

THE CANTONMENT AREA

GENERAL

In general, the cantonment area will only benefit from the proposed modifications necessary to render it serviceable as a National Training Center. The services available to those who currently inhabit the post will improve significantly. The physical deterioration which is inevitable with non-utilization will halt with constant use and maintenance.

Recreation facilities such as the swimming pools, the golf course, and playgrounds for children will be reactivated and available for use on a regular basis. This will also be the case for social service functions like the hospital, various post exchanges, and postal services.

It must not be inferred, however, that the facilities within the cantonment area will be self sufficient in providing for all the needs of the projected 3,378 people who will reside there. A reliance on Barstow and the surrounding area to supplement the day-to-day needs of people in residency at the Fort will continue to exist. But, for most typical indicators, the quality and quantity of life within the Fort Irwin community will improve considerably.

A Fort Irwin Master Plan to be developed will outline the possible alterations required for the proposed change of mission and will geographically analyze, for function and appropriateness, the land use relationships which exist currently within the Fort and cantonment area. The master plan process will also evaluate the existing facilities relative to future uses, with the construction impact estimated and mitigation measures identified and programmed accordingly. The cantonment area, simply stated, will once again become a busy center of activity with signs of life the norm and not the exception.

There are, however, two concerns whose effects will be exaggerated by the population growth anticipated. These are the use and availability of water, on which hinges all such activity in a desert environment, and the relationship between sound levels generated by military exercises and the community of people for which Fort Irwin will be home.

3.8 WATER

3.8.1 Water Supply

The proposed base reactivation will result in increased water, requirements that will have to be satisfied by

increasing the production of the existing wells, or by finding additional water sources. For the following discussion, it has been assumed that the average daily per capita water use will be 150 gallons in summer (June through September) and 100 gallons the rest of the year (this assumption is based on computations presented in a document in the Post Engineer's files entitled "Water Requirements, Fort Irwin, MIA-T147" which apparently was prepared in 1964 (author and date unknown)).

The projected yearly domestic water use is shown in Table B-2. It is based on the typical population distribution as visualized in September 1977 and on the foregoing average daily per capita water use assumptions. The figures shown are probably high, since most of the transient personnel in training will be bivouacked in the field and will consume less water than projected. The impact assessment will be based on 1.5 times the total water required, to include unknowns, sales to the Goldstone facilities, and contingencies. Therefore, the assumption is made that total water to be used every year at Fort Irwin will be +634.2 million gallons (1,975 acre-feet).

Since 1956, when the Irwin basin was essentially full, about 4,591 million gallons (14,087 acre-feet) have been extracted from the Irwin and the Bicycle Lake basins. Since the yield capacity of these two basins is estimated to total 86,968 million gallons (266,855 acre-feet), a total of 82,377 million gallons (252,768 acre-feet) of water is estimated to remain in usable storage, not including recharge. At the rate of extraction of 634.2 million gallons (1,975 acre-feet) per year, the two basins would yield water for about 130 years before being depleted. Assuming a rate of recharge of 266.7 million gallons (818 acre-feet) per year, mining of water will occur at a rate of 367.5 million gallons (1,132 acre-feet) per year. Water supply would last for 224 years.

The total combined capacity of the wells at both Irwin and Bicycle Lake basins of 4,689 gallons per minute (2,465 million gallons or 7,562.25 acre-feet per year) would be sufficient to extract the projected water quantities.

It should be noted here that the exact amount of water used may easily vary from the above assumption or could be controlled through strict conservation measures. Either of these could considerably alter the 224-year estimate given.

Based on well capacities and basin yields, extraction of groundwater at the proposed rate would apparently not require the development of additional water sources. However, negative effects of subsidence may be intense enough to require additional or alternate water sources. At this time, it is not possible to evaluate quantitatively these effects.

Table B-2. Fort Irwin Projected Yearly Water Use

<u>Permanent Personnel</u>	<u>Transient Personnel</u>	<u>Time</u>	<u>Water Requirements</u>	
			<u>(gallons)</u>	<u>(acre-feet)</u>
4400+ ^e	-	Summer (June-September)	79,200,000	243
4400+	-	(October-May)	105,600,000	342
	2500 (per month)	June, July, August ^a	33,750,000	104
	3500 (per month)	September-May ^b (10.5 months)	123,375,000	380
	25,000	February ^c	70,000,000	215
	1000	36 weekends ^d (assume 150 gpd per capita, 72 days)	10,800,000	33
			422,750,000	1,317

a Army Reserve and National Guard Annual Training.

b 21 Forces Command Brigade Rotations at 3500 troops each @ 2.5 months summer use rates 8 months winter use rates.

c Joint Combined Readiness Exercises.

d Army Reserve and National Guard Weekend Training.

e Includes 3,378 population living on-post plus.

A. Pumping Capacity

The existing wells have a pumping capacity of about 4 times the required yearly pumping rate, and additional wells should not be required. The month of greatest water use will be February, when 83.2 million gallons (255 acre-feet) of water will be required. The monthly pumping capacity of 205 million gallons (630 acre-feet) is 2.5 times the required capacity, so that apparently there would be no problem in supplying sufficient water, provided that pump breakdowns or other unforeseeable conditions do not interrupt pumping.

As water is pumped from the Irwin and Bicycle Lake groundwater basins, water levels will decline at a rate that will vary depending upon actual pumping rates and recharge conditions. Additionally, as the water level declines, pumping lifts will increase and energy requirements will be greater.

