guide to Public Works Management,” Naval School, Civil Engineer Corps Officers, Port Hueneme, CA, Chapter 10, 1992

## REAL PROPERTY MAINTENANCE (Normalized for approved closures)



**Figure 28 Real Property Maintenance Funding**

Our goal for capital investment has been 2% of plant value, which reflects a 50 year replacement cycle. (Current plant value (CPV) is a replacement cost index maintained at each base for each facility. Many of our facilities funding goals and condition reports uses the index as a benchmark.) MILCON investment in the last twenty years has reached a high of 1.3%, and when all construction is considered, our best has been 1.7%. This percentage is much lower than the rest of the public sector (8.2%), major colleges and universities (6.1%)<sup>30</sup> and the private sector (5.4%). The National Council on Public Works determined that capital investment must be increased to 9% by 2000 in order to properly maintain the existing American infrastructure.<sup>31</sup>

<sup>30</sup> Coopers & Lybrand Survey, sponsored by the Association of Physical Plant Administrators of Colleges and Universities and the National Association of College and University Business Offices, October 1988.

<sup>31</sup> National Council on Public Works Report, February 1988.

Unfortunately, a large portion of our MILCON program each year is devoted to construction supporting new weapons systems and new or expanding missions. So, even the 1.3% capital investment peak cited above represents a brighter picture than actually exists.

#### 3.2.3.3.4 Local M&R, and minor construction

Projects that fall within the approval of Commanding Officers will usually be funded from base operating funds (O&MN). These projects should be made a part of the MAP or LRMP. Under unusual circumstances, some projects that fall within the CO's approval threshold will be funded directly by the claimant. This is likely to happen after the mid-year review in the budget cycle, and might actually depend on the cost of the project. For instance, the claimant may have unexpectedly freed up \$0.9M and the base may have a repair project estimated to cost \$850K already designed and prepared for solicitation. The claimant may authorize the base to procure the project because it "fits" the budget at the time.

#### 3.2.3.3.5 Special Projects

The Special Projects Program consists of projects whose total funded costs fall in the threshold between the Commanding Officer's authority and the authority of Congress.<sup>32</sup> The major claimants manage the program. Examples of costs that do not count against funded thresholds include military labor, depreciation, planning and design. Contract administration and procurement costs (reimbursable costs charged by NAVFAC construction offices) are counted.

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<sup>32</sup> "Guide to Public Works Management," Naval School, Civil Engineer Corps Officers, Port Hueneme, CA, Chapter 11, 1992.

There are many different types of projects that can be funded through the major claimant. By far the bulk of the special projects is made up of basic repair and maintenance, with minor construction being a part of many projects. The repair, maintenance and construction contracts are prioritized on several levels, with the final result being the Readiness Erosion Deterrent List, or "red list", which is promulgated at the beginning of each fiscal year. The red list contains all of the projects to be funded in that fiscal year, above the red line on the claimant's priority list. Another set of projects is designate as "swing" projects; this set represents the projects that may be funded at the end of the year depending on how things go with the overall budget and with the red list projects.

#### 3.2.3.3.5.1 Energy

There are several programs available to award projects which save energy. The names and details of these programs change every few years, but the general requirement is for a short payback (usually less than ten years), and it may include installation of energy saving features in an existing building. Construction of individual energy saving systems is sometimes also allowed.

#### 3.2.3.3.5.2 Environmental

The claimant also reserves an environmental fund to be used to fund projects that lead to compliance with existing or emergent environmental regulations.

#### 3.2.3.3.5.3 Housing (FHN) Congress through claimant

Navy Family Housing is funded out of a separate congressional appropriation called FHN (Family Housing Navy). The funding associated with this appropriation is distributed down the chain of command to the claimant and the individual activities

administering housing. FHN covers construction, maintenance, repair and operations.

#### 3.2.3.3.5.4 PPV

Public-private ventures (PPV) have been a part of Naval facilities for decades. Several different types of programs have been attempted, each based on special congressional legislation. Family housing has been the target of much of the past PPV effort. In 1996, Congress passed special legislation for the Navy that allows PPV's for other quality of life projects, including bachelor quarters, gymnasiums and the like. Currently, efforts are underway to develop limited partnerships with the private sector for family housing and for bachelor quarters.

The new programs being developed allow the Navy to put its assets at risk in the marketplace. It is a commonly held belief that the PPV acquisition process will allow the Navy to procure projects for one-third the normal cost. This belief has led to funding cuts within the housing organizations to take advantage of the savings (which have not yet been realized.) Another outgrowth of the PPV process has been the capture of MILCON funds associated with all family housing projects within the Atlantic Fleet area. The funds are necessary to build a central funding source for the first few PPV ventures. The result has been to put all housing projects on hold while PPV is investigated at each site.

#### 3.2.3.3.5.5 Demonstration projects

Demonstration of new technology is a way to finance construction projects. The Naval Facilities Engineering Service Center (formerly Navy Civil Engineering Lab) is currently funding several pier upgrade projects to demonstrate the use of composite materials to strengthen piers to allow heavy crane usage to a greater

extent. A natural gas fuel cell is being installed at SUBASE as part of a DOD demonstration project. This technology converts fossil fuel into electricity, steam and hot water, with minute amounts of residual pollution.

#### 3.2.3.3.5.6 Demolition

Demolition has been difficult to accomplish in the past, because of its definition as “construction,” reverse construction one supposes. Funding rules associated with construction apply to demolition as well. This unfortunate classification has resulted in a lack of demolition, an ever-increasing base facility square footage, and spreading out by base tenants into recently abandoned space created by construction of new facilities. Recognition of this problem at the major claimant level has resulted in claimant funded demolition projects when funding is available. Costs of moving tenants from buildings to be demolished, not usually funded as part of these projects, is a continuing problem that provides a reverse incentive for bases to demolish older buildings. The base is faced with the choice of spending a large chunk of money it doesn't have to avoid smaller but increasingly annoying yearly operations and maintenance costs for these older, sometimes severely dilapidated, facilities.

#### 3.2.3.3.6 Military Construction

##### 3.2.3.3.6.1 Background

All new construction with funded costs exceeding \$500,000 requires approval by Congress. An exception to this rule is “Unspecified Minor Construction” which covers construction projects solely to correct life-, health- and safety-threatening deficiencies; these are approved at the CNO level up to \$1.0M. The military construction process is lengthy and complex, but an understanding of its implications

is important to base facility managers. Until very recently the entire process, from identification of a need, until construction completion, took from 6-8 years! Within the past two years, a new process has been developed that compresses the process into about three years between proposal and construction award.<sup>33</sup>

The recent funding trend in military construction for the Navy is positive. There is some evidence that acceptance of the quasi-crisis state of affairs in Navy infrastructure has occurred in Washington. While maintenance budgets don't seem to have been affected yet, new construction has apparently been identified as a necessity to supplement our aging facilities.

#### 3.2.3.3.6.2 MAPIT Initiatives

In 1995, the Navy established a team, the Military Construction Acquisition Process Improvement Team (MAPIT), to analyze and improve the military construction process. The team developed a new process, which achieved:

- Moved project planning to the right (i. e., later in time)
- Defers investment in project until after initial programming
- Emphasizes good up front planning, at the right time, using an integrated project team

It eliminated six preliminary design and documentation steps, and trimmed almost three years off the old way of doing business.

#### 3.2.3.3.6.3 New Timeline

The new process includes the following steps:

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<sup>33</sup> "Advanced Public Works Management," Student Guide, Naval School, Civil Engineer Corps Officers, Port Hueneme, CA, Section 1625-1, 1996.

- The activity submits initial project documentation to the major claimant in the spring of the year three years prior to award. For example, SUBASE would propose a project in April 1997 for inclusion in the fiscal year 2001 budget. 2001 is the earliest year the project could be awarded (without extraordinary measures).
- The major claimant collects new project proposals from its activities, combines with any leftovers from previous years, and prioritizes them for the SFPB.
- The Shore Facilities Planning Board is made up of the major claimants and three directorates of the office of the CNO (N44 Facilities, N46 Housing, and N80 Warfare). They incorporate program guidance from the Secretary of Defense, usually in keeping with the 6-year defense plan, consider resource constraints and produce a list of projects. The projects may get initially planned for the year two, three or four years hence, depending on priorities and projected funding.
- Armed with the SFPB comments, the MILCON Project Team, made up of NAVFAC, EFD, major claimant, activity and customer team members, gets to work preparing more detailed project documentation. They initiate the appropriate environmental planning study, while waiting for the major claimant to release the Initial Program List (IPL).
- When the major claimant releases the IPL and N44 has chopped it, the project team begins parametric cost estimating (PCE) as a budget input. The EFD takes the lead in preparing the PCE, which is carefully scrutinized by the Naval Audit Service.
- After audit, the project documentation packages, along with the rest of the budget, is reviewed by the Navy Comptroller (NAVCOMPT), which "marks" it (deletes unjustified projects).



- SECDEF and the Office of Management and Budget (OMB) marks it and sends it to Congress for the (sometimes) year-long deliberations.
- When the list is sent to NAVCOMPT, the project team, NAVFAC and the EFD come together to develop an acquisition strategy. Only after OSD has cleared the project list can a design contract be awarded for the project. Once awarded the design proceeds directly to 100% without any holdups due to funding questions.

#### 3.2.3.3.6.4 Program Objectives

For the FY99 programming cycle, SECDEF provided the following objectives for projects to be included on the list.

##### 3.2.3.3.6.4.1 Compliance

- Program all projects required to correct Class I & II environmental violations
- Address life safety and health deficiencies
- Comply with host nation, local, state and federal requirements
- Reduce explosive safety waivers (particularly important to SUBASE, which has a long history of ESQD waivers for lower base operations)

##### 3.2.3.3.6.4.2 Quality of Life

- Provide quality bachelor quarters (BQ), personnel support facilities and MCON-funded recreational/facilities
- Provide quality work spaces that are safe, efficient and comfortable
- Provide community and family support facilities
- Revitalize existing inadequate BQs to new DOD standard in 8 years (current funding is on a 17 year track)
- Eliminate BQ deficit in 15 years using public/private venture initiatives

- Fund other quality of life in 10 years (current funding is on a 22 year track)

#### 3.2.3.3.6.4.3 Mission Support

- Address all “new mission” requirements
- Program projects that support new weapons delivery schedules
- Provide facilities that support expanded mission or emergent critical mission requirements

#### 3.2.3.3.6.4.4 Infrastructure Revitalization

- Replace aging, high cost of ownership facilities (inadequate)
- Modernize facilities to bring them up to current codes, criteria and proper functional layout (substandard)
- Consolidate functions now housed in underused facilities
- Demolish inadequate facilities

### 3.3 Budgeting

In the previous section, the discussion centered on identifying the deficiencies and planning and programming projects for correction of the deficiencies. The Military Construction process included some budget information as well, because of the nature of the process. However, we have not seen how the rest of the Navy budget system works, and how it affects facilities decisions.<sup>34</sup>

A budget can be defined in many ways. As a tool, it has different attributes that depend on time. Before the year begins, an annual budget can be used as a basis for an activity’s operating plan. After spending has begun, actual expenditures can be compared to the budgeted amount, so that the budget acts as a fiscal

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<sup>34</sup> “Advanced Public Works Management,” Student Guide, Naval School, Civil Engineer Corps Officers, Port Hueneme, CA, Section 1631-1, 1996.

roadmap. After the year is complete, the budget becomes a benchmark with which to measure the value of the year's expenditures, and the wisdom of the plan.

