THE TIOGA GROUP

CALIFORNIA INTER-REGIONAL INTERMODAL SYSTEM (CIRIS)

Implementation Plan
Final Report

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Background

Foreign trade is a cornerstone of California's prosperity. Transportation of international containers between the Central Valley and the Port of Oakland is Northern California's lifeline to foreign markets, but that lifeline is threatened. If exporters must rely on increasingly congested freeways to move their goods, both their ability to compete and the region's ability to grow will be jeopardized. If importers must rely on those same freeways, they will locate elsewhere.

The California Inter-Regional Intermodal System (CIRIS) was envisioned as an umbrella concept for rail intermodal service between the Port of Oakland and its Northern California hinterland. Inland intermodal facilities served by rail shuttle operations offer potential solutions to Northern California's looming need for better trade lifelines to Bay Area ports. Previous feasibility studies have established the potential viability and value of the CIRIS concept and concluded that the concept is worth pursuing from multiple perspectives.

An implementation plan is the logical next step toward obtaining the long-term regional benefits of CIRIS. The objective of this implementation planning effort is to develop and document a concrete plan for a near-term demonstration and startup, and lay out a logical progression toward an on-going service. The scope of this effort included examination of CIRIS economics and benefits, operating options, and implementation choices.

Overall Implementation Plan

As the study team considered the options available for CIRIS implementation, the inherent uncertainties in a new service, and the time required for institutional adjustments, the desirability for a multi-step implementation plan became clear. To accommodate these needs the study team has laid out an implementation plan encompassing:

- A pilot/demonstration project
- Transloading at the Port of Stockton
- CIRIS organization
- CIRIS service start-up
- Long-term market extension

Pilot Project Implementation

The purpose of a start-up or pilot CIRIS service would be to:

- Verify the ability of the railroads, terminal operators, and trucking companies to maintain competitive service and reliability standards;

- Determine actual operating costs and explore system efficiencies;

- Verify market acceptance and long-term volume potential; and

- Enable customers, ocean carriers, drayage firms, and other participants to adjust to new operating methods.

Although the effort may be regarded as a demonstration project for funding purposes, it should be planned as the initial stage of a system that will eventually attain long-term operation and significant volume.

Class 1 options. Either UP or BNSF could implement a pilot CIRIS operation between Oakland and Stockton. Railroad Industries, Inc. (RII) analyzed the potential rail routes for initial CIRIS service to Stockton and Fresno, and expansion to Bakersfield. Of the four possible rail routes between the Port of Oakland and Bakersfield, two are currently in use and suitable for near-term demonstration or startup service.

BNSF Railway Oakland to Bakersfield. The BNSF route from the Port of Oakland to Bakersfield is the shortest route (314 miles) of all of the alternatives. The BNSF operates over the UP lines to Richmond and then its own lines all the way to Bakersfield (Exhibit 1).

Exhibit 1: BNSF San Joaquin Valley Route

The BNSF route has the following advantages.

- Shortest, flattest route with lowest line-haul costs.

- Direct access to active Stockton and Fresno intermodal terminals.

- Direct access to potential CIRIS terminals at Modesto and Bakersfield.

- Efficient interchange with CCT at the Port of Stockton and at Mormon Yard.

The BNSF route has the following disadvantages.

- Potential congestion due to Amtrak operations between Port Chicago and Bakersfield.
- Use of UP trackage rights through the East Bay bottleneck north of Oakland.
- Limited capacity at the Stockton (Mariposa) terminal.

Union Pacific: Altamont Pass to Fresno Line. The Union Pacific has a route (Exhibit 2) from the Port of Oakland over Altamont Pass to the San Joaquin Valley and then on to Bakersfield (326 miles).

Exhibit 2: UP Altamont Pass Route

The UP route over Altamont Pass has the following advantages.

- Less congestion than the Oakland-Port Chicago bottleneck.
- Existing "tenant" operations of ACE trains by Herzog under contract to SJRRC.
- Access to Bakersfield transloading site.

The UP route has the following disadvantages.

- Additional mileage and steeper grades, with slightly higher operating costs.
- Short sidings, with the potential for future train schedule interference.
- Access to Lathrop terminal requires a detour.

- No active Fresno terminal.