B. Subsidence

Another potential impact of the proposed pumping rates is the high possibility of inducing subsidence in both Irwin and Bicycle Lake basins. Subsidence is a common effect from groundwater withdrawal in basins where water is mined, that is, where the withdrawal of water exceeds the amount of water recharged to the basin. The consequences of subsidence include tilting and warping of the ground surface, incremental decrease in elevation of the ground surface, and cracking of the ground around the periphery of the subsidence bowl. Ground fissures with vertical offsets of one to three feet have been reported in other basins where groundwater has been mined. Initially, these cracks may be no more than one-half inch wide but enlarge rapidly to several feet wide and may attain depths of 100 feet or more. For example, subsidence due to fluid withdrawal is known to be occurring in the alluvial basin south of Chino, California, and in several parts of Arizona: the Picacho area near Casa Grande, the Sulphur Springs Valley near Wilcox, and the area near Bowie (Bureau of Land Management, 1976).

The development of a subsidence bowl due to fluid withdrawal is dependent upon the rate of pumping and the physical characteristics of the material from which the fluid is pumped. For example, before it was halted in 1966, subsidence resulting from petroleum production at the Wilmington Oil Field near Long Beach, California averaged 0.7 foot per year and totalled 29 feet (Bureau of Land Management, 1976; pp. 3-24).

Withdrawal of water from one groundwater basin may affect adjacent basins if there is a subsurface hydraulic connec-

tion between them. There does not seem to be such a connection between the Irwin and Bicycle Lake basins, so that both are considered independent of each other, and water withdrawal from one would not affect the water storage of the other. Subsurface flow from the Irwin basin into the Langford Lake basin is possible (Hostrup and Associates, 1975), but would most probably be interrupted when the groundwater level in the Irwin basin declined to an elevation below an assumed subsurface barrier located between both basins (see Figure 3 for assumed location of subsurface barrier).

Although the decline in water levels due to water pumpage is unavoidable, its major potential adverse effects are subsidence, and interference with adjacent basins. These effects will be mitigated by implementing a basin management program as part of Phase II of the Fort Irwin Master Plan. Such a program would consist of controlling the pumping sequence of the wells to prevent excessive drawdowns around any one well. This would, in turn, require the implementation of a careful monitoring program of water levels and production. This will be based on a detailed study of the relationships between the groundwater basins and of water requirements during the operating life of the proposed facility. It is possible that subsidence probabilities could be significantly reduced by extracting less water from the existing basins and developing an additional groundwater source, such as Langford Lake or even Coyote Lake. By reducing subsidence probabilities in this manner, the water resources of the Irwin and Bicycle Lake groundwater basins would be depleted at a slower rate or may even result in no depletion if a combination of water sources results in extractions less than basin recharge. However, energy requirements would be increased due to additional pumping from longer distances and lower elevations.

3.8.2 Water Quality

The average chemical quality of the water pumped from the wells in the Irwin and Bicycle Lake basins does not seem to have changed significantly since the wells were drilled. It is possible, however, that changes may occur as water levels decline through the years.

3.8.3 Sewage Treatment and Disposal

The existing sewage treatment facilities at the base are below current standards and are insufficient to handle the expected volumes of sewage to be generated when the population at Fort Irwin exceeds about 10,000 people. The existing facilities provide primary treatment only.

Expanded facilities will be upgraded to the equivalent of secondary treatment as a minimum to comply with EPA criteria contained in NPDES permits to be issued (Army Regulation 200-1, 3-9). The specifications for the proposed new treatment facilities are unknown. An impact assessment of their operation is, therefore, not possible at this time.

Liquid and solid wastes generated in the field by personnel in training will be contained in portable facilities. Wastes will be treated and disposed of in an environmentally safe manner so that no adverse impacts occur to the groundwater resources of the area.

3.9 NOISE

The airspace above Fort Irwin and the other military lands within the general area provides the arena for a great deal of military air training activities. Aircraft operations at those airfields used for deployment of air sorties specifically held over Fort Irwin or in the supply and maintenance support of ground activities would increase only minimally in number. The timing of aircraft operations for brigade exercises could be expected during both day and nighttime periods. The exact degree and extent of impact from these air activities can be estimated only once specific exercises have been planned.

Noise within and around the maneuver areas and gunnery ranges can be expected to increase significantly from the natural state, as if currently does during National Guard training exercises. The increase in duration of noise would reflect the proposed augmentation of training activities which occur at the base.

The populace potentially most exposed to the sounds of both air and ground operations would be those people living in the cantonment area. People utilizing neighboring Bureau of Land Management lands for recreation purposes can also be expected to notice the sounds of air and ground operations.

Any sonic booms which might occur could be strong enough to cause structural damage and public reaction. The extent of these booms, again, can be determined only once specific conditions have been formulated for a particular exercise. The cantonment area and the Goldstone Deep Space Communication Complex are most likely to be affected.

Except for approved departure and recovery for aircraft from existing air bases, overflight of populated areas would be avoided. In general, supersonic flight restrictions will be formulated and enforced. Noise abatement procedures, such as afterburner limitations, will be required.

A noise study to be conducted by the Army Construction and Engineering Research Labs or similar consultants, will be included as part of the Fort Irwin Master Plan. Based on this study, additional restrictions to air operations as well as weapons training could be implemented within a special noise buffer zone centered on the cantonment area.