### 3.3.1 Important terminology

- Reservation. Occurs when money is set aside (earmarked or "fenced") for planning purposes.
- Commitment. Is made when the project or program is actually recognized on paper as a necessary line item in the budget.
- Obligation. Happens when an order is placed for goods or services. Award of a contract or any similar transaction legally binding the government for payment is an obligation.
- Expenditure. Occurs whenever funds are withdrawn from the Treasury to cover an obligation.

Until the obligation stage, funds may be withdrawn from one program and redistributed to another authorized program.

### 3.3.2 Authorizations and Appropriations

There are two acts of Congress required for the base to obtain budget funds. The first is called the Authorization Act. This act legally recognizes a program as a viable need and necessary for the government to provide funding for its purposes. Authorizations may be permanent or specific. Examples of permanent authorizations are the National Environmental Policy Act (NEPA), the Armed Services Procurement Act (ASPA), and the Competition in Contracting Act (CICA). Examples of specific authorizations are the Military Construction Program, Weapons Procurement, Research and Development, and Military Operations.

To apply tax revenues to the authorized programs that have been budgeted, an appropriations act is required. There are annual appropriations that fund ongoing operations, like OPN (minor equipment), O&MN (operations and maintenance), MPN (personnel/labor), etc. These are “fenced” accounts, to be used for their intended purpose only. They have a one-year period of obligation followed by a five-year expenditure limit. There are continuing appropriations that fund long-term programs, which have specific obligation and expenditure limits written into the act. The last type of appropriation is the multiple year appropriation. It pays for large procurements that take longer than one year to deliver, like RDT&E (research and development), WPN (weapons procurement), SCN (ship construction), and MCN (military construction).

There are two primary laws to prohibit agencies from spending money in ways not authorized by Congress. One is 31 US Code Section 1301, which requires the right “color” of money. For example, MCN funds cannot be spent on ongoing base operations needs. 31 US Code Section 1517, also known as the “anti-deficiency” act, prevents agencies from spending what they don’t have.

### 3.3.3 Cycle (BY, CY, PY)

In the facilities management system cycle, there are budget actions for three separate year’s budgets happening concurrently. In order to keep the different steps straight, the following terminology is used.

- Budget Year (BY) budget refers to the planning actions that generate the budget two years hence.
- Current Year (CY) budget refers to actions for next year’s budget.

- Prior Year (PY) budget is the one for which funds are currently being obligated. It is called prior year because Congress is no longer concerned with the budget process. The budget is complete and being obligated against.

Figure 29 explains graphically the simultaneous actions required for the three active budget years.

## FY97 FISCAL REQUIREMENTS:

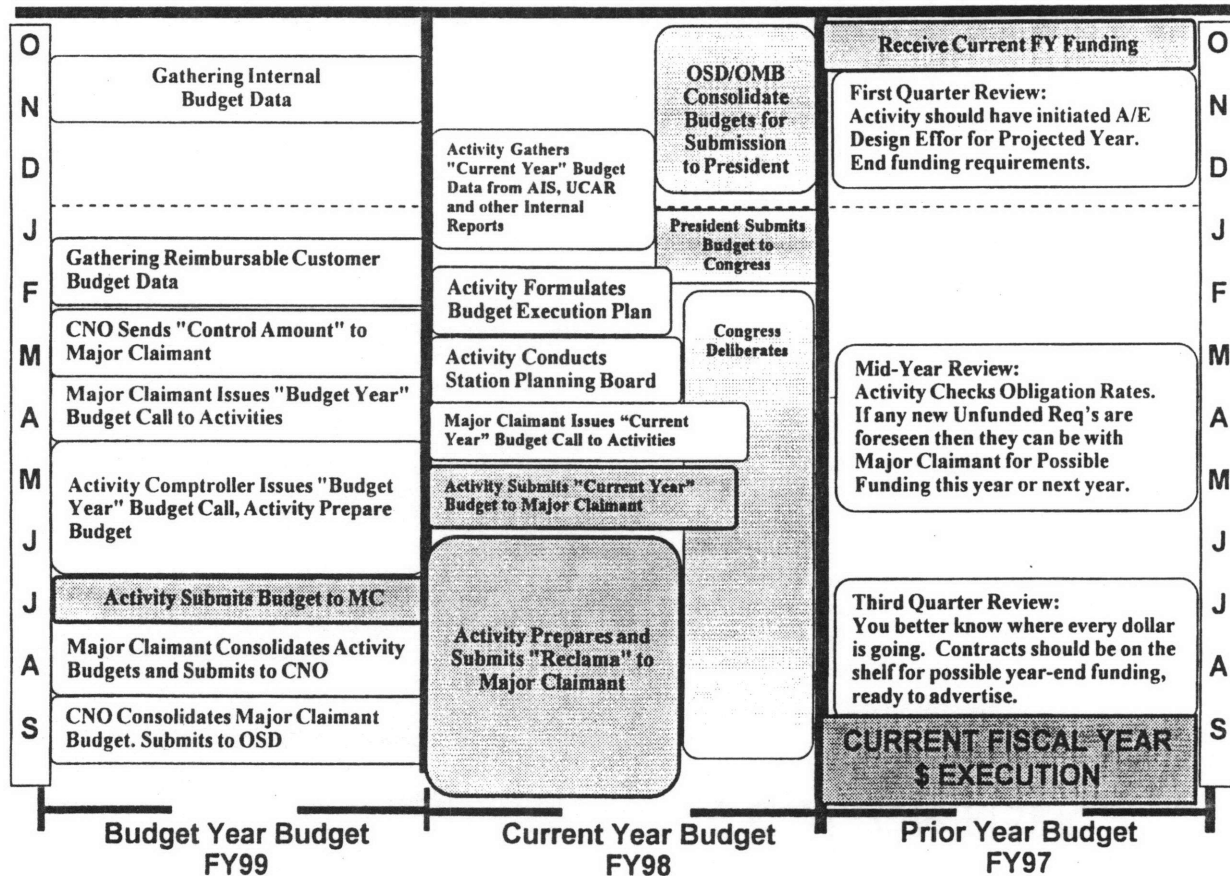


Figure 29 Fiscal Requirements for 3 budgets

### 3.3.4 Local budgeting

The details of the budgeting process for a base fills volumes. To aid the reader in understanding the goals and present conditions at SUBASE, a basic

discussion of the O&MN account, the steps in budgeting, and some useful measurements are included.<sup>35</sup>

#### 3.3.4.1 Operations and Maintenance, Navy (O&MN)

The O&MN appropriation provides funding for most of the operating and facilities needs of a base like SUBASE. The appropriation is divided into four sections, called budget activities:

- Operating Forces
- Admin and Servicewide Support
- Training and Recruiting
- Mobilization

The operating forces budget activity governs almost all of the cost accounts within all of the investment categories described in Figure 13. Base budget submissions are divided and subdivided into individual cost accounts with work units and dollars attached to each. When the O&MN appropriation has been made, the money flows down to the base through the hierarchy and ultimately the major claimant. Money to operate the base and maintain the facilities is given to the base annually to be used as budgeted. Special projects are also funded with O&MN dollars which are specifically reserved and managed by the claimant for each project.

#### 3.3.4.2 Steps in budgeting

1. Predict operational requirements.
2. Consolidate requirements into annual maintenance plan.
3. Translate plan into financial terms.

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<sup>35</sup> "Advanced Public Works Management," Student Guide, Naval School, Civil Engineer Corps Officers, Port Hueneme, CA, Section 1631-1, 1996.

4. Adjust when targets arrive.
5. Measure progress against the plan.

### 3.3.4.3 Investment Indicators

#### 3.3.4.3.1 Facility Condition Index (FCI)

This provides a broad idea of the general condition of the facilities on base, and what it would take to make required improvements. The FCI is calculated by the dividing the BMAR by the CPV. BMAR is the backlog of maintenance and repair, as reported by the base; it is a byproduct of the AIS, and it represents the estimated cost to maintain and repair everything to a particular standard. The problem with BMAR is that the standards are not clearly stated anywhere, and the funding climate bears directly on what standard of facility a base could reasonably expect. An FCI below 3.5% is good.

#### 3.3.4.3.2 Facility Funding Index

This index measures the annual real property maintenance funding against the BMAR. No target is advertised, however high is obviously good. This index is good for trend analysis, to see whether the historical funding level is high enough to arrest and reverse the growth of the backlog.

#### 3.3.4.3.3 Asset Protection Index

This is the annual funding divided by the CPV. How much are we investing per dollar of infrastructure? NAVFAC advertises a target of 1.75% as representing acceptable facilities risk.

### 3.4 Acquisition – How do we **get** what we **need**?

The government contracting officer (KO) is affected by many decisions of each branch of federal government. The legislative branch writes the procurement laws, like CICA and ASPA, and provides some oversight through the General Accounting Office (GAO). These statutes limit and control the ways in which the Judicial branch provides an interpretation of the laws and regulations by which owners and contractors maintain the contractual relationship. The Executive branch publishes policy guidance through the Office of Federal Procurement, within the Office of Management and Budget, and through its agencies. All of the guidance, policy and case law is incorporated into a kind of bible for contracting. The contract acquisition of construction and maintenance services by government agencies is governed by the Federal Acquisition Regulations (FAR). Each agency delivers additional and supplemental guidance to its contracting activities by means of other documents.<sup>36</sup> In the case of SUBASE, Navy KOs are guided further by the Defense Acquisition Regulations, the Navy Acquisition Procedures Supplement (NAPS), and the P-68 NAVFAC Contracting Manual.

Essential in deciding which type of contract is appropriate for a particular project are the following considerations: quality, quantity, timing and flexibility required. There FAR allows eleven different types of construction contracts, but within only two broad project delivery strategies: design-bid-build (DBB) and design-build (DB).

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<sup>36</sup> "Advanced Public Works Management," Student Guide, Naval School, Civil Engineer Corps Officers, Port Hueneme, CA, Section 1641-1, 1996.



### 3.4.1 FAR requirements

FAR Part 7 provides guidance for acquisition planning, which is defined as, “the process by which the efforts of all personnel responsible for an acquisition are coordinated and integrated through a comprehensive plan for fulfilling the agency need in a timely manner and at a reasonable cost. It includes developing an overall strategy for managing the acquisition.” There are two interesting things to note about this definition and the nature of the FAR itself. One is the emphasis on a singular acquisition, and the other is that the FAR was developed with major systems acquisition in mind. Project delivery methods for construction and acquisition of facilities are prescribed in the FAR, directly inconsistent with Part 7, and as if facilities are ministerial tasks which support real procurement. Planning for a portfolio of projects, as a facilities professional might attempt, is difficult within the FAR framework, because Part 7 lays out the concepts and Part 36 limits the tools. Portfolio management is never really discussed in an organized way within the Naval Facilities training environment.