The essential steps in implementing a pilot project are as follows.

- Identify a sponsoring agency. The sponsoring agency would develop the detailed proposal, seek and obtain funding, and either manage the pilot project or contract for management.

- Obtain funding. Funding will be required to manage and market the pilot project and to cover the expected operating deficit.

- Arrange for pilot project administration, management, and marketing. CIRIS will need someone to perform the business solicitation, booking management, invoicing, and tracking functions of an Intermodal Marketing Company (IMC).

- Reach rate and service agreements with the railroad. Most intermodal customers, including IMCs and ocean carriers, sign contracts with the railroads specifying service standards, rates, and terms. An agreement between a sponsoring agency and one of the two railroads would likely consist of a railroad commitment to make CIRIS service available to existing and new intermodal customers at specific rates in return for a sponsor commitment to the negotiated subsidy.

In both the near term and the long term, the key factors in obtaining cooperation from the Class I railroads are cost and capacity, and the tradeoffs between them. The railroads are reluctant to use scarce capacity for low-revenue, short-haul intermodal moves if those moves displace higher-yielding long-haul business. To be as attractive to the railroads, a CIRIS pilot service must either offer a comparable profit margin, arrange to augment capacity, or achieve some balance between profit and capacity.

Near term pilot-phase capacity increases are unlikely. A pilot program with BNSF or UP, therefore, should mesh the CIRIS business as closely as possible with existing operations. Both railroads operate at least some of their intermodal services to Stockton terminals by picking up and setting out cars from long-distance trains. As long as the schedules and transit times met customer requirements there is no need for CIRIS movements to ride the same trains in each direction or even the same trains every day.

Intermodal contracts typically include volume considerations. In a pilot project, it would be more appropriate to give the railroad a commitment to the negotiated subsidy in return for a railroad commitment to offer the service for the duration of the demonstration project. A one-time demonstration grant rather than a per-container subsidy would facilitate a pilot project without the need for a large administrative effort.

Shortline/Contractor Options. BNSF and UP control the only line-haul rail routes, so if they will not operate a pilot service themselves they might permit either a shortline railroad (e.g. CCT) or a contractor (e.g. Herzog under SJRRC) to operate between one or more Central Valley intermodal terminals and the Port of Oakland. Developing a pilot service without the direct participation of the Class I carriers would be difficult, but may be possible. Possible pilot project configurations include:

- Establishing an intermodal terminal at the Port of Stockton, served by CCT, and operated in conjunction with a transloading program. CIRIS intermodal movements would be combined with Class I carload traffic between Stockton and Oakland.

- Trackage rights to operate between an intermodal facility at the Port of Stockton (or one of the Class I Stockton terminals) and either the UP terminal or the Port/BNSF OIG at Oakland. This could be difficult to arrange for institutional reasons, including possible labor rule conflicts between shortline and Class I agreements.

- Operation by a contactor over Altamont Pass using SJRRC's trackage rights over UP. UP would ordinarily not want a contractor carrying freight in competition, but if the business were not attractive to UP there may be more flexibility. SJRRC and the contractor would need to arrange access to UP intermodal terminals on both ends of the movement, and trackage right between Niles Junction and Oakland.

- Operation by a contractor over BNSF's route, which would entail similar considerations of access and capacity.

The key to such arrangements would be creating incentives for the railroads involved.

Pilot Program Organization. A pilot program will require a sponsor, if only to act as a conduit for funding.

- Formation of a JPA or other CIRIS-specific organization would be a logical first step if consistent with the best funding opportunities. If it appears that pilot funding can be secured relatively quickly, it may be expedient to use an existing organization as a sponsor.

- SJCOG has been the sponsor of the research and planning work to date, with funding from Caltrans and the Ports. SJCOG is not set up as an operating agency, but might serve as a funding conduit.

- The Port of Oakland has already secured a small amount of funding towards a CIRIS startup. If that funding and level of participation can be used as leverage for additional support, it may make sense to pursue a CIRIS pilot with the Port of Oakland as the sponsor.

- The Port of Stockton would be involved in the transloading efforts described in the next chapter, and in any search for public support for that start-up. If the transloading were to become the initial CIRS focus, the Port might also serve as a funding conduit.