It is the position of San Bernardino County that:

"when an existing or a proposed land use is within a noise environment that exceeds the recommended levels for that particular use, mitigating measures should be implemented to resolve the conflict. In some cases, mitigating measures are not possible because of economic or design limitations. In such cases, steps should be taken to permit compatible land uses".

As residential and social service land uses are necessary within the cantonment area, insulation techniques which modify existing structures to diminish interior noise levels will be incorporated into the rehabilitations of buildings planned for the base. Additionally, those procedures and actions cited in Chapter 7 of Army Regulation 200-1 titled "Environmental Noise Abatement" will be commenced upon transfer of control of the base from the State of California to the Army.

3.10 ENERGY

Fort Irwin has 506 family housing units, 88 mobile home sites and 1,002 bachelor quarters to satisfy the demand of single military personnel. Space available is 2,378,000 square feet, versus the estimated requirement of 1,600,000 square feet. Space not used would have to be mothballed or turned over to National Guard to limit utility consumption. Propane, the single fuel, must be supplemented with more available fuel in the long range projections. This will require retrofitting. The type of fuel used with this retrofit will probably be oil with some coal.

The Army projects propane consumption at 144,396 MBTU per year during operations, and electricity consumption at 12,033 megawatt hours.

THE BARSTOW AREA

B3.11 ECONOMIC CONDITIONS OF THE BARSTOW AREA

The day-to-day operations of Fort Irwin as a National Training Center will depend on and substantially affect the primary and secondary employment sectors of the Barstow market area. Nearly half the population associated with the proposed action will require off-post housing and utilities. Educational opportunities, retail sales, social services, and recreation activities will be needed to supplement those offered within the post. In many ways, therefore, the 37 miles which stand between Fort Irwin and Barstow do not represent a significant factor.

B3.11.1 Population

The resources of the City of Barstow and surrounding communities will provide a strong complement to those which will exist on Fort Irwin. In many respects the relationship of Fort Irwin and Barstow can best be represented by a comparison of the projected populations for each: Fort Irwin with about 3,400 people and the Barstow market area with approximately 42,000 people. Although the Fort will provide many services which do not typically exist in a small town of similar size, it will not provide the resources which are connected with a regional center like Barstow. The Barstow market area will, then, be impacted by a change of mission at Fort Irwin as it would be by any relatively rapid influx of 6,600+ people within its area of influence.

The fact that the catalyst for such an expansion is based on a core population unit of 2,374 military personnel would not be a new phenomenon within the city or area. Barstow has, in recent history, been to some degree a military town in its association as the regional center for an area hosting numerous military activities. Intermittently since 1940, it has directly served the population of Fort Irwin whose populations have, at times, equalled and exceeded those of the proposed activities.

The relative significance of the impacts on Barstow is best determined quantitatively, yet there are always non-quantifiable elements which need to be addressed. Perception of impacts is often more important in the decision process than the quantitative data presented through the EIS process. An impact that is beneficial to one segment of society, such as the land speculator, could be adverse to other segments, such as the apartment renter, homeowner, or taxpayer.

What is a minor, moderate, major, adverse or beneficial impact will always be somewhat subjective. A common way to visualize an economic impact is to compare it to a data base year in terms of percentage increases. For example, the population growth in the U.S. is less than two percent annually. California's growth rate used to be much higher than the nation's, but has recently slowed down. Some cities in the state, however, may be capable of growing at five percent or more annually. Depending on the city's initial size and capacity, the experience to its citizens can vary widely.

While opinions also vary, most observers would consider increases of 10 percent or more to be major or significant. On this basis, most of the projected changes in the Barstow area as a result of reactivation of Fort Irwin can be considered significant.

The most relevant impacts are generated off-post since most on-post activities are fairly self-sufficient. The off-post impacts generally range around the 10 percent mark. It should also be noted that these impacts compare 1983-84 to the 1975-77 period. In most cases, impacts will be less because the data base will be increased by growth and inflation.

B3.11.2 Employment

Introduction - Primary and Secondary Employment

The terms "primary" and "secondary" employment refer to what are also commonly called basic and non-basic employment, direct and indirect, or base and service employment. The concept is linked to the multiplier effect developed by economists in export base theory.

In this theory, the economy is divided into two sectors, one which produces goods and services for export and the other which produces goods and services to meet the demand supported by the local economy. Economists assume a relationship between the primary sector and the service or secondary sector, and that relationship is a multiplier. The multiplier means that the creation of one primary job in an area will result in a number of secondary jobs needed to support the new activity. The primary job imports money from outside the area while the secondary job recycles money within an area and does not involve importation of new money (while the theory as expressed is a simple one, it usually creates significant problems in its practical application. Differences of opinion abound on such issues as the extent of the study area boundaries needed to contain a "complete" economy;

the definitions of which industries are basic and which are non-basic since some industries display characteristics of both; and differences in productivity, capacity and similar economic characteristics of the study area. The size of the multiplier is subject to the most dispute as a result of the above issues and it often changes in magnitude by as much as a factor of 10 or more -- anywhere from 0.25 to 2.5.

Generally, a multiplier of 1.5 means that the creation of 1,000 primary jobs will result in 1,500 total jobs; that is, 500 secondary or service jobs have been produced. In other words, the multiplier equals $\frac{\text{Total Jobs}}{\text{Primary Jobs}}$.

This report has used the ratio of $\frac{\text{Secondary Jobs}}{\text{Primary Jobs}}$ as the multiplier.

To convert this ratio to the original multiplier, simply add "one" to the ratios used in this report.)