Full and open competition is said to be the only rule, from which exceptions can be made only in the following situations:<sup>37</sup>

- Only one responsible source and not other supplies or services will satisfy agency requirements
- Unusual and compelling urgency (i.e. the Government would be seriously injured unless competition was restricted)
- Industrial mobilization; engineering, developmental, or research capability; or expert services

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<sup>37</sup> Federal Acquisition Regulation, Part 6, paragraph 6.302, January 2, 1997.

- International agreement
- Authorized or required by statute
- National security
- Public interest (Secretary of the Navy approval; not delegable)

The problem is that Part 36 requires constructed facilities to be acquired in ways which prescribe how “full and open competition” is conducted. Other means for achieving full and open competition are not explored, and arguably are not allowed.

### 3.4.2 Contracting tools available

#### 3.4.2.1 Methods

##### 3.4.2.1.1 Sealed bid

Contracting officers shall solicit sealed bids if all of the following conditions are met.<sup>38</sup>

- Time permits the solicitation, submission, and evaluation of sealed bids
- The award will be made on the basis of price and other price-related factors
- It is not necessary to conduct discussions with the responding offerors about their bids, and
- There is reasonable expectation of receiving more than one bid

##### 3.4.2.1.2 Negotiated

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<sup>38</sup> Federal Acquisition Regulation, Part 6, paragraph 6.401, January 2, 1997.

This type of contract uses either competitive or other-than-competitive proposals and discussions.<sup>39</sup> Any contract awarded without using sealed bidding is a negotiated contract. Negotiation is a procedure that includes the receipt of proposals from offerors, permits bargaining, and usually affords offerors an opportunity to revise their offers before award of a contract. Bargaining may apply to price, schedule, technical requirements, type of contract, or other contractual terms.

The Small Business Act, section 8(a), provided for establishment of a program by which the Small Business Administration (SBA) can contract with a small disadvantaged business concern. Government agencies, like the Navy, contract with the SBA to obtain the construction services of the 8(a) firm. Contracting officers may limit competition to one or more eligible 8(a) firm without written justification. 8(a) contracts are usually limited to \$2M. This type of contract offers the contracting officer the benefit of being able to choose the contractor solely on the basis of past performance.

#### 3.4.2.2 Types

There are several different types of contracts available to the KO. These types are prescribed in Part 16 of the FAR. Part 36 and supplements limit the use of these methods for strictly "construction" projects. CEC officers and Navy facilities KOs are forced to structure acquisitions to not look like construction, incorporating "professional services" instead to overcome the limits and open up the Part 14, 15 and 16 contracting options. Part 16 allows the following.

##### 3.4.2.2.1 Fixed price

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<sup>39</sup> Federal Acquisition Regulation, Part 14, January 2, 1997.

This type of contract provides for either a firm price or an adjustable price. If adjustable, the adjustments are made only in accordance with the included contract clauses providing for equitable adjustment under prescribed circumstances. There are economic price adjustments, incentive, prospective price redetermination, and level of effort contracts.

#### 3.4.2.2.2 Cost reimbursement

A cost reimbursement contract provides for payment of allowable costs to the extent prescribed in the contract. An estimate of the total cost is prepared in advance for the purposes of obligating funds and establishing a ceiling that the contractor may not exceed without approval of the contracting officer. Cost reimbursement contracts are used when the scope of work is less certain than in a fixed price contract. Reimbursement of costs can be supplemented by an incentive fee, award fee or fixed fee. An award fee is the combination of a base fee (which may be zero) and an additional fee based on a judgmental evaluation by the Government; it is used to motivate the contractor to perform the work in an excellent manner. Fixed fees are negotiated and do not change unless the work to be performed is changed; this type of contract may be used when risk is high, but it provides little cost control incentive to the contractor.

#### 3.4.2.2.3 Incentive

Several types of incentive contracts exist, to allow the contracting officer to motivate the contractor to meet certain targets. Cost incentive contracts include a target cost, target profit or fee, and a profit or fee adjustment formula based on the relationship of the final cost with the target cost. Technical performance incentives are generally only used in major systems during research, development or

production. Delivery incentive contracts are used when schedule is a significant government objective.

#### 3.4.2.2.4 Indefinite Delivery

An indefinite delivery contract is used when the Government anticipates a requirement for multiple items. The number of items to be ordered can vary within a range specified, and they are ordered when required by the Government. A requirements contract specifies that if the contracting agency has a need for a particular item, it must order that item from the contractor; maximum or minimum quantities may be specified. Multiple awards for indefinite delivery contracts is sometimes encouraged to allow the Government flexibility in purchasing and to spread the work among eligible contractors.

#### 3.4.2.2.5 Time and Materials

A time and materials contract is not as open-ended as it sounds. It includes a ceiling price, and material costs are agreed to up front. It is used when an accurate estimate for the effort required to perform the work is not possible. Time and materials contracts are rare in facility construction or repair, partly because of the extensive Government surveillance is required.

#### 3.4.2.2.6 FAR 36.6 Contracts with Architect-Engineers for design (first step in DBB)

FAR Subpart 36.6 is a limitation on other FAR parts. A-E contracts are required by the Brooks Act to be negotiated and awarded based on the following selection criteria:<sup>40</sup>

- Professional qualifications

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<sup>40</sup> Federal Acquisition Regulation, Part 36, January 2, 1997.

- Specialized experience and technical competence
- Capacity to accomplish work on time
- Past performance in terms of cost control, quality and timeliness
- Location in and familiarity with location of project
- Demonstrated success in prescribing the use of recovered materials and achieving waste reduction and energy efficiency in facility design

The evaluation criteria are sometimes collectively referred to as a “beauty contest,” because there are no objective measurements. In very unusual circumstances, an actual design competition may be performed.

#### 3.4.2.2.7 FAR 36.2 Special Aspects of Contracting for Construction (second step in DBB)

This subpart further regulates the conduct of KO’s in procuring construction. The general areas of regulation encompass the following headings:

- Contractor performance evaluations. These are required in all construction contracts valued in excess of \$500,000, even though previous evaluations can almost never be used in selection or rejection of a successful low bidder.
- Specifications. This paragraph prescribes the use in contract specifications of generally accepted standards and products. Specification of brand name products must be accompanied by an explanation of the particular attributes of the product required in the contract.
- Government estimate. An estimate must be produced for contract actions above \$25,000, and it cannot be shared with prospective bidders.

- Disclosure of magnitude of construction projects. This requirement prescribes the ranges that can be advertised when soliciting the contract, allowing prospective bidders to get an idea of the general magnitude of the project.
- Statutory cost limitations. A largely superfluous paragraph, this one disallows contract award in excess of any legally prescribed limit. Significantly, it also requires rejection of “unbalanced” offers.
- Liquidated damages. This paragraph requires the KO to consider the use of LD’s in the contract.
- Pricing fixed-price construction contracts. Requires lump-sum pricing except where unit prices make more sense.
- Concurrent performance of firm-fixed-price and other types of construction contracts. Prohibits mixing contract types on the same work site.
- Construction contracts with A-E firms. This paragraph is significant. It prohibits award of a construction contract to the same firm that designed it except with agency head (SECNAV) approval. Presumably, this prohibition is not in effect when Subpart 36.3 is in force (DB authority.)
- Inspection of site and examination of data. Requires KO’s to allow examination of the construction site prior to bidding.
- Distribution of advance notices. KO is given wide latitude in distributing advertisement of the solicitation to industry.
- Preconstruction orientation. Requires the KO to inform the successful offeror of significant matters of interest, including labor standards and contract administration authorities.

- Special procedures for sealed bidding in construction contracting.

Modifies Part 14 requirements for presolicitation notices, invitations for bids and notice of award.

- Special procedures for price negotiation in construction contracting.

Requires the KO to be diligent in seeking a “meeting of the minds” with the contractor regarding scope, cost and price data, and use of rough yardsticks associated with per unit costing.

- Special procedures for cost-reimbursement contracts for construction.

Restricts the KO from using cost-reimbursement for construction unless it is specifically consistent with Subpart 16.3 and Part 15.

None of the above paragraphs are particularly onerous to the construction contracting officer. However, the aggregate effect of the section is to place additional requirements, prohibitions and administrative inefficiencies on construction contract managers, reducing, for the most part, their discretion in making sound business decisions.

#### 3.4.2.2.8 Design-build

Effective January 1, 1997, a two step design build award method is acceptable for government construction contracting (Final rule, 62 FR 224 1/2/97). A fairly rigid procurement process is prescribed in the FAR<sup>41</sup>, consisting of two phases. Phase one includes the scope of work, evaluation factors of technical approach and technical qualifications, the phase two evaluation criteria, and a statement of the maximum number of offerors who will be asked to submit phase two proposals.

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<sup>41</sup> Federal Acquisition Regulation, Part 36, subpart 36.3, January 2, 1997



Phase two requires submission of technical and price proposals, which are evaluated separately.

## Chapter 4

### ANALYSIS

#### 4.1 Results of above planning, budgeting and acquisition system

Each individual rule and regulation included in the Navy Planning Programming and Budgeting System, and in the FAR, is there for a good reason, having been included as new lessons were learned in the field or as leadership or cultural philosophy shifted. The facilities business within the Navy has evolved over time, and is continually undergoing incremental change. New legislation is introduced to allow a particular action or prohibit another. And each change by itself is analyzed and debated before its acceptance into the system. Today, we have a system that allows us to keep bases operating and ships at sea, so far. There are however, significant impediments within the system to frustrate and handcuff facilities professionals. Some of these are presented below.

##### 4.1.1 Segmentation of the "program" from the beginning of planning

Each summer, public works officers and comptrollers and Commanding Officers are forced to make difficult decisions about how next fiscal year's money will be spent. In coming up with a facilities "program", or strategy, for the year, the decision-makers on the base level have to produce many separate spending plans. There is the MAP that guides maintenance and repair within the CO's funding authority; there is the RED list of projects to be funded by the major claimant; there is MILCON program for new construction above \$500,000. And all of it is based on data that is from several months old (in the case of the MAP) to several years old (in the case of MILCON.) Funding for the three areas comes from three or more separate pots of money, each of which is controlled by a superior in the base CO's

chain of command. The CO is forced to “sell” individual parts of his program to different players, each of whom is looking for different attributes.

In the author’s experience, it appears obvious that money drives decision making in the Navy facilities arena. For a base, there are many different sources of funds. But, the fact that money is coming from different places does not preclude coherent portfolio planning. Planners are forced to pigeonhole projects into arbitrary funding thresholds; funding decision-makers focus only on individual projects, not on overall base infrastructure conditions. The base is left to execute disjointed pieces of their master plan, never knowing what is coming next year, and often having few (or no) practical alternatives from which to choose.

#### 4.1.2 Discrete value measurement

In the commercial world, capital rationing can be done based on a comparison of the predicted revenue generated by the facilities among which the choices are made. Cash flow analysis and risk analysis can be modeled using discounted dollars as the measuring rod. But the private planner never loses sight of the overall bottom line. How does the initial project investment affect the company’s cash flow for that year, and how does that investment and the maintenance and operations expenses that necessarily follow fit in with out-year budgets? And how does a proposed facility improve, detract from, or maintain the company’s existing infrastructure portfolio?