- SJRRC or another regional organization might also serve as a pilot sponsor, again if consistent with funding opportunities.

Transloading Implementation

The Port of Stockton has developed a strong market niche in rail-truck transloading for bulk and similar commodities. Transloading from truck to container is a logical extension of the Port's existing market and offers specific attractions as part of an overall CIRIS strategy.

- Transloading five truckloads to four containers creates economic "leverage" and increases the favorable impacts on congestion and emissions.
- The lack of existing or planned "overweight" highway routes to the BNSF or UP intermodal terminals prevent those facilities from handling the best commodity candidates for transloading.

If successful, the intermodal movement of transloaded containers to and from the Port of Stockton could either be integrated into a regional system or continue as a parallel service to CIRIS trains. The same rail capacity issues mentioned earlier apply to transloading.

The key steps in implementing transloading operations at Rough and Ready Island include the following.

- Agreement between CCT and either BNSF or UP to handle loaded container cars between a Rough and Ready loading track and an Oakland intermodal terminal at a commercially competitive rate.
- Location of a CCT-served loading/unloading track and sufficient improvement for start-up operations (e.g. grading, gravel, fencing, and lighting as required).
- Identification of a loading track operator. Candidates could include Stevedoring Services of America (SSA), transloaders, experienced intermodal terminal contractors, such as Parsec and Pacific Rail Services, or CCT itself.
- Acquisition or lease of lift equipment. Most of the potential operators have access to usable equipment.
- Identification of participating transloaders, either with existing Port of Stockton operations or with interest in establishing Port of Stockton operations.
- Development of necessary contractual agreements and other institutional arrangements.
- Identification of demonstration funding sources to close any gap between revenue and cost.
- Solicitation of customers.

If detailed investigation and rail negotiations indicate that a Rough and Ready transloading operation could succeed without subsidy it could be started without waiting for broader CIRIS funding. If successful, a Rough and Ready transloading effort could later be folded into CIRIS or, if advantageous, continue as a parallel program serving the same goals.

CIRIS Organization

Assuming a pilot or demonstration project yields favorable results, the next step would be to establish a permanent sponsoring organization in anticipation of long-term operation. The requirements of a sponsoring organization will vary somewhat depending on how the service is organized and what relationship is established with the railroads. The study team analyzed the two most promising organizational options: formation of a Joint Powers Authority, or use of the San Joaquin Regional Rail Commission as a sponsor.

Exhibit 3 below, taken from the 2003 Feasibility Study, lists the major roles that must be performed in a door-to-door CIRIS operation.

Exhibit 3: Rail Shuttle System Roles and Potential Participants

Role	Description	Potential Participants
"Rail Shuttle Sponsor"	Public, private, or public-private organization that develops, oversees, and subsidizes the shuttle system.	Caltrans, joint powers authority, council of governments
"Rail Shuttle Customer"	Tenders container to railroad for line-haul movement, pays rail invoice	Shipper, consignee, ocean carrier, drayman, IMC
"Manager"	Supervises door-to-door service, handles problems, resolves disputes	Shuttle sponsor, shipper, consignee, ocean carrier, drayman, IMC, terminal operator
"Terminal Operator"	Receives containers, loads and unloads rail cars, and chassis, interchanges equipment	Container depot operator, rail terminal contractor
"Railroad"	Operates trains, receives containers in interchange	Railroad (BNSF or UP)
"Intermodal Marketing Company"	"IMC" – provides marketing, sales, and customer service	Existing IMC, railroad, drayman
"Drayman"	Provides over-the-road trucking to/from intermodal terminals, interchanges containers	Drayman, rail terminal contractor
"Ocean Carrier"	Provides ocean container transport, interchanges containers	Steamship line, NVOCC

Most of the roles will be filled by commercial firms. The customers, terminal operator, railroad, IMC, drayman, and ocean carrier functions can all be performed by existing private sector companies. The key roles of sponsor and manager, however, do not have obvious private sector candidates.

- A sponsoring organization will require legal standing to negotiate and fulfill contractual agreements, receive and disburse public funding, and represent the interests of multiple stakeholder agencies and constituencies.