The proposed use of Fort Irwin as a National Training Center will generate new primary employment in two major areas:

- o Construction and rehabilitation of Fort Irwin facilities.
- o Operation of the installation.

Most of the rehabilitation will take place in 1980 and 1981 and new construction will take place in 1982. Construction of new homes and other non-military facilities in the Barstow market area is considered a secondary effect and is assumed to take place in 1981 through 1983, with relatively minor activity continuing in 1984. The construction of the base and the housing in the Barstow market area may result in some overlap of the same construction crews, but this overlap is ignored in the accounting process.

The impact of the base operation employment will begin in 1981 and continue thereafter. In order to estimate the expected impacts of the primary employment sectors, it is necessary to make assumptions about the following issues:

- o How much of the total construction cost is for labor?
- o How much of the cost will accrue to firms and workers outside San Bernardino County, within the County and within the Barstow market area?
- o How much secondary employment will be generated by the primary employment sectors?

- o Is the employment multiplier the same for both primary sectors, and what is the employment multiplier?

These questions will be answered in the following sections.

A. Fort Irwin Construction Phase

Base rehabilitation and construction employment can be distributed among three components:

- o Direct construction labor;
- o Labor generated through purchase of materials and supplies; and
- o Labor generated by initial start-up costs at the base.

Total base construction cost is estimated to be \$40,031,000 as shown in Table B-3. It is assumed that one-third of this cost represents equipment, specialized services, construction management fees and other items which will be imported from outside San Bernardino County. Because it is impossible at this time to allocate this export amount by geographic area, most of it is assumed to accrue to the Los Angeles market area. It is, then, not included in the remainder of this analysis, which is primarily concerned with the impacts on the Barstow area. The remaining two-thirds, or \$26,688,000 of the initial construction cost at the base is assumed to be divided evenly between construction labor and construction materials and supplies from the San Bernardino County area. This means that \$13,344,000 represents projected construction wages. Assuming an average annual wage of \$18,000, this amount represents a base construction force of about 741 construction person years over the three-year construction period, or 247 construction workers per year.

The second component, labor generated by purchase of materials and supplies, is derived in the following manner.

Total cost of materials and supplies purchased within the county is \$13,344,000. It is assumed that 20 percent of this amount is attributed to the county labor force, or \$2,668,900. At an assumed annual wage of \$12,000, this represents 222 person years of employment within San Bernardino County over a three-year period, or an average of 74 workers per year.

The third component, that is the labor generated by the purchase of \$1.6 million in start-up equipment, is similarly derived. One-fourth of the \$1.6 million or \$400,000 is assumed to be purchases within the county and 20 percent of this is attributed to labor costs, resulting in 7 additional person years of employment.

Table B-3. Construction Requirements and Projected Costs of Proposed Action

<u>Item</u>	<u>\$1,000's</u>	
<u>Operation and Maintenance Army Portion</u>		
BEQ Minor Repairs (90 spaces)	\$ 43.0	
BEQ Furnishings (912 spaces)	1,048.6	
Facilities Reopening	64.2	
Foad Repair (Cantonment Area)	321.0	
Sewage System Repair	642.0	
Power Transmission Repair	428.0	
Management Information System Upgrade	63.5	
MISO Site Preparation	<u>10.7</u>	<u>\$ 2,621.0</u>
<u>Family Housing Management Account Portion</u>		
Family Housing (rehabilitation & furnish - 506 units @ 5,095 each)	\$ 2,578.0	
Mobile Home Park (rehabilitation utilities - 30 spaces @ 1,605 each)	<u>48.1</u>	<u>\$ 2,626.1</u>
<u>Military Construction Army Portion</u>		
Tactical Equipment Shops ^b	\$ 13,401.7	
Primary Facilities	205.2	
Support Facilities	2,324.1	
Battalion Maintenance Facility	2,012.3	
Bn. HQ & Classroom	928.6	
Administration & Supply Building	2,312.0	
Airfield & Facilities	<u>13,600.0</u>	<u>\$34,783.9</u>
Total Initial Construction Cost		<u>\$40,031.0</u>

a) Reference AR 415-7 (9 Aug. '76) was used for costing MCA portion.

b) Includes hardstands for equipment pool, DS/GS maintenance shop and two tactical equipment shops; includes lighting and fencing for these facilities.

Source: United States Army Forces Command.

The total expected employment generated in San Bernardino County in 1980-82 as a result of the base construction and purchase of construction supplies and start-up equipment is therefore 970 person years. Averaged over a three-year period, this represents 323 employees per year.

The 323 construction employees generated in the county will result in additional secondary workers in the service industries. For purposes of estimating these secondary workers, an employment multiplier based on past experience of 0.65 is used, resulting in 210 secondary employees.

The net result of the base construction in San Bernardino County is the sum of primary and secondary employment or 533 employees per year, averaged over a three-year period.

Half of this countywide work force or 266 workers is allocated to the Barstow market area and the other half to the rest of the county, including towns such as Victorville and San Bernardino. Of the 266 workers in the Barstow market area, it is assumed that one-half will be existing residents of the market area, or dependents of Fort Irwin employees, for a net influx of 133 new workers in the Barstow area as a result of the Fort Irwin construction phase.

B. Fort Irwin Operations Phase

The operations phase matures in 1984, a year after the construction phase has peaked. The primary operations employment consists of the following:

1,628	-	Fort Irwin workers living on-post
1,064	-	Fort Irwin workers living off-post
30	-	Off-post workers generated by Fort Irwin procurement
<u>2,722</u>	-	Total Employment

The first two numbers are from Table 1 (2,692 employees). Please note that this number includes 64 workers who are also dependents of other workers. Therefore, the number of required housing units is reduced as also shown in Table 1.