In the Navy, income generation potential is almost never a factor in deciding which facilities get fixed, replaced or constructed. The measurement scale used is not dollars alone, but a conglomeration of less easily determined criteria like mission impact and quality of life with available funds. Therefore, prioritizing work at each level of decision-making is more difficult. Decision-makers are forced to measure

the relative value of totally unrelated projects against one another, using only the individual project documentation as a guide. Of course there is policy regarding relative importance of functions (i. e., by investment code described in the previous chapter), but in the end it becomes each project against every other.

#### 4.1.3 No way to minimize lifecycle cost

Lifecycle cost is a concept most engineers are familiar with. It is important to recognize that the overall cost of a facility is much, much more than just the price of construction. Lifecycle cost includes design, acquisition (construction), operations, maintenance and disposal. In the Navy, lifecycle cost must be considered when proposing a project. It is also a stated goal that lifecycle cost be minimized. However, current acquisition methods have not been applied in ways which ensure that minimization occurs. In fact, lifecycle cost is only considered at the very beginning of planning—the first stage. Unfortunately, the predicted lifecycle cost, which is only one criterion for selecting projects, will not be the real lifecycle cost unless operations, maintenance and disposal costs are actively minimized throughout the life of the facility. Inactive or inattentive facility management, and preventive maintenance neglect, will drive up lifecycle cost. The disconnect here is between procurement budgeting and O&M budgeting. Lifecycle cost is an evaluation tool, not a budgeting tool. There is no guaranteed funding stream attached to construction financing by the claimant or Congress that covers the future O&M costs of the facility. Bases are funded based on historical funding levels and current funding availability, not strictly CPV or projected facility O&M cost.

There must be planned investment throughout the life of the facility to ensure that lifecycle cost is actually minimized. For instance, a building whose life expectancy is 50 years should have a new roof every 10-15 years, window

replacement at 20, regular mechanical system cleaning, inspection and balancing, an expandable electrical system, and many more planned expenditures to allow proper performance for the 50 year period. Under the present system, deferrable maintenance is almost always deferred. In other words, if the work is not critical to the very existence of the facility, it can be pushed back to "next year." Next year, all too often, never arrives. Therefore the useful life of the building is shortened, requiring earlier capital investment for replacement.

#### 4.1.4 No innovation

Innovation must be considered from several points of view to understand why the government is not a facilitator of innovation. All of the players can derive benefits from innovation, but each will innovate only when those benefits can be realized. In the sealed bid, fixed price paradigm now required by FAR 36.1, there is little room for innovation. The Navy acts more like a regulator than an owner, and it is risk averse. Therefore maximum risk is placed on the contractor. The segmented design-bid-build strategy means that designers are not compensated for innovation, contractors can't afford the risk of innovation, and the government is not fully aware of the benefits of innovation, nor is it willing to pay to get them. There are just too few benefits available in the system.

#### 4.1.5 Ability to execute attracts funds

There is an operative dynamic in Navy facilities management that contributes to inefficiency and incoherence. Throughout the budget process, bottom line control figures are used to come up with a spending plan. Once the figures are advertised, all parties develop their facilities plan to match those funding figures. Each year though, additional funding becomes available toward the end of the year, and short-

fuse data calls are sent out by the funding sources to the bases asking if there are additional projects that can be awarded before the end of the fiscal year. Everyone knows this is the way the game is played, so each base has a backlog of projects ready or nearly ready to be awarded, so they can capture some of the available dollars. These projects may not be the most important, but if they “fit” into the available pot of money, they are funded and awarded. This informal system has the effect of minimizing faith in long range plans, thereby providing incentive for base facilities managers to spend more effort on flexibility and execution than on planning.

#### 4.1.6 Waste design funds and time—design process diagram

Figure 30 shows the convoluted design process followed by engineers in the Public Works Department at SUBASE.<sup>42</sup> There are four critical decision points in the process where further action must await funding. There is considerable time, effort and money involved in performing each task on the diagram, and it is wasted if the project is never funded.

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<sup>42</sup> Hosig, Rodger. Facilities Management Engineering Division Director, SUBASENLON, 1996.



#### 4.1.7 Design strategy

The Engineering Division in PWD is the center of most major project planning, design and documentation. One of its primary goals is to prepare to capture as much funding as becomes available. Personnel within the division make decisions about which projects will be designed in-house and which will go to an A-E. They also perform liaison with the major claimant and other funding sources on an informal basis to maintain an awareness of the funding climate, so they can react to opportunities appropriately. The division director calls this "sensing the wind and tacking to it."<sup>43</sup> There is some policy guidance that is promulgated regularly regarding the types of base functions that top officials consider important at the time. From this, one can glean what projects are likely to be funded. Often though, funding decisions do not mirror the policy guidance. Another problem is that with each new official (CNO, SECNAV, SECDEF, Commander-in-Chief), the wind direction changes. Of the 40 or so projects designed by the engineers at SUBASE each year, about one fourth are never funded.

#### 4.1.8 Year end dump tough on industry and government

The annual budget cycle is surrounded by an aura of uncertainty, the history of which is outside the scope of this paper. This uncertainty causes money managers within the government to dole out funds very carefully, and to maintain a contingency reserve in case shortfalls should arise. Each comptroller at every level holds this reserve until the last minute, releasing a large portion of the yearly budget

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<sup>43</sup> Schweitzer, Duncan. Engineering Director, SUBASENLON, personal interview, April 1997.



in September of every year. Again, everyone knows to expect a “year-end dump,” and prepares for it as well as possible.

#### 4.1.8.1 Bids are rushed and contain contingency

With about half of the year’s projects awarded in August or September, industry is hard pressed to keep up. Plans and specifications are advertised during the summer, at the height of the construction season in most places, when contractors are the least able to perform adequate pre-bid research or prepare accurate estimates. So, bids are hurriedly prepared, often with a contingency factor thrown in.

#### 4.1.8.2 Bid documents prepared hurriedly – less accurate

The design community is also adversely impacted by the glut of work at the end of the fiscal year. Design firms cannot afford to adequately staff to meet inconsistent government requirements throughout the year. Often, designers are given unrealistically short timeframes to prepare plans and specifications. In combination with the A-E design procurement system that limits design investment to 6% of project cost, these circumstances lead to imperfect project documentation and eventually to change orders in the field.<sup>44</sup>

#### 4.1.8.3 Splits year into two halves: planned and unplanned

Execution of the MAP, the approved Special Projects and MILCON projects is split into two separate efforts. For the first three-quarters of the year, the plan must be executed as if there would be no year-end dump, to avoid unplanned violations of

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<sup>44</sup> Section 2306(d), Title 10, United States Code and Section 254(b), Title 41, United States Code.

the Anti-Deficiency Act. The last quarter becomes a scramble to execute unplanned projects in a constricted time frame.

#### 4.1.8.4 Leaves little time to negotiate

The split execution process has the effect of constraining the contracting judgment of the PWO and ROICC. At the end of the year, the quickest procurement method, and the one with the least risk of a bid-bust, is sealed bid, fixed price—the so-called “traditional” method. The other contract types often require too much time and manpower to justify and document. Negotiated procurements, including design-build, leases, complicated service agreements (which might include DBO or BOT) just can’t get done in the year-end dump.

#### 4.1.8.5 No opportunity for value engineering

The “traditional” segmentation of design and construction leaves a large gap between owners, designers and builders through which fall innovation and value engineering, among other things. The design-bid-build contracting method, especially when conducted at year-end, offers no opportunity for designers or builders to appropriate the benefits of creative ideas. The Navy has a formal value engineering program that pays the contractor 55% of the estimated savings of a particular value engineering idea. However, the contractor has no guarantee before bidding that its idea will be accepted, and the request process is painfully slow and detailed. Therefore it is usually not worth the contractor’s while to even suggest a value engineering change. Designers as well, are hamstrung by our system of guide specifications and reliance on proven technology.

#### 4.1.8.6 Winter wrong time to start construction

The end of the fiscal year on 30 September results in award of a large portion of our construction projects just before winter every year. In the southern climes this is not a problem. In New London however, it only compounds the problems associated with year-end dump. Projects that would ordinarily take 4-6 months now take 7 –9 to allow for bad weather. This time extension translates into added costs for overhead and inefficiencies due to poor working conditions.

#### 4.1.8.7 Creates adversarial relationships

It is commonly accepted that fixed price contracts are the root of the normally adversarial relationship between owners and contractors. Fixed price contracts with the above year end disadvantages most assuredly result in greater risk of misunderstanding, distrust, late completion, poor quality and motivation for the contractor to cut corners. There is just no incentive built into most of these contracts that would serve to preclude these unfortunate results.

#### 4.1.9 Shortage of funds slows change order processing and extends construction time

When the ROICC, EFD or PWC awards a construction contract, the administering activity (usually the ROICC) is not given a contingency fund to pay for change orders. Such a fund is commonly held at the major claimant level, but in recent years it has been a target especially toward the end of the year for redistribution. Therefore, the change order process now takes longer than it used to. More scrutiny by the funding activity now means that the ROICC must argue the technical and financial points of each change order to “sell” it to the funding authority. Simple minor changes involving unforeseen site conditions often take 4-8

weeks to be approved and funded. Negotiations and issuance of the change order cannot take place before approval, so the work is often delayed sometimes requiring additional funds for extended overhead. Of course, many of these results can be avoided with appropriate management and discipline by the funding activities.

#### 4.1.10 Disconnect between planning and budgeting

Since 1992, the backlog of maintenance and repair at SUBASE has grown from \$55M to almost \$90M. This deterioration occurred while the base was spending \$8-10M per year on maintenance and repair, supplemented by another \$2-\$20M worth of construction and repair funded by the major claimant and other sources.<sup>45</sup>

##### 4.1.10.1 Never accomplish plan

Without a major increase in funding levels it is obvious that this trend cannot be reversed. The backlog will steadily be filled by more projects with higher price tags as deterioration of building systems compound one another. The master plan will remain an unrealized fantasy as long as it is not a consideration in project funding.

##### 4.1.10.2 Buildings continue to age

The average age of buildings at SUBASE is over 40 years.<sup>46</sup> There are 26 buildings still in operation on the base that are over 60 years old. These facilities are past the end of their useful life, yet we continue to use them and spend money on

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<sup>45</sup> Public Works Department SUBASENLON, Facilities Management Engineering Division, Project Files, 1992-1997.

<sup>46</sup> P-164, Naval Facilities Engineering Command, 1996.

them because we have no choice. Military and civilian Navy personnel perform mission-essential tasks within them.

#### 4.1.10.3 Only critical repairs are made

One of the criteria for funding of maintenance and repair special projects is critical deficiency resolution. In other words, the project will likely go unfunded until the deficiencies it corrects become critical. Any project that can be deferred until later is deferred. Given the current funding climate, this is the right choice. However, it drives us further down the path toward a crumbling infrastructure.

#### 4.1.10.4 Crisis spending—breakdown maintenance

There is no long-range maintenance plan at SUBASE. This alone speaks volumes. It is not poor management but rather the result of lack of control at the base level. There is no commitment of funds by higher authority to either the master plan or any maintenance plan. So there is no reason to have a long-range plan. An annual spending plan (MAP) provides the road map for maintenance and repair, and accomplishing more than half of the MAP is a moral victory. A significant portion of the annual maintenance and repair budget is spent for unplanned repairs, as systems deteriorate and break down. For instance, with two months left in FY 97, SUBASE has almost \$100K in air conditioning repairs alone that remains unfunded, while people work in unsatisfactory conditions. Money will have to be requested from higher authority to make these necessary repairs, because the base has only enough money to pay salaries, utility bills and other previous obligations for the rest of the year.