- The "manager" role may be critical to the success of this complex endeavor. The decentralized "management" of intermodal services is often a serious weakness, resulting in inconsistent service and inconsistent customer support. To maximize the container volume, control costs, and obtain the potential public benefits of CIRIS an effective centralized manager may be required.

Formation of an organization dedicated to CIRIS will also signal the serious intentions of the sponsors and the commitment to a long-term service. Given the natural skepticism of potential customers regarding pilot or demonstration projects the appearance of permanence may be of value in establishing reliability.

JPA Formation. Formation of a Joint Powers Authority (JPA) is one logical way to establish an organization to manage an inter-regional rail operation. The formation of a JPA may be a key procedural step in implementing CIRIS. The formation of a JPA is likely to take anywhere from a few months to a year or more, so it may be desirable to identify an interim sponsor for the short-term demonstration phase.

San Joaquin Regional Rail Commission Option. The alternative to creating a new organization is to extend the scope of an existing operation. The San Joaquin Regional Rail Commission (SJRRC) oversees the Altamont Commuter Express (ACE). SJRRC is structured to allow for expansion and could become the CIRIS sponsor. SJRRC has the legal and governmental standing to apply for and receive funding, negotiate and contract for services from railroads or contractors, and administer the subsidy or grant. Initial contacts with SJRRC can be described as cautious supportive.

CIRIS Startup Implementation

Class 1 options. CIRIS operation by either of the two line haul railroads would be the simplest choice, if it can be arranged. Either UP or BNSF could implement an on-going CIRIS operation between Oakland and Stockton. BNSF could also serve Fresno. The essential steps in implementing an ongoing service are similar to the pilot project, as follows.

- Identify a sponsoring agency. The sponsoring agency would develop the detailed proposal, seek and obtain funding, and either manage the service or contract for management.

- Develop a publicly funded capacity investment program. The Class 1 railroads would not be willing to commit to on-going CIRIS service without capacity increases.

- Obtain funding for the ongoing subsidy. Funding will be required to manage and market the service and to cover the expected operating deficit.

- Arrange for service administration, management, and marketing. CIRIS will need someone to perform the business solicitation, booking management, invoicing, and tracking functions of an Intermodal Marketing Company (IMC).

- Reach rate and service agreements with the railroad. Most intermodal customers, including IMCs and ocean carriers, sign contracts with the railroads specifying service standards, rates, and terms. An agreement between a sponsoring agency and one of the two railroads would likely consist of a railroad commitment to make CIRIS service available to existing and new intermodal customers at specific rates in return for a sponsor commitment to the negotiated subsidy.

- Intermodal contracts typically include volume considerations. In a ongoing service it would be more appropriate to give the railroad a commitment to the negotiated subsidy in return for a railroad commitment to offer the service.

There are, however, several barriers to CIRIS operation by the major railroads.

- **Terminal Capacity.** The study team understands there to be marginally adequate capacity at the UP and BNSF Stockton ramps for the near future. Both carriers have indicated a preference for concentrating all international business in Oakland and leaving the Valley terminals for domestic business. Serving the Fresno market is more problematical. UP does not have an active intermodal terminal in Fresno; BNSF does.

- **Track Capacity.** Track capacity may be the toughest operational issue. Problems with the UP's East Bay Bottleneck were noted earlier. BNSF's route between Oakland and the Central Valley is nearing capacity due to the growth in both BNSF freight business and Amtrak passenger operations.

- **Train Capacity.** Depending on how BNSF and UP are serving Central Valley points at present there may be opportunities to add demonstration or start-up businesses to existing trains. For example, if BNSF is using an eastbound train from Oakland or Richmond to pick up eastbound intermodal at Stockton and/or Fresno, that train may have capacity for CIRIS traffic on the Oakland-Valley leg. The Stockton and Fresno cars do not necessarily need to be on the same train, or even necessarily on an intermodal train.

- **Profitability.** CIRIS service will not be a profitable venture, especially on the shorter Oakland-Stockton leg. Although the upward pressure on trucking costs is raising the CIRIS rate and revenue ceiling, the length of haul is basically too short for profitable rail line haul economics.

Contractor/short-line options. The essential steps in implementing a SJRRC/contractor or CCT service are necessarily more complex than the Class I options but have many steps in common.

- Identify a sponsoring agency. The sponsoring agency would develop the detailed proposal, seek and obtain funding, and either manage the service or contract for management.