The 30 primary workers generated by procurement were derived from the \$6,000,000 in post supplies and services that the Army intends to purchase annually. One-quarter of these purchases is assumed to come from the Barstow market area. Twenty percent of this \$1,500,000 in local purchases is assigned to a labor component. This results in \$300,000 for labor, which equals 30 workers earning \$10,000 per year each in the Barstow market area.

In order to derive the generation of secondary employment from the above primary operations employment of 2,722 persons, it is necessary to review expected expenditure patterns. These will be used to determine the employment multiplier. (It is assumed that the income multiplier and employment multiplier are essentially equal.)

The following expenditure patterns have been developed for the Fort Irwin on-post and off-post employees on the basis of past studies and experience:

<u>Income Expenditures</u>	<u>Average Percent of Income</u>	
	<u>On-Post</u>	<u>Off-Post</u>
Miscellaneous Payroll Deductions	25%	25%
Payroll Allocations and Savings	15%	10%
Housing Allotments	20%	25%
Post Exchange Commissionery and Clubs	30%	15%
Other Retail and Miscellaneous Services	<u>10%</u>	<u>25%</u>
Totals:	<u>100%</u>	<u>100%</u>

Because the Army provides a great number of services to its personnel, the multiplier effect on civilian services is much less than other industries. Based on the above expenditure patterns, the multiplier for on-post personnel is assumed to be 0.1, and for off-post personnel, it is assumed to be 0.5.

The multiplier for the 30 employees generated by the Army procurements in the Barstow area is assumed to be 0.65. Application of the three multipliers is as follows:

$$\begin{aligned}
 1,628 \times 0.1 &= 163 \\
 1,064 \times 0.5 &= 532 \\
 30 \times 0.65 &= \underline{20}
 \end{aligned}$$

TOTAL = 715 Secondary Employees

The total primary and secondary employment in the operations phase in 1983-84 is therefore 2,722 plus 715 or 3,437.

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B3.11.3 Generated Income

Construction of facilities and the operation of Fort Irwin will result in the generation of considerable income to the state, the county and the Barstow area.

During the construction phase, income to the county is estimated to be:

	<u>Employees</u>	<u>Average Annual Wages</u>	<u>Total Wages (\$1,000's)</u>
Fort Irwin Construction Labor	247	\$18,000	\$4,446
Fort Irwin Supplies Labor	74	12,000	888
Start-Up Supplies and Equipment Labor	7	10,000	70
Secondary Employment	<u>210</u>	<u>13,000</u>	<u>2,520</u>
	538	-	\$7,924

Of this amount, half, or \$3,962,000 is assumed to be spent in the Barstow market area for construction in 1980 through 1982.

Income from the peak operations phase of the base (1983-84) has been estimated as follows:

	<u>Number</u>	<u>Average Income/Year</u>	<u>Total Annual Income (\$1,000's)</u>
<u>On-Post:</u>			
Officers	111	\$20,855	\$ 2,314.9
Enlisted Support	1,485	9,530	15,152.1
Civilian	<u>14^a</u>	<u>15,000</u>	<u>960.0</u>
Subtotal On-Post	<u>1,660</u>	<u>11,100^b</u>	<u>\$18,427.0</u>

Off-Post:

Officers	53	\$20,855	\$ 1,105.3
Enlisted Support	725	9,530	6,909.2
Civilian	<u>254</u>	<u>15,000</u>	<u>3,810.0</u>
Subtotal Off-Post	<u>1,032</u>	<u>\$11,460^b</u>	<u>\$11,824.5</u>
TOTALS:	<u>2,692</u>	<u>\$11,240^b</u>	<u>\$30,251.5</u>

- a) Dependent workers.
- b) Derived.

Secondary employment from operations was projected to be 745. Most of these are lower-paid service workers whose average income is estimated to be \$10,000 per year for a total of \$7,450,000.

Total primary and secondary employment during operations will therefore generate \$37,701,500 in total income in the Barstow market area in 1983-84 and thereafter, plus changes in inflation and future work factors.

3.12.4 Generated Retail Sales and Sales Taxes

The taxable retail expenditure pattern for Fort Irwin and other operations employees is expected to be as follows:

	<u>Income</u> <u>(\$1,000's)</u>	<u>Retail</u> <u>Factor</u>	<u>Taxable</u> <u>Retail Sales</u>
Fort Irwin On-Post	\$18,427.0	10%	\$1,842.7
Fort Irwin Off-Post	11,824.5	25%	2,956.1
Other Off-Post	<u>7,450.0</u>	<u>25%</u>	<u>1,862.5</u>
			<u>\$6,661.3</u>

Sales represent taxable retail sales (not including food purchases) in the Barstow market area. Approximately one percent, or \$66,613 is expected to be returned to the local market area from the State as the local share of tax receipts.

Because of the unique and more independent nature of Army installations, retail sales impacts were generated as a percentage of income rather than on typical per capita assumptions. The total taxable sales in 1983-84 were estimated to be \$6.66 million by both off-post and on-post newcomers in the Barstow market area. This amount represents a per capita expenditure of \$1,005 in taxable retail sales, which is considerably below state, county and city per capita expenditures for the total population. In fact, it is only about 50 percent of the countywide average and may prove to be too conservative. The \$6.66 million estimate will be retained for analysis purposes, but the reviewer should keep the assumptions in mind.