#### 4.1.10.5 Bumpy local operating budget

As long as breakdown maintenance and repair is the rule rather than the exception, there is no way to get ahead of the bow wave and stick to a reasonable plan. Like the city of Franklin, Ohio, which sought private sector help for wastewater treatment, SUBASE has no way to predict how much money it will need to keep the physical plant operating for one more year. The best estimate, and the one that comptrollers like to use, is last year's budget. Unfortunately, with a plant value approaching \$800M at SUBASE, necessary capital investment cannot be predicted to the nearest \$100K, and will not remain constant from year to year, at least not as long as significant expenditure is unplanned.

#### 4.1.11 Effort directed at clearing hurdles and gamesmanship

The process described in Chapter 3 is complex and based on volumes of rules and regulations. There are good reasons for each and every one of them. However, together they provide the source of the undoing of our Navy infrastructure. The system in its current configuration is pretty fair when it comes to distributing funds throughout the several thousand naval activities throughout the world. Competition between activities is waged on a level playing field, with all players knowing the rules. Our major problem is in developing a connection between facilities planning and funding. They remain divorced from each other, even as very detailed documentation is prescribed for both the planning and funding processes by the same hierarchical authorities. Facilities professionals direct much of their effort chasing the mighty dollar, while navigating the maze of forms, documents and separate authorities that govern small insular portions of the procurement process (e. g., SBA, OMB, DCAA.)

## 4.2 Causes of adverse results

### 4.2.1 Planning

There is no shortage of plans and planners within the Navy. The planning system for facilities is a well developed, thoughtful process aimed at turning requirements into projects. Base facilities staffs accomplish this planning with the aid of EFD and PWC technical assistance. The projects form a “wish list” or portfolio. The portfolio is a continuously evolving entity, but few people view the portfolio as a whole.

#### 4.2.1.1 Too many layers means no coherent portfolio

With over fifty tenant commands on the base, each with its own major claimant and potentially several resource sponsors, the engineering organization on base is forced to deal with a multitude of higher authority groups. These groups also have portfolios of projects within their purview. Major claimants try to balance individual base priorities against each other in forming the RED List each year. So the base must submit project documentation to each of the funding authorities, and then hope many of its projects are “chosen.” The CNO staff has to balance other needs with the major claimant infrastructure needs, so operations and maintenance of ships and aircraft competes directly with base infrastructure needs. Fulfilling the needs of the many funding source activities may often be internally inconsistent; that is, it may be impossible to act in consonance with all of the individual plans simultaneously.

#### 4.2.1.2 CO turnover

On the base level, it is difficult to maintain a consistent and coherent portfolio, partly because of the transient nature of those in command. Each new CO, not trained in facilities management, and usually fresh from operational deployment,

takes the helm at his base and sets a new course. Every CO has his pet projects and perceptions of what is important. CO's also have to be cognizant of the expectations set by their superiors, and what they value. To compound the problem, base CO's often compete for promotion with tenant command and other base CO's. So there is the desire to perform ahead of his peers that motivates a CO to chart a unique course.

The base CO has the power to make or break facilities operations. The job of the local engineering organization is to educate the CO about his facilities, and encourage him to be disciplined in his planning and budgeting approach. The engineers are often unsuccessful, and even when they do succeed, a new CO arrives as soon as the old CO has fully grasped the system.

#### 4.2.1.3 Focus du jour

Far above the base CO's head, policy is developed and promulgated from within the walls of the Pentagon and the Capitol building in Washington.

##### 4.2.1.3.1 Security

Ever since the bombing of the barracks in Riyadh, Saudi Arabia in 1995, security has been near the top of the agenda for military planners. It is a hot topic in this year's budget (FY98), and major claimants are scouring the project backlogs for "security" projects (projects that list improved security as a benefit.) CLF requested information from SUBASE in July 1997 for facilities projects involving security. Apparently, \$2M had become available for security facility projects. However, there were none on the books at SUBASE. SUBASE has a requirement for security equipment, but not a facility. Engineers scrambled to find something that could be submitted as input, just to capture available funds.



#### 4.2.1.3.2 Quality of life

In an all-volunteer force, it is necessary to make an effort to entice career motivated individuals to remain in the service. "Quality of Life" has become a popular maxim to describe these efforts. It is present in every level of the hierarchy as a policy priority. Improvement of the quality of life of the sailor, marine, soldier and airman is used as a knife to trim money away from weapons procurement and operations and maintenance of the fleet. Each leader though, has his own definition of quality of life, and how good is good enough. The debate will rage on far into the future, but facilities continue to deteriorate.

#### 4.2.2 Programming, budgeting and decision making

##### 4.2.2.1 Congress only wants responsibility for construction

With less than one third of those now serving in Congress having military experience, it is not inconceivable that our elected representatives would not wish to control every aspect of the nation's military infrastructure. That they would reach down and choose only construction, and then only construction projects above \$500,000, is rather questionable. The following recent event illustrates the problem vividly.

"The House of Representatives boosted the Pentagon's budget for barracks 17% July 8 when it overwhelmingly approved a \$9.4B construction budget. The construction funding bill... provides \$109M more than the \$752M requested for troop housing. "We have had some criticism... that we are pork-barreling, but I do not think it is pork-barreling when we are doing the very best that we can with limited dollars for our men and women in the armed services... It is absolutely terrible when we go to these bases. In some of them, these young men and women are operating the most sophisticated weapons that man has ever devised and they are walking across unpaved parking lots and standing in showers with water up to their ankles to take a bath. This is absolutely not right," said Rep. W. G. "Bill" Hefner, D-NC. The Defense Department has a 20-year, \$14.3B plan to provide better housing for service members that would provide a private room and a shared bath for everyone assigned to a permanent base. The 39 projects requested would

make modest steps toward improvements. The House however, added 10 projects to the military's request. Rep. Ron Packard, R-CA, the military construction subcommittee chairman, said the expense was necessary to keep service members happy. "We spend billions of dollars to train our men and women, only to lose them because we do not have adequate housing for them. That is atrocious." The construction funding bill also includes \$278M more than the administration's request for construction of family housing and a \$21.4M increase in money that will buy four additional child-care centers.<sup>47</sup>

One of the proposed child-care centers in the Navy Times article is to be located at SUBASENLON. The regional commander, responsible for five bases in New England and the North Atlantic (Iceland and Wales,) wants to scrap the plans for the child-care center in favor of a community center in the family housing area. Unfortunately, Congressional military construction funding bills don't allow local commanders to change the approved list. Who is in the better position to be able to discern the needs of the sailors and their families at SUBASE, the regional commander, the CO, or Congress? Why does Congress only want to control construction, and not the other parts of the infrastructure budget? These are questions that we in the military are fortunate enough not to have to ask. We will continue to provide the best input we can to those on whose decisions our lives depend, and trust that those decisions are the right ones.

#### 4.2.2.1.1 No recognition of O&M tail

Base CO's and Congressmen can see immediate results from a construction project. A brand new building looks great and its new occupants usually have smiles on their faces. Unfortunately, lurking around the corner, maybe five or more years in the future, are obligatory maintenance and repair expenses to prevent the building from deteriorating. This O&M "tail" is not part of the decision to build or not build a

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<sup>47</sup> "Construction vote paves way for new barracks," Navy Times, p. 6, July 22, 1997.

facility. Predicted lifecycle cost is a consideration, but there is no commitment that follows the construction dollars to pay for the tail. And with each new construction project, there is usually an unrealized opportunity to demolish an existing facility or two.

#### 4.2.2.1.2 Politically driven

Construction can be used as a tool to make one's mark on the landscape. The reason the congressman cited above was criticized for pork barreling is patently obvious. Military construction is a visible way to bring work to the community and be seen as an advocate for strong defense. When the opportunity arises to also be perceived as an advocate for families and children, what politician can possibly resist? The fact that local commanders do not even want the new facilities is an indication of how much it is really needed.

#### 4.2.2.1.3 Myopic

The congressman above has also not fully realized why the young men and women have to take showers with water up to their ankles. Construction dollars do not pay to keep drains clear and water flowing on a base. Operations and maintenance dollars do, and facilities requirements must compete with weapons, social programs, ship and aircraft upkeep, and contingency troop operations like Bosnia and Haiti and Somalia.

#### 4.2.2.1.4 No hard decisions

Another Navy Times article provides some insight on the wisdom and fortitude of Congress in dealing with the harder questions of what to fund and not to fund in the military.

“There won’t be a 1999 round of base closings. Congress won’t approve it. That spells trouble for the Department of Defense, because military officials had hoped base closing rounds in 1999 and 2001 would generate \$2.7B a year to pay for weapons modernization. The military’s options are now severely limited by Congress, which has refused additional base closings, opposed large personnel cuts and limited increases in defense spending, but is pushing for faster weapons modernization. Arguing for base closings, Defense Secretary William Cohen said that after four rounds of closures in which 97 major installations were selected to be closed, the military has eliminated only 21 percent of bases while force structure is dropping by 36 percent.”

#### 4.2.2.1.4.1 Core business

There is no structure or consistency to congressional policies like the one on base closure above. Most striking was the unwillingness to cut bases or personnel while budgets are shrinking and weapons modernization is a priority. It seems fairly obvious that the goals of Congress are mutually exclusive given the current state of the military infrastructure. Decisions on which functions are strictly military may be made by default, absent the will of Congress. For instance, bases like NAS Brunswick may have to close because there is simply not enough money to repair its facilities.

#### 4.2.2.1.4.2 Social vs. weapons vs. infrastructure

Choices have to be made between many good projects in the portfolios of Navy bases throughout the world. Weapons modernization is in conflict with infrastructure investment and quality of life. It appears clear to me that we are trying to be all things to all people. And there is not enough money to allow us to continue to try.

#### 4.2.2.2 Minimal facilities organization

NAVFAC is the heart of the Navy’s facilities organization. Its power is small in comparison to the fleet commands and systems commands. But it is tasked to

"support the fleet" with quality facilities. In the 1990's its mission funding, allotted to pay for the expenses of its internal operation, has been cut dramatically, so that today most services provided by NAVFAC are reimbursable. This has resulted, naturally, in a redoubled effort to please, "delight" some would say, the "customer," the customer being the fleet in all of its different forms.

The PWD and ROICC offices on SUBASE are the embodiment of NAVFAC on the base. PWD is funded with base operations and maintenance funds while the ROICC operates on a reimbursable basis, providing construction and service contract administration for a percentage of the project cost. The PWO is the linchpin of the organization on base, and acts as the CO's point man for facilities issues. The PWO has little power to determine the destiny of the base infrastructure even though he is responsible for maintaining it. The CO is ultimately responsible for the performance of the base as a fleet provider, and he therefore has the power to control where the money goes.