- Obtain operating funding. Funding will be required to manage and market the pilot project and to cover the expected operating deficit.

- Arrange for management, and marketing. CIRIS will need someone to perform the business solicitation, booking management, invoicing, and tracking functions of an Intermodal Marketing Company (IMC).

- Reach trackage rights and access agreements with the Class I railroads. These would likely build on existing agreements and precedents and would cover locations, usage limits and terms, fees, and many other details.

- Establish combination rates for SJRRC/contractor line haul and Class I terminal loading and unloading. These would be complex but not without precedent, as there are instances of one railroad delivering intermodal business to another trainload's terminal. Intermodal terminals are operated by contractors rather than railroad personnel, so those contracts may require amendment.

SJRRC/Contractor Option. The San Joaquin Regional Rail Commission (SJRRC) operates the Altamont Commuter Express (ACE) and has both an internal organization experienced in rail operations and working relationships with the railroads (chiefly UP). The SJRRC option permits rethinking the central California rail network. In principle SJRRC could sponsor CIRIS operations over Altamont Pass or over another route. Actual ACE operations are currently managed and conducted by Herzog under contract to SJRRC.

SJRRC, however, does not have intermodal terminals or access to BNSF or UP terminals on the west end. SJRRC would need to obtain trackage rights from Niles to the Port of Oakland over one of UP's three routes (two ex-SP and one ex-WP) or purchase one of the routes. On the east end SJRRC would need to obtain trackage rights between its existing routes and either UP or BNSF terminal facilities.

While there are precedents for hire-haul intermodal trains of one railroad originating or terminating at the intermodal terminals of another, it is an uncommon practice. Such an arrangement would leave the terminal owner – BNSF or UP – performing few if any functions at all, since intermodal terminal operations are contracted out at both railroads (e.g. to Omnitrax at BNSF's Oakland International Gateway).

CCT/Short-line Option. The Central California Traction Company (CCT) is a short-line and switching railroad jointly owned by UP and BNSF. CCT operates rail services at the Port of Stockton, including on Rough and Ready Island. CCT also operates between Stockton and Lodi to serve carload customers on its own trackage. The CCT line extends to Sacramento but the 27 mile portion between Lodi and Sacramento is presently dormant.

By virtue of its joint ownership and short line/switching status, CCT enjoys greater flexibility in its operations than BNSF or UP. If appropriate working relationships can be established with BNSF and UP, it would therefore be conceivable for CCT to operate CIRIS as a quasi-independent system overlaid on the existing rail system, much as Amtrak operates.

A more ambitious role for CCT would involve assembling CIRIS trains from multiple Central Valley terminals. CCT would also be a logical candidate to move intermodal cars to and from a new Sacramento terminal (either on its own rehabilitated line or on one of UP's lines). Under this admittedly speculative scenario CCT would be operating over the Class I lines much as Amtrak does.

Long-Term Market Extension

CIRIS service is expected to be offered initially in the Stockton/Modesto and Fresno markets. Once established there, long-term implementation options would include expansion to other markets.

- **Bakersfield.** The Shafter initiative currently contemplates service by separate non-CIRIS trains, but does not yet have a terminal. If a terminal is eventually established in the Bakersfield market, regardless of the actual site, it could be integrated into CIRIS.

- **Modesto.** The Modesto and Empire Traction (M&ET) Valley Lift facility in Empire was served by BNSF until BNSF opened their Stockton facility, and the Empire terminal has since been put to other uses. The initial CIRIS implementation envisions serving the Modesto market from Stockton or Lathrop but the long-term CIRIS implementation could include direct Modesto service.