Whichever number is used, however, there are other uncertainties and implications for growth in the retail services sector. For example, how many square feet of retail space does \$6.66 million represent? Is existing capacity underutilized or will additional retail space be needed? Taxable sales in California are estimated to be about three-fourths of total retail sales; therefore, total retail sales could be \$10.0 million. Estimates of sales per square foot (gross leaseable area) range from \$45 to \$300 per square foot depending on type of store, efficiency, location, inflation, etc. An assumption of \$100 in annual sales per square foot would mean the need for approximately 100,000 square feet of retail space. At a rate of \$150 per square foot, more than 66,000 square feet of retail space would be needed.

Because of other assumptions noted above, actual retail space needed may range from 50,000 to 100,000 square feet or more of new retail space. For visualization purposes only, the higher amount equals four or five typical chain supermarket stores. However, the recent surge of retail space construction should be able to absorb the new sales generation. Barstow merchants also sell at relatively higher efficiencies because of the concentration of transient services. These same tourist services, especially food, eating and drinking stores and service stations, are the very ones most likely to be most patronized by the Fort Irwin-induced population.

B3.12

HOUSING NEEDS

The total projected population and housing generated by operations at Fort Irwin in 1983-84 is developed as follows:

Of the 2,722 (2,692 + 30) direct employees of Fort Irwin, 1,411 (1,396 + 15) are projected to be married. Assuming the state and national averages of 50% of married employees where both spouses are employed, 705 dependent employees are available for employment of which 64 dependents are already assumed to be employed on base. This leaves 641 net new employees relative to 715 new secondary jobs, or a net addition of 74 new employees from the Barstow market area. These are assumed to be absorbed by dependents of existing Barstow area employees, and other presently unemployed Barstow area residents.

The 133 new workers to Barstow during the construction phase are not included in the total offpost housing requirements because their presence is primarily in 1980 through 1982 and most will be accommodated in rental units, mobile homes or transient lodging units.

Total housing need is therefore 2,560 units (1,596 on-post plus 964 off-post).

B3.12.1 Housing Allocations, Construction and Costs

Allocations for off-post housing are estimated to be 25 percent of income per year. This amount equals \$4,818,625 (25 percent of \$9,274,500, which consists of \$11,824,500 plus \$7,450,000). In a sense, this \$4.82 million represents rents for mobile homes and rental units as well as the equivalent rent (principal and interest) on owned single-family homes.

Based on typical expenditure to income patterns and marital status of employees living off-post, housing units may be distributed as shown in Table B-4. The expected distribution of total housing needs is:

120	Mobile Home Units
400	Apartment Units
344	Moderate Single-Family
<u>100</u>	Moderate to High Single-Family
964	Total Units

The three-year increase in property value induced solely by construction of new housing units in the Barstow market area is \$40,450,000, excluding mobile homes. In the third year, these properties, ignoring inflation, will have an assessed value of \$10.1 million. A tax rate of \$1 per \$100 would generate \$101,000 per year.

Table B-4. Number of Housing Units by Occupation
Within Selected Income Ranges

<u>Off-Post</u>	<u>\$6,000 to</u> <u>\$8,000</u>	<u>\$8,000 to</u> <u>\$12,000</u>	<u>\$12,000 to</u> <u>\$18,000</u>	<u>\$18,000 to</u> <u>\$30,000</u>	<u>Total</u>
Officers	-	-	20	33	53
Enlisted	100	400	48	-	548
Civilian	10	50	96	45	201
Other	<u>10</u>	<u>80</u>	<u>50</u>	<u>22</u>	<u>162</u>
Totals:	<u>120</u>	<u>530</u>	<u>214</u>	<u>100</u>	<u>964</u>

The construction of \$40.5 million worth of housing or approximately \$10 million per year would also generate secondary employment for approximately 260 workers. Possibly 100 of these would be newcomers to the region. These construction are expected to be accommodated by the considerable transient facilities which exist in the Barstow market area.

B3.12.2 Housing Demand, Production Capacity and Distribution

When compared to the recent pace of housing construction in the City of Barstow, the provision of 964 new units over four years represents a significant increase in production capacity. If all units are built within the city limits, the construction rate is approximately 250 units per year over four years. If only half the required units are built within the city, the rate is still 125 units per year.

During the 1970-76 period, Barstow added only a total of 676 dwelling units including 416 mobile homes. This is an average of less than 100 units per year, including mobile homes, or only 23 single-family units per year.

However, during the 1960-69 period, the city built an average of 151 units annually, excluding mobile home units. The peak for housing authorizations was 1963 when 276 units, including 244 single-family homes, were authorized.

The home construction industry within the city has been in a decline for almost 10 years. Projected growth of Fort Irwin will require increased output compared to recent experience; however, meeting the increased production is not considered a problem. There are already signs that output is picking up considerably in 1977. There are homebuilders capable of building 200 or more units at a time. Housing will more than likely be distributed over the market area which contains a considerable inventory of vacant land.

The major housing issue, however, will not be production capacity, but the provision of affordable housing for the influx of families expected. (There are also dangers of overbuilding and speculative practices.)

On an annual basis, over a four-year period, the market area will require 30 mobile homes, 100 apartments, 86 moderate single-family and 25 moderate to high cost single-family units to meet the needs of Fort Irwin's projected growth.