The fact that the engineering organization is subordinate to a line officer, representing the interests of the submarine in the case of SUBASE, is a double edged sword, keeping fleet requirements paramount, but with an inexperienced commander making facilities decisions. Many would this arrangement is an absolute necessity. However, relegating NAVFAC to merely a reimbursable puppet, subject to the specific facility wishes of operational commanders, is unwise in my estimation. A supportive role must always be maintained by whatever engineering/facilities organization serves the fleet. But it is not necessary to minimize its influence in order to keep fleet requirements foremost in the engineers' minds.

### 4.2.3 Acquisition

The acquisition process has received much attention in recent years, identified by many as the primary source of government facilities problems. The FAR requires documentation at every turn, which makes the contracting officer's job a tedious one. The FAR though is a result of years of legislation governing how the government should procure goods and services. The legislation is supplemented with additional agency requirements that further regulate the contracting officer's behavior. There are other barriers to efficiency as well.

#### 4.2.3.1 Convoluted/arbitrary authority limits

Figure 26 showed the authority limits placed on CO's and their superior commanders. The limits are different depending on the type of work being done. The planner and designer must be cognizant of these limitations when developing the facility requirements because the different authority limits correspond to different approval processes and time requirements. They would not want to sink a project whose primary objective is repair by including just a bit too much construction, so that the entire project has to go through the MILCON mill. The limits have the effect of further segmenting the facilities portfolio.

#### 4.2.3.2 Brooks Act

The Brooks Act governs procurement of A-E services under different rules of competition than those available for construction. This act drove the procurement system almost exclusively into Miller's Quadrant IV, separating design from construction and contributing to the segmentation of the entire acquisition process.

#### 4.2.3.3 Guide spec produces no innovation

Guide specifications are used in Navy facilities procurement for many good reasons. We have a huge procurement system, and communication between different groups especially in the field, is cumbersome at best. The EFD maintains technical guide specifications that incorporate best materials and techniques and ensure that specifications include the lessons of past technical failures. Using the guide specification without considering the unique nature of each project causes many field engineers and contracting officials to be overly conservative. It limits innovation by the designer and the builder. Guide specifications are not the only cause of technical stagnation in federal procurement, but the lack of innovation is an unfortunate outgrowth of systematic reliance on them.

#### 4.2.3.4 Competition requirements

The FAR, and almost any other guidance the contracting officer has in his/her acquisition toolbox, contains specific and detailed rules governing competition. It is the stated goal of the federal government to maximize competition in procurement. In general, this goal is an excellent way to ensure that the government procures goods and services at their fair and reasonable market prices. It also furthers the federal government's long standing aim of helping the small business owner get started and succeed. And it gives the appearance, at least, of a level playing field.

Unfortunately, efforts to get the lowest award price result in marginal quality, and the ultimate cost of procurement is higher than it might have been. Weeding out the poor performer so that all competitors for government work are professional and quality oriented is nearly impossible. So there is a price paid for leveling the playing field.

#### 4.2.3.5 Sealed bid paradigm

Prior to the recent focus on acquisition reform, and since the Depression era, the backbone of government procurement has been the low bidder. In working with the low bidder, the government created an adversarial environment in which the government played the role of player and referee. A contractor doing government work is burdened with administrative requirements, all with a worthwhile objective but when added together become unwieldy. The contractor is less efficient when forced to play under government rules, so much so that a large portion of the contracting community in many areas refuses to do government work. So the system that was set up to maximize competition has grown into one where some of the competition has decided not to play.

The sealed bid paradigm also affects government procurement offices. ROICC administrators spend a large portion of their days trying to resolve disputes over inconsistencies in documents, acting as intermediary between prime contractors and subcontractors who don't agree, and documenting change orders. Many of these problems could have been resolved before award if the contract had been negotiated. The tradeoff becomes time spent before award versus time spent after award. The system often forces administrators to award the job so funds can be obligated, and take care of technical and other problems "in the field."

#### 4.3 Acquisition Reform: Only one part of the puzzle

Acquisition reform has been hailed in recent years as the answer to our prayers. As part of the effort to "reinvent government," administrators and legislators have worked in concert to shed excess regulation and delegate authority to contracting officers. Changes to the FAR and to the once ultra-conservative posture of most procurement agencies have resulted in more options being open to facilities



contracting officers. There are many more contracting vehicles to choose from, and justification to avoid sealed bid, fixed price contracts has been streamlined. All of these are positive steps.

In construction, there are now mechanisms to avoid poor performing contractors. Contracting officers at the field level can now issue delivery orders to contractors already chosen to provide construction services in the region. There are several types of these contracts in the SUBASE area that the from which the ROICC.

#### 4.3.1 BOS-JOC – job order contract for small projects

For small construction jobs, system repairs and service, the base has its own “BOS-JOC”, Base Operating Support-Job Order Contract. A large multi trade engineering and construction firm has an annual contract with four one-year options to support general base requirements. The PWD facilities support contracts (FSC) office administers the contract, issuing delivery orders against the \$3M minimum requirement. This contract was awarded after a two step qualification and selection process, with each delivery order being pre-priced based on the Means Estimating Guide; there is still negotiation involved, but it is minimal.

#### 4.3.2 Regional Contracts

There are two new regional contracts to provide for larger construction jobs, called the Task Order Contract (TOC) and the Multi-Award Regional Contract (MARC). The TOC was awarded by the Washington area EFD, and is designed for medium sized construction projects (\$75,000 - \$2M). The MARC was awarded by the Philadelphia area EFD and is aimed at large construction (\$2M - \$10M). Both of these contracts award a base year with two option years, each with a minimum

guaranteed award. Individual delivery orders are competed within the three or four pre-selected TOC or MARC contractors. The contractors were selected on qualifications, expertise and past performance, with the objective being best value rather than lowest price. Advantages for local contracting offices are less detailed specification (35% design required), a faster project award period of only 21 days, and a known contractor eliminating the risk of low ball offers.

#### 4.3.3 RAC

Environmental remediation projects have been awarded since the early 90's on a cost-reimbursable basis to pre-selected Remedial Action Contract (RAC) contractors. These are also awarded regionally based on qualifications, expertise and past performance. This type of cost-reimbursable contract makes sense when requirements are only loosely defined, as is the case in many remediation efforts.

#### 4.3.4 PPV

Recent legislation makes it allowable for government agencies to enter into agreements with private developers to leverage federal funds.<sup>48</sup> It is revolutionary in that it allows contracting officers to put government funds at risk in the marketplace in an effort to obtain additional value from private sector investment. Called "Public-Private Ventures" (PPV), these contracts are being tested by the Navy in the procurement of family housing construction and operations. Its objective is to modernize the Navy family housing inventory in a shorter time frame than would be possible with federal funding alone; projections indicate that it would take 30 years and \$20B to accomplish this task.

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<sup>48</sup> Section 2837, Title 10, United States Code, 1995.

The Navy started the PPV process by establishing a revolving fund to finance the startup of the first few projects using already identified MILCON projects. These projects were withdrawn from the MILCON program and the funds deposited into the PPV central fund. The rule of thumb used by those involved in the process is that for every dollar invested by the government up front, three dollars worth of housing can be obtained. All housing projects on the East Coast are now being studied for PPV, and housing budgets have been trimmed to match the expected savings. As of this writing, no PPV projects have been awarded under the current law.

#### 4.3.5 Open base and franchising

In recent years, most of the Navy bases on the East Coast have gone to an open gate policy, with base entrance gates being unmanned during daylight hours. The rules of travel on the base did not change; temporary or permanent military passes are still required. But the bases appear more inviting to the community. This could be a first step in persuading the private sector to join with the military in linking the base more closely to the surrounding community. Fast food franchises have been on bases since the early 1980's, but that trend could certainly be expanded to include other base services. SUBASE has just established a private investment liaison position to solicit community involvement on the base.

#### 4.3.6 Utilities partnerships

A new effort is being undertaken in the wake of utilities deregulation. "Utilities partnerships" are being studied at the EFD level to increase private investment in utilities upgrades and conservation services. The objective of this initiative is to reduce direct federal financing by financing upgrades and operations and from private sector generated savings. The initiative is in an embryonic state in 1997, but

promises to yield procurements in Miller's Quadrants I and II, reducing the segmentation of base facilities portfolios.

#### 4.3.7 Credit cards

On a smaller scale, efficiencies are being gained on the base level through the use of government credit cards. Instead of using the circuitous and lengthy supply system, administrative, maintenance and transportation materials can now be procured immediately using the cards. The savings here are gained in terms of time and efficiency of normal daily operations.

#### 4.3.8 Streamlining

Simplified acquisition processes are now in place for procurements with values under \$100,000. They allow for quicker project award and avoid some of the competition requirements required for larger projects.

#### 4.3.9 New MILCON process

The new MILCON process described in section 3.2.3.3.6 cuts the time required for large construction project award from more than five years to about three years. It utilizes a teaming approach and compresses the time schedule by allowing many of the necessary planning and documentation activities to occur in parallel. The approach has the benefit of committing significant funds to the project only after approval of the project is virtually assured.

#### 4.3.10 Summary

All of the above initiatives are steps in the right direction, toward a more reasonable approach to facilities procurement. Cumulatively, they will have the effect of simplifying the acquisition process, compressing the time it takes for a

project to be awarded and freeing up time and money for investment in more worthwhile tasks. However, government leaders and facilities professionals should recognize that these steps address only the part of the facilities infrastructure process. Free use of Engineering Systems Integration, as proposed by Miller, requires a paradigm shift in the who, how and where of planning and budgeting. Continuing down the road to fully implemented acquisition reform only puts off the tougher decisions of how many different products the military can provide to its own employees, local communities and industry, and the nation.

## Chapter 5

### PROPOSED PROCESS

This chapter presents the author's views regarding improvements that could be made to the current system of planning, budgeting and acquisition in the U. S. Navy. No attempt is made to develop a plan to get from here to there, and the proposed process is not defined comprehensively.

#### 5.1 Characteristics

##### 5.1.1 Discipline--resist attempts to change constantly

The direction of the facilities plan at most naval bases changes at least as often as the commanding officer changes. Each leader has his own idea of what is important, and the priorities for maintenance, special projects, and MILCON are continuously being updated to take advantage of hot-button issues (e. g., security, quality of life). Planning has become a secondary task because it seems that the plan is so flexible that it isn't really a plan, it's just a list of possibilities.

##### 5.1.2 Efficient delivery process

From the time a new requirement is identified until a project is completed, a need remains unmet. Reducing the time it takes from drawing board to operational facility is a primary consideration in any new system.

##### 5.1.3 Lifecycle cost minimization

A long-term approach is the only way to ensure minimum infrastructure expenditures. The current focus on what is broken and the scramble to find funds to make repairs run counter to the desire to operate a physical plant as inexpensively as possible. Early investment of time, energy and funding during the procurement

process will pay big dividends over the lifetime of a facility (see Figure 24 for reference.) In other words, O&M expenses ought to be more firmly tied to the initial decision to build.

#### 5.1.4 Smooth capital budgeting at Core Naval Facilities

Each base needs to know how much infrastructure investment is required in any given timeframe. Large anomalies in spending carry with them increased administrative support requirements translating into more people which means more dollars. Likewise, downturns in spending result in either layoffs or inefficient operation. Smooth capital expenditures mean a constant workforce and level resources from year to year.