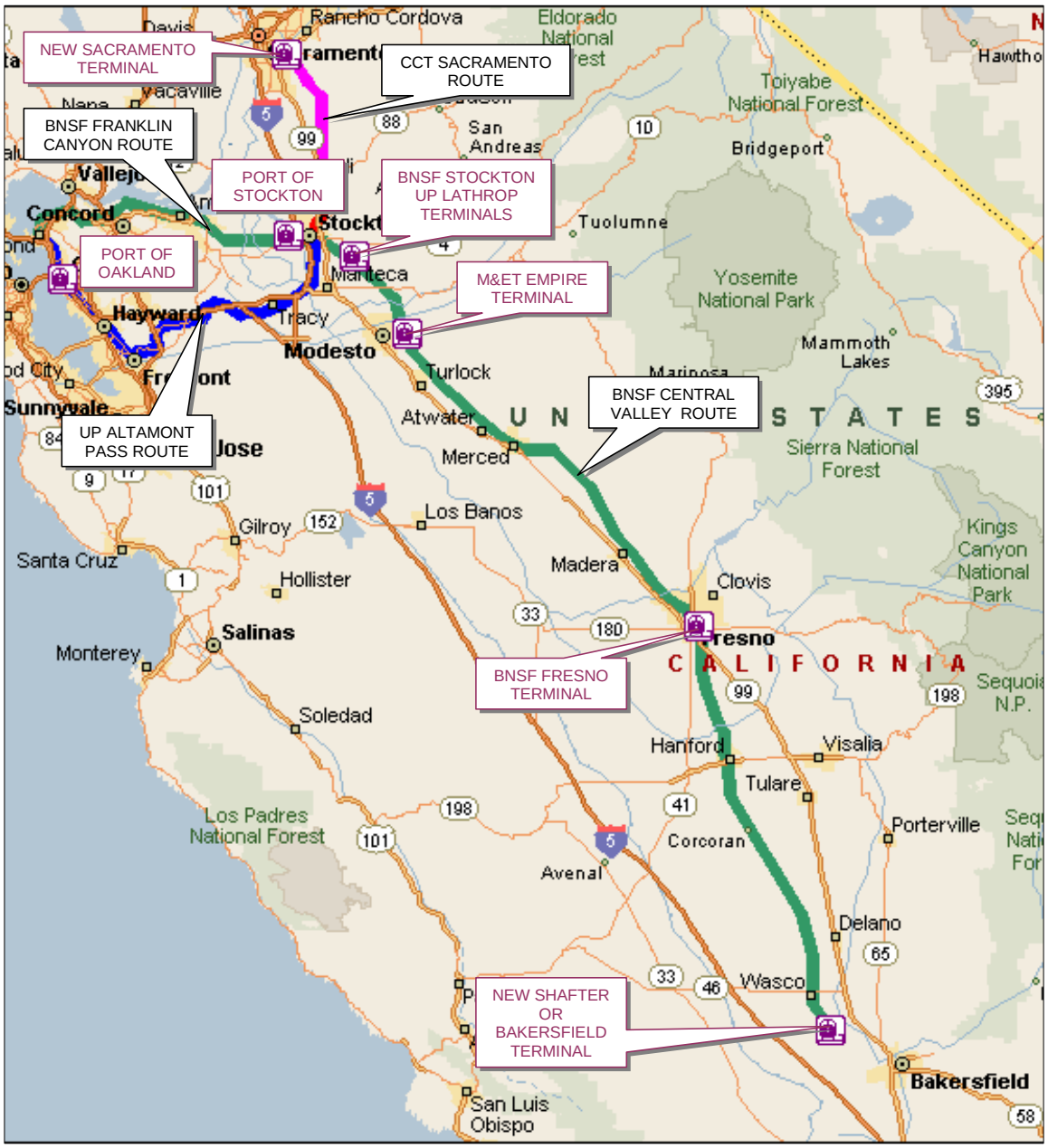
- **Sacramento.** The November 2003 Feasibility Study excluded the Sacramento market from consideration on the grounds that it lacked an intermodal terminal for direct service and was too far for competitive drayage from Stockton. The Sacramento market could generate substantial volume however, particularly in export fruit and nuts. Development of a modest intermodal facility and a creative approach to rail service could bring Sacramento into CIRIS.

- **Additional Central Valley Terminals.** The viability of additional future terminals in the Central Valley (e.g. at Crow's Landing) will depend on access by the operating railroad or contractor, sufficient volume to justify a terminal and service, and the availability of a terminal or funding to build one.

- build on the work done to date at Shafter but there may be other terminal options.

At its most expansive CIRIS could link the Sacramento, Stockton, Modesto, Fresno, and Bakersfield markets and the Port of Stockton to the Port of Oakland via either the BNSF Franklin Canyon route or the UP Altamont Pass route. Exhibit 4 shows the potential CIRIS system in this configuration.