The provision of mobile home units is not considered a problem. Neither is the single-family market. Provision of 400 multiple units will be the major concern. Only 338 apartment units were built in the city over the period 1960 to

1976. The last apartment units authorized were 43 units in four structures in 1973. The major constraints are the financial return or feasibility of apartment units to the private developer and his ability to obtain financing.

Again, the apartment units could be dispersed throughout the region. (County building statistics are not available by area in order to determine past or proposed apartment construction activity outside incorporated cities.) Many of the 400 families and individuals assigned to rental units may also move into available single-family units. If both spouses are working, the purchase of single-family housing would be possible. Also, existing Barstow area residents may "move up" into the new housing, leaving older existing homes available to newcomers unable to afford new housing.

The Army will institute a housing assistance program, pending a Master Plan assessment. Provision of additional on-base housing, particularly for lower-income families, assistance to families in purchasing off-base limits, and spreading out the reactivation will be considered.

B3.13 GOVERNMENT SERVICES

Of the 3,246 off-post people expected to accompany reactivation of Fort Irwin, it is expected that many will move to the City of Barstow because of the proximity of services there, but this will depend greatly on the availability of housing at affordable prices.

The 3,246 persons may be fairly well distributed throughout the market area in cities and unincorporated areas, with resultant impacts depending on the actual distribution of the population with respect to a jurisdiction's fiscal and operational capacity.

The following discussions of impacts on government services should be considered in light of the uncertainties about where and how the new population will be distributed throughout the relatively extensive market area.

In addition, the newly passed Proposition 13, which dramatically limits property tax revenues, will have effects which are as yet undetermined. It can be expected, at the minimum, that government services financed in whole or part through property tax revenues will be greatly restricted.

B3.13.1 County Special Districts

The County Special Districts in the study area vary considerably in functions, boundaries, assessed valuation, and tax

rates. For most of the districts, the major impacts of the proposed project will arise from the need to supply additional services. The costs are presumed to be offset by the increase in assessed valuation from construction of homes and other facilities within the taxing area. The budgets for the County Service Areas and Community Service Districts are very modest, which can be seen in the following ratios of taxes levied per total assessed value in the 1975-76 fiscal year.

	<u>\$ Taxes Per \$ Assessed</u>
Daggett CSD	\$ 0.010
Newberry CSD	0.007
Yermo CSD	0.008
CSA 36	0.002
CSA 40	0.004
CSA 70	0.003

If these districts maintain their present revenue and expenditure patterns, an increase of \$1 in assessed value would result in a penny or less in new tax revenues. A \$60,000 home would produce \$30 to \$150 in taxes for these districts under 1975-76 assumptions.

The same relationships generally hold true for the larger budget tax districts such as Barstow Fire and Barstow Recreation and Park, because of the similarity in tax rates. These and the school district impacts are discussed separately below.

B3.13.2 Health Facilities

Although the recently announced addition of a new Family Health Center in Barstow should alleviate the presently perceived shortage of pediatrics and obstetrics care, implementation of the National Training Center will generate additional population in Barstow and cause a further increase in the demand for medical services. Other health services will be provided by the military for its personnel and their dependents.

B3.14.3 Education

School age population ratios have been developed by the Army based on past experience. These numbers are generated as follows: Fort Irwin families:

On-Post	-	594	
Off-Post	-	<u>738</u>	
Total	-	1,332	families at

an average of four persons per family of which two persons per family are assumed to be adult heads of family and two persons per family are other dependents. Of these, two other dependents per family, 0.5 persons are assumed to be pre-school age and another 0.5 persons either children beyond high school age (say 0.2) or other related family members (say 0.3). This leaves 1.0 persons per family of school age, of which 2/3 are assigned to elementary school age (K-8) and 1/3 is assigned to high school age (K9-12).

	<u>Population</u>	<u>School Age Children</u>
Fort Irwin Off-Post	3,246	738
Fort Irwin On-post	<u>3,378</u>	<u>594</u>
	6,624	1,332

	<u>On-Post</u>	<u>Off-Post</u>	<u>Total</u>
Elementary (K-8)	396	492	888
High School	-	<u>444</u>	<u>444</u>
	<u>396</u>	936	1,332

If it is assumed that there are 25 to 30 pupils per class, then there will be a need for 16 to 20 elementary (K-8) classrooms in the Barstow area and 15 to 18 school classrooms.

Because the Barstow Unified School District is more than 3,000 students below its recent peak enrollment, and has considerable excess capacity, the physical capacity to teach 1,332 students generated by the reactivation of Fort Irwin appears to be well within the District's resources. The grade school at the Fort should handle the 396 elementary students expected to be living on the post.

The question of revenues per pupil available to the District in order to finance the education of the additional students is complicated by the recent passage of Proposition 13 by the voters of California, which dramatically limits property tax revenues statewide. The issue is further complicated by the recent Serrano-Priest decision in California, which attempts to equalize per pupil expenditures among rich and poor districts. The School District should be eligible for approximately \$400,000 in impact funds from the federal government.

B3.13.4 Parks and Recreation

There is a full range of social and recreational services now available or expected to be available within the Fort Irwin complex. The Barstow Park and Recreation District is also undertaking a significant improvement program. No adverse impacts are anticipated and it is likely that the Park and Recreation Department will realize an increase in operating budget proportionate to the anticipated population growth.