#### 5.1.5 Confidence in plan and execution

Predictable milestones that are routinely met prevent effort being spent devising alternate plans and workarounds. Planners have to know that their plan, or a reasonable facsimile thereof, will be executed. Absent that confidence the quality of the plan suffers, and eventually there is no real planning. On the execution side, procedures should be in place to allow engineers to choose between different methods of execution in order to obtain the best overall value with the facilities budget, not only for each individual project but for the aggregate facilities program at each core Navy base.

#### 5.1.6 Sustainable base infrastructure

Every year that we do not invest properly in our facilities, they deteriorate at an ever-increasing rate. The systems in place to plan, design, construct, own, operate, maintain, repair and dispose of our facilities should be mutually reinforcing

rather than disjointed and mismatched. Each phase of the facility lifecycle should be considered in each phase of the procurement and operations cycle. Funding must be available to support the systems, which requires a firm commitment by leaders from Congress on down to a sustainable infrastructure.

#### 5.1.7 Aggregate vs. Discrete project analysis

Currently, the focus for planning, programming and budgeting is solely at the project level. This project focus must continue—supplemented, as described below, by evaluations at the portfolio level. Each project proposed by each base competes for funds with every other project on several different playing fields simultaneously at least once a year. If a project is not funded one year, it usually appears on the list until it does get funded. With each passing year, the project becomes more critical and more expensive.

Judging value from base to base without considering the entire base project portfolio is a subjective effort at best. Evaluating the portfolio at each core base is the effort that requires advanced technical insight and practical knowledge of mission requirements. This is the strategy that is likely to pay dividends in the long term. Excessive scrutiny of any one project is less meaningful the further away from the base environment the reviewer becomes. How much can a congressman know about a \$1.5M shop addition to the intermediate maintenance activity? What is its importance to the base's mission, and how does it fit in with the rest of the base infrastructure? The answers are self-evident.

#### 5.1.8 Ability to really **manage** portfolio

“Portfolio management” is not a term used in Navy infrastructure. There is encouragement at all level for base CO's and PWO's to manage their “programs,”



but management in that sense means only to monitor the documentation and approval process as it happens to make sure no one forgets about their base.

The Navy has been known in the past for its unique approach to leadership. Decision-making authority is given to the person lowest in the chain of command that has the expertise and wisdom to make the right call. Decisions are made and communicated up the chain of command; if a superior doesn't like the decision he or she countermands it.

The facilities world does not operate like that, yet. The base must ask permission from higher authority to spend its money in a way that it views will maximize its mission effectiveness. Of course ownership can be questioned; the major claimant is given money to spend for special projects at bases, so whose money is it, really? If a ship's commanding officer has the autonomy to fight his ship the way he sees fit in battle, why is the base CO not given autonomy to operate his base, even in the slower, less dynamic shore environment?

## 5.2 The Core Base Model

The methods described below are fairly generic, and not necessarily designed for SUBASENLON alone. They are proposed for a small group of bases, to be designated "core bases," by authority at the national level (i. e., CNO, SECDEF, Congress). These core bases might include the following on the east coast:

- SUBASE New London
- NAS Oceana
- Naval Base Norfolk
- SUBASE Kings Bay
- Naval Station Jacksonville

The variety of funding streams currently destined for facilities (MAP, MILCON, FHN, Special Project) would be lumped together and made available to the CO with strict portfolio planning and execution requirements from higher authority (SECDEF, SECNAV, CNO) focused upon improving the quality, timeliness, and cost effectiveness of the portfolio of naval facilities at each core base. These bases would become, for the next twenty years or so, untouchable by base closing initiatives like BRAC. Such a designation reduces flexibility in dealing with budget reductions, but more importantly would bring about a commitment to properly fund those bases that are core to the Navy's mission of keeping our fleet a viable fighting force.

#### 5.2.1 Organization and decision making

##### 5.2.1.1 Execute phased MAP

The Maintenance Action Plan (MAP), should be written, funded and approved in such a way as to allow for multi-year maintenance and repair plans. Facility lifecycle investment should be a part of the plan, so that a roof replacement or cooling tower replacement are planned events. Routine maintenance would again become routine, rather than the current situation in which routine maintenance is almost never done. Each facility should be maintained on a scheduled basis, with lifecycle costs programmed into annual or multi-year budgets. The current AIS is a good inspection program that is the backbone of the MAP, but would become more of a quality assurance tool under the proposed phased MAP system.

#### 5.2.1.2 Program contingency into plan

Breakdowns will occur no matter how good the plan is. A portion of the maintenance and repair budget should always be set aside for it. The PWD includes this every year, budgeting over \$1M to service or “trouble” calls.

#### 5.2.1.3 Reunite construction with maintenance

Separating construction planning from maintenance planning is a mistake. Distinguishing between repair and maintenance and construction in authority limitations is arbitrary and counterproductive. There is good reason to connect the phases of construction with the operations plan, so that a coherent and cohesive funding stream is produced. This can only be accomplished by providing incentives for designers to reduce future facility operating costs.

#### 5.2.1.4 Remove facilities from line operations

As long as base commanding officers are directing the day to day operations of the physical plant under their command, a short-term approach will dominate. These “line” officers, trained in warfare, not facilities engineering, are ill equipped to make the decisions they are asked to make. They are at the mercy of their competing department heads, all of whom know their part of the business better than the captain does. Unlike a ship or aircraft squadron, where an officer starts out at the bottom and sees the jobs of those he commands first hand, base commanders almost never have had any other job on base. The comptroller is a supply officer who is trained in financial management and procurement. The PWO is an engineer, trained in facilities and procurement. The hospital commanding officer is a doctor, nurse or medical service corps officer, trained in medicine and hospital

administration. The base CO just cannot become expert enough in these areas to know how best to invest limited funds.

Rather than making the CO a pawn in a short-sighted and tightly regulated facilities procurement and operations strategy, or removing power from him, the core base model empowers the CO with more responsibility and greater flexibility in delivering a more functional final product. The CO would have broader authority to execute the facilities portfolio as a whole, eliminating the requirement to ask permission from multiple funding sources to procure each project individually. The present trend of rewarding base CO's for creative new facilities plans and grand strategies, which they have inadequate training and time to develop, would change. Instead, CO fitness reports (evaluations) might be based on their ability to carry out the approved facilities master plan most efficiently and expeditiously. Readiness, repair status and operating functionality of mission essential facilities at the core bases would be more controllable, and these evaluation criteria would form the facilities benchmarks of the CO's three-year tour.

One of the frustrations of many CO's is the constant pressure to accomplish individual pet projects given them by regional commanders, and indeed the temptation to develop some of their own to feel like they have some power to control the destiny of the infrastructure on their base. These projects, sometimes requiring only miniscule financial expenditure, become the most important things on the near-term horizons of the CO and PWO, and many have no long-term benefit on the base facilities portfolio. A separate priority is often used by public works organizations, called "CO hot" or "Admiral attention", to highlight the intense political visibility of the project. They serve to remove engineering manpower from other far more important longer-term endeavors, and ultimately hinder efforts to reduce infrastructure

deficiencies. Under the core base model, pet projects would lose their luster, as attention is placed on moving forward along the path set out in the master plan.

#### 5.2.1.4.1.1 Take local comptrollers out of loop

In either case, whether the CO has authority over the facilities acquisition and operations or not, the local comptrollers should not have the power to shift O&M funds to and from facilities line items. Two illustrations based on recent events at SUBASENLON provide some anecdotal evidence to support for this argument.

##### 5.2.1.4.1.1.1 Choice between tug overhaul and roof

In a recent department head meeting, there was debate about whether to continue a plan to replace a leaking roof using \$400K of base O&M funds. An option was put forth to award a contract for only half of the roof this fiscal year, followed by another for the other half next year. The reason given was that there was some chance that a base owned tugboat needed a \$60K overhaul, one that was two years overdue. It was not yet known whether the overhaul could be done with remaining FY97 dollars. If that option had been chosen (it wasn't, but the roof contract hasn't been awarded yet...), the following results could have been expected:

- Increased overall procurement cost due to two separate mobilizations, material purchases and contract awards
- Mismatch between roofing materials
- Inability to obtain roof warranty
- Potentially two different roof contractors, neither taking responsibility for the other's work
- Late award of the second roof contract, resulting in November or December installation (wet and cold weather preclude most roofing work)

- Questionable life of the roof

#### 5.2.1.4.1.1.2 Utilities funds returned to claimant

In early July, the comptroller returned \$600K of O&M funds designated for payment of utility bills for the base. The decision was based on historical accounts, and the action was done without the knowledge of the PWO. Current projections made by the PWO and base energy manager show a potential break-even scenario; these projections are based on engineering estimates, historical data, current utility agreements and base power plant configuration modifications. The comptroller is now seeking reimbursement of the funds from the major claimant.

#### 5.2.1.5 Make facilities operations a mission

At SUBASE, the facilities engineers are a loosely joined group under the general guidance of the PWO. They are responsible to their respective CO's (Submarine School has its own staff civil engineer; the submarine intermediate maintenance facility has its own facilities department head) for the appearance, working condition and operation of their facilities. Given a limited amount of money annually, they are asked to perform miracles, to provide more with less. Expected standards in technology and comfort have risen considerably over the last 40 years, yet the facilities built in 1957 still stand and are younger than the average building on base.

Facilities professionals are part of the "support" mission. They are part of the logistics tail of the warfighting fleet. This support role in the present culture means that facilities requirements now run a distant third place behind weapons modernization and quality of life programs. Priorities are an unavoidable part of management, especially of such a massive organization, but if its priority remains

low enough for long enough facilities failures will adversely affect the more important programs. Therefore, adopting a new mission called “facilities operations” at least may stem the tide enough to reverse the present trend of under-investing in infrastructure.

The facilities operations mission would be conducted by those experienced and trained. It would mean a more robust facilities group within the Navy, reversing the trend to parcel out the facilities personnel and knowledge to the fleet commanders. NAVFAC would have to reorganize to take on this new role, a task that would no doubt provide serious challenges. There is a danger that engineering would again become one of the now taboo “stovepipes,” making management and mission success more difficult rather than efficient. Responsiveness has always been the issue. Close relationships between fleet commanders, regional commanders, base commanders and the facilities organization are a prerequisite to being responsive to changing fleet requirements. However, this responsiveness must not be assumed to exist everywhere in the facilities processes. Flexibility to respond to changing needs means ability to react at the margins, and not at the core of the base facility functions. Our core bases will not completely change their *raison d’être* overnight. We can’t afford to build our facilities organizations around that possibility, making the engineers subordinate to line officers at every level in the chain of command. There has to be some stability within the facilities world, a dependable baseline (funding and process) that can be relied upon to sustain the base infrastructure.

## 5.2.2 Programming

### 5.2.2.1 Iterative Planning

A key component of the core base model is the facilities plan. In the model, it would be an iterative exercise, ultimately approved and funded by higher authority, but developed at the local level. The planning exercise is predicated on long-term mission requirements, communicated to the engineering organization in the form of performance standards, rather than design standards. Facilities engineers and consultants could then develop a long-term (20 years), medium-term (5 years) and short-term (1 year) plan to achieve the desired performance standards. The long-term plan would include cost estimates and a multi-year budget. Higher authority could then balance the needs of its core bases with the needs of subordinate bases to split the funding pie in accordance with long-term mission requirements. At this point in the process it may become clear that we simply can't afford to perform all of the missions that we would like. This information may lead to more global decision-making at the national level and force some tough policy modifications. When the plan is sent back down to the base level with insufficient funds to complete the plan, base planners should also expect guidance on which facilities requirements it should delete from the program. Absent this guidance, base planners could prepare several options for higher authority to choose from, each eliminating one part or another from the functions its facilities can perform.