B3.13.5 Public Safety

The preferred standard ratio of police personnel to population generally varies from 1.75 to 2.0 per 1,000 persons. The Barstow Police Department prefers to maintain a ratio of 1.8 sworn personnel per 1,000. Barstow, like many other jurisdictions, does not meet its standard. The present ratio is 1.43 per 1,000 (24 sworn personnel divided by 16,812 persons in 1975).

If all 3,246 off-post persons moved to Barstow, the increase in police personnel would be 6.5 positions at the preferred standard and 4.6 to maintain the present ratio. If only 60 to 75 percent of the new population moves within the city limits, the Barstow police needs would be three personnel at the city's present ratio. Police services for those persons moving to unincorporated areas would then be met by the County Sheriff's Office.

Influx of residents in the Barstow market area is expected to require the addition of one shift (three persons) to the Barstow Police Department and another shift to the San Bernardino Sheriff's Department.

The Barstow Fire District presently has 0.73 full-time personnel per 1,000 persons and 1.85 volunteers per 1,000. Fire service standards are related more to response times, water flows and building types or land uses, but a crude approximation of potential need can be made on the basis of

per capita statistics. On this basis, an influx of 3,246 persons within the district would require the addition of 2.4 full-time personnel and 6.0 volunteers.

In response to an increased need for volunteer firemen in the Barstow Area, an expression of this concern will be incorporated into the orientation program for off-post personnel employed at the Fort.

Because of response time requirements, the fire facilities at Fort Irwin would provide backup for more serious fires in the Barstow Area.

B3.13.6 Transportation

The major transportation impact will occur over the Barstow-Fort Irwin access road. Approximately 1,032 employees at Fort Irwin living off-post will need to travel the road to work each day. The total cars on the road will depend on work shift and carpooling. Presently, 172 Fort Irwin employees commute to the base. In addition, the Goldstone/NASA facility generates an average traffic flow of 92 vehicles on weekdays. The NASA use is relatively low because of the high incidence of carpooling. There are about 451 NASA personnel working at the facility, but government cars are provided and carpooling is encouraged. The projected Fort Irwin traffic can be accommodated by the road, although present maintenance efforts may have to be increased.

The proposed transportation changes currently needed within central Barstow, such as the First Street Bridge, can be attributed to the very significant pass-through of Las Vegas and other desert-attracted tourists and not to the growth of Fort Irwin.

All construction activity will filter through Barstow and over the Fort Irwin Road. The level of activity anticipated will represent a minor degree of impact to the traffic volumes of the First Street Bridge and to the ambient noise level and air quality along the road to the Fort.

The renovation of trailer spaces will occur early in the phasing of construction activities. Construction workers will be able to use these, as space permits, in order to avoid any lengthy commutes and subsequent impact. Carpooling of personnel living in the Barstow Area will be encouraged.

B3.13.7 Water Supply

The provision of future water requirements in the Barstow market area is already a major concern and will certainly be strained by a change of mission at Fort Irwin, unless one of many presently proposed solutions is implemented.

Water in the market area is limited and is considered approximately a 20-year supply by the Mojave Water Agency. A number of solutions have been proposed based on presently expected rates of growth. The Fort Irwin reactivation, however, means the achievement of presently predicted 1990 populations by 1983 or 1984.

Three major alternative water supply solutions have been proposed (Barstow City Manager's Report, September, 1977). These alternatives are:

- o Construct a water supply transmission system to convey water from a basin in Helendale to connect with the Lenwood distribution system and thence to the Barstow main system. Seven wells and a booster pump station would also be required. The total present capital and operating costs of this alternative are \$7.2 million.
- o The second alternative is similar to the first, but is to be done in two steps -- first, from Barstow to Hodge, until the underground storage at Hodge is exhausted, and then from Hodge to Helendale, where a second underground storage system is utilized. The total present cost of this alternative is \$5.2 million.
- o The third and least desirable alternative under present assumptions is a system to tap the California Aqueduct near State Highway 395, south of Helendale. Present cost of this alternative is \$29.1 million.

The city manager has recommended the first alternative rather than risk a two-stage process. Whichever alternative is selected, the population timetable would be pushed up from 1990 to 1983-84 by the projected growth of Fort Irwin, with a subsequent loss in the expected life of the water supply system.

A critical analysis of the impact on water supply, however, depends on many assumptions, such as per capita consumption rates and conservation efforts in the future, plus the duration of drought conditions throughout the state. The City's report quotes a figure of 300 gallons per capita consumption, whereas typical design criteria is 150 gallons.

The 1,064 projected off-post families will require approximately 1,064 acre-feet of water per year under this assumption.

This represents an increase of 17.7 percent in the Barstow area's present rate of overdraft taken from storage in excess of the water added or recharged to the supply. The amount of overdraft was estimated in the City's report at 6,000 acre-feet per year in the Barstow area.

Spreading out the growth rate of Fort Irwin will probably do very little itself to alleviate the present Barstow area water shortage under present assumptions. Water conservation efforts will most likely be increased by all parties concerned. Joint efforts by the military, the city, the Santa Fe Railroad and the Mojave Water Agency to develop and conserve new sources of water may also be required. At the present, however, the entire water issue is in a considerable state of flux and may require additional measures -- administrative and legal changes as well as financial support.

B3.14 ENERGY

Fort Irwin is near a town, Barstow, that can absorb the utility requirement of off-post residents of 1,4 kwh per person peak demand or the annual electrical requirement of 10,000 kwh per person indicated in the 1974 energy use in the Barstow area. It did handle this requirement in 1970 when Fort Irwin was fully manned and there is no reason to believe this will not be true in the future.