The local plans should each include the contracting vehicles most advantageous to the execution of the portfolio. Financing sources should be identified, and the appropriate quadrant for the procurement designated. The medium- and short-term plans should be nothing more than periodically adjusted portions of the long-term plan. So, the steps in the process look like this:



- Mission requirements and performance statements from higher authority
- Plan locally
- Submit plan for approval
- Approval includes incomplete funding
- Local decisions adjust plan that meets funding constraints (includes best contracting vehicles for portfolio)
- Final plan approved
- Design, award and construction
- Adjust plans every five years with new Five Year Defense Plan (FYDP)

#### 5.2.2.2 Eliminate multi-level competition within our system

A programming system that attempts to compare the value of a warehouse repair at an air station to a pier upgrade at a submarine base is hollow. There are measurements that can be attached to each individual piece of a project that correspond to data point from the myriad facilities databases, but in the end the decision on which one gets funded will be largely subjective. Is the air station's fourth priority more important than the submarine base's fourth priority always? Never? Sometimes? This type of competition within the system is counterproductive. Each base has a list of functions it is responsible for. To accomplish all of the functions to a published standard requires facilities of a certain type and condition. If the facilities don't measure up, that function is unfulfilled and the base has failed in a portion of its mission.

#### 5.2.2.3 Multi-year fenced funding attached

The military construction program is funded with multi-year "fenced" funding. Operations and maintenance of family housing is funded with an annual fenced

appropriation (FHN: Family Housing, Navy). It seems logical that facilities funding should be fenced, not necessarily all lumped together, but at least kept separate from salaries and material requirements of the base. This could potentially have the effect of politicizing the facilities planning process. This effect might not be all bad. If congressmen became more aware of the facilities needs on bases, they might see ways for the local private sector communities to get involved, most importantly in the financing of needed projects. Of course, there is also a down side to Congressional scrutiny, very similar to having the base infrastructure in the hands of the untrained base CO. Provisions would have to be included in the core base model to protect against too much politicization of the process. Developing these provisions is beyond the scope of this thesis.

#### 5.2.2.4 Congress & DOD make commitment to infrastructure

Commensurate with a separate appropriation for core base facilities funding is increased commitment from higher authority to reversing the present trend of infrastructure deterioration. A fenced account would bring a reliable funding stream to lend credibility to the approval of the long-term base infrastructure plan. Increased technical effort on planning would be the natural outgrowth of this commitment, further improving effectiveness and efficiency of the infrastructure processes.

#### 5.2.3 Acquisition

The emphasis by the Vice President and others on the current acquisition reform effort indicates recognition of the inefficiencies of government procurement. The procurement piece of the infrastructure puzzle is critical to a sustainable core base infrastructure process.

### 5.2.3.1 Best value

While we cannot afford to pay top dollar for our facilities, we also cannot afford to be at the mercy of low bidders on every construction site. There is simply no way to compensate for a contractor that bid too low to make money on a job; there aren't enough inspectors in the world to ensure we get what we paid for. It makes sense to seek the best value for the precious facilities dollar. Sometimes, this may mean sealed bid, fixed-price; other times negotiated source selection; or when private sector interest is high a PPV may be the right way to go. It is important to recognize that the contracting vehicle is not the horse, but the cart. In other words, to obtain best value, there is no "right" contracting vehicle for all occasions; project, owner and market requirements should all be factors in deciding how to procure the final product.

In order to obtain the best value, contracting officers and facilities engineers should make prudent use of contracting vehicles that maximize:

- Quality incentive
- Shared goals--partnering
- Innovation
- Long term commitment

### 5.2.3.2 Utilize Engineering Systems Integration

Miller's ESI strategy could open new doors for the procurement of Navy infrastructure. With a physical plant valued at nearly \$800M, SUBASENLON has leveraging capabilities that are as yet untested. We also share many of the same needs as community businesses and residents. There is room for quadrant I and II procurement if regulations continue to open up, giving contracting officers increased

flexibility and autonomy to do what makes sense locally. Regional initiatives like utilities partnerships will also lead to further movement away from the “traditional” quadrant IV segmented process.

#### 5.2.4 Cutting costs

With the defense budget shrinking during a period of extended economic growth, it is unrealistic that a major financial commitment can be made in the DOD to our core base infrastructure without concomitant policies to cut costs where it makes sense.

##### 5.2.4.1 Eliminating excess capacity

The BRAC process of 1989-1995 reduced military bases only about half as much as the concurrent personnel drawdown. The 600 ship Navy envisioned in the 1980's is on its way to becoming a 300 ship Navy. There is neither justification nor money available to operate as many bases as we now own. Congress recently decided to procrastinate rather than take action to reduce the Navy's infrastructure when it demanded additional accounting of savings realized from BRAC. Accounting is important, but it is patently obvious that elimination the operating expenses of large numbers of bases while drawing down personnel and consolidating functions is bound to take the budget down with it. Knowing how much will be important, but it seems fairly obvious that we have not gone far enough.

Individual bases can help the process by taking a closer look at space utilization. Base tenants have a way of migrating to the open space when a function is terminated or a new building is constructed. There is much guidance available on space standards. Once the standards are met, consolidation of functions and

personnel may provide opportunity to demolish old facilities that have become expensive to operate.

#### 5.2.4.2 OPM (Other People's Money)

This is almost always preferable to using your own money. The use of quadrant II procurements allows private investment in the public infrastructure, not only lowering capital expenditures but also providing the opportunity to smooth the remaining capital program.

#### 5.2.4.3 Core capabilities

Vertical cuts are always a scary proposition. However, there may be room in the DOD to shed some capabilities that we have amassed over time that no longer make sense. Any cuts will be met with overwhelming resistance by part of the population. There are some services now owned and staffed by individual bases, with mission funding provided centrally by resource sponsors, that can be identified as on the fringe of necessary military functions.

##### 5.2.4.3.1 Housing

Housing is a very large part of the Navy's infrastructure problem, many communities having fallen into disrepair and neglect. The "Neighborhoods of Excellence" program initiated in the early 1990's revitalized much of the dilapidated housing with an infusion of capital backed by strong commitment from Navy leadership. The real question is whether the Navy should be in the housing business in the first place.

As much of the Navy is now using the private sector as a template for management techniques and industrial efficiency, we continue to provide benefits that extend far outside the workplace. It is possible on most bases for a military

family to live, work, eat, shop, play, worship, go to school and relax all within the confines of the base. How much of that is really necessary as a retention tool? The "retention" rubric has the power to envelop almost any politically expedient program on the horizon. Retention is important of course, but to what ends should the military go to keep its personnel in uniform? What keeps servicemen and their families motivated to remain in the service? The answer to these questions is bound to change with time. The services should foster a continuous healthy debate regarding benefits and their relative value.

#### 5.2.4.3.2 Commercial activities (CA)

OMB circular A-76 provides guidance for outsourcing of government functions to the private sector. A "Commercial Activities", or CA, study is required before civil service jobs can be replaced by a contract workforce. Two such studies are underway at SUBASE, one for 79 public works maintenance jobs and the other for 36 transportation positions. The process is used to first determine if what the government's most efficient organization is, and exactly what tasks they perform. The tasks are collected and written in service contract form, then solicited in the private sector. If the private sector low bidder is greater than 10% less expensive than the government workforce, the contract is awarded and the civil servants displaced. About half of the CA studies in the past fifteen years have resulted in replacement of government workers.

## Chapter 6

### CONCLUSION

"Something has to give. We just don't know what," said a senior defense official.<sup>49</sup>

#### 6.1 Climate

The official quoted above, under the condition of anonymity, heralds a challenging time for the Navy. The fact that we cannot continue to operate as usual should be more obvious to more political leaders than it appears. The Secretary of Defense presented an ambitious set of objectives for the FY99 military construction program (see section 3.2.3.3.6.4), objectives which appear to be unrealistic and internally inconsistent. The objectives are fantasies without a plan to finance the rest of the infrastructure that has to absorb the MILCON projects. There appears to be little thought given to the fact that a 50-year operations and maintenance commitment is not available to support these new facilities. New facilities are certainly badly needed at most aging Navy bases, but funding projects based upon discrete value measurement without evaluating the surrounding infrastructure can be a decision leading to further deterioration.

Congress and top military leaders are all interested in the MILCON program. Why are they not yet interested in the rest of the infrastructure picture? Investing \$172M in undesired barracks MILCON's has the unintended effect of keeping that poor serviceman's ankles wet in the shower. Putting too much money into new barracks only makes the problems in the old ones get worse. The maintenance money needed to unclog the drain is being siphoned off by base comptrollers eager to support other "key" operational objectives, all of which are part of SECDEF's

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<sup>49</sup> "No Base Closings in 1999," Navy Times, p. 3, July 22, 1997.

mission and quality of life imperatives. Balance and discipline must be the watchwords.

There are government agencies all over the globe coming to this conclusion; others are not there yet. Some of each were chronicled in chapter 1. And even some of the agencies and municipalities that have been unsuccessful at using quadrant I and II delivery systems had the foresight to seek better ways to do business. We in the Navy are groping for the answer, the magic acquisition tool or process, that will keep us from having to make the tougher call: What are we willing to do without? It may be time to test the theory that an all-volunteer force needs social programs to survive.

## 6.2 Options—Core base model

The Core base model provides some measure of balance and discipline by forcing decision-makers to look at the whole infrastructure picture at once. Choosing core bases sets the model in motion by making a long-term financial commitment to support and improve the infrastructure of a select few centers of fleet concentration. Without a commitment that has teeth (read dollars), there is no way to make long-term planning viable. A facilities capital program is nothing if it isn't long-term.

Planning at the local level is vital, but no more important than investment at the national level. A financially unconstrained long-term planning effort educates the top leaders about the possibilities. A realistic control figure sent back to the base provides boundaries on the plan that only local planners can discern. Once those boundaries have been identified, in the form of suggested functions to delete from the base list of missions, those in the Pentagon get a real picture of what the choices are. Certainly the mission choices are better made at the top than the bottom, but they should be made deliberately rather than by default. Approval of the long-term



plan and identification of a guaranteed funding stream to finance the plan provide the necessary channel markers for base facilities professionals to navigate the still embryonic world of Miller's Engineering Systems Integration.

Acquisition in the core base model falls where it belongs in the facilities cycle: after planning and budgeting. A definition of the scope and available financing for projects leads the engineer on the correct course of procurement decision making. Public-private housing partnerships (a quadrant II procurement) may provide the right balance of construction financing and operational efficiency at one base, while MILCON (in quadrant IV) may be the answer at another. Flexibility to choose the right type of procurement for the time and place requires a circumspect analysis of the whole capital program, and nailing down the planning and budgeting mysteries beforehand is a must.

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