Exhibit 4: CIRIS at Full Build-Out



Railroad Participation and Capacity Requirements

The willing participation of either or both railroads is a prerequisite for success, as is the choice of the actual operator/manager of the service. Plans for rail participation in either start-up or long-term operations must encompass rail operating, pricing, and equipment options, and capacity.

Both the BNSF Railway (BNSF) and Union Pacific (UP) have expressed varying degrees of interest in such an operation, as have independent operators such as Northwest Container. Short

line operators have discussed the feasibility of linking dormant or underutilized routes under common operation. The team explored the feasibility and benefits of various operating scenarios to determine which are sufficiently promising to warrant consideration in implementation planning. Railroad commitments and funding requirements can only be made concrete with indications of likely business volumes. The survey work completed in previous studies showed that potential customers were interested in trying the service.

Capacity is the primary issue in railroad participation, not cost. It is clear to the project team that long-term railroad participation in CIRIS – either as an operator or as a host for operation by someone else – will be contingent on public funding for increased capacity. The situation is parallel to that of passenger rail services in California, whose expansion has been facilitated by strategic state investments in additional track capacity, signaling, and other measures to expand total rail capacity.

Studies consistently indicate that unsubsidized short-haul rail shuttles in the 75-150 mile range will not be commercially viable or attractive business propositions for the railroads. It is equally clear that developing and operating intermodal facilities is unlikely to be a profitable stand-alone venture. Both will require subsidies or other forms of financial support to succeed in a competitive environment. The means of providing those subsidies is at the crux of the implementation effort.

Both Class 1 railroads are experiencing traffic growth, driven by transcontinental intermodal movements that generate far more revenue than short-haul intermodal movements such as CIRIS trips. An operating subsidy to make up the difference between commercial rail intermodal rates and the trucking competition will not be nearly enough to interest the railroads if they have to turn away higher-yield business due to capacity constraints.

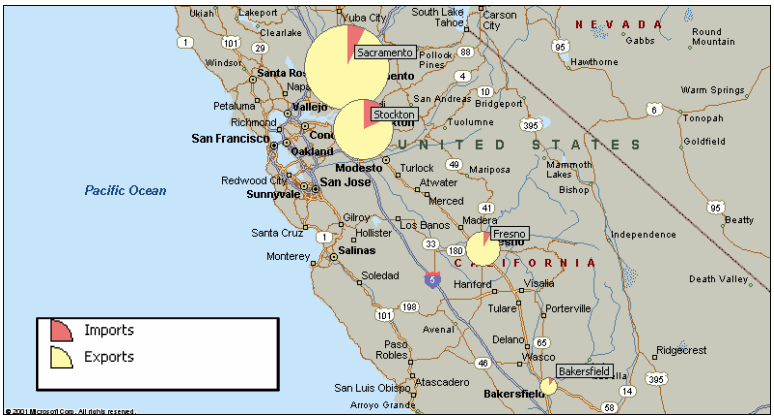
Recent national discussions of public-private partnerships for freight have included the possibility of public investment in rail capacity in return for rail service and rate commitments on target movements. The scope for direct public investment in CIRIS-related facilities has expanded since the inception of the CIRIS concept as traffic growth has brought both BNSF and UP closer to their trackage and terminal capacity limits in Northern California.

Public investment elsewhere in California could also be part of a public-private agreement for lower CIRIS rates and service guarantees. The scope of such discussions could include CIRIS-like services being considered in Southern California and potential public investment in Alameda Corridor East. A multi-jurisdictional or comprehensive public-private agreement for rail freight projects in California could have great advantages to both parties and facilitate progress on many pending issues.

CIRIS Markets

The 2003 CIRIS Feasibility Study examined several data sources to locate and size the potential CIRIS market. The geographic locations of major segments are shown in Exhibit 5.

Exhibit 5: Geographic CIRIS Markets



The first phase of CIRIS service is targeted at the Stockton-Modesto and Fresno markets, which are served by active intermodal terminals. Exhibit 6 divides the market data into first phase markets (Stockton-Modesto and Fresno) and expansion markets (Sacramento and Bakersfield). The analysis presented in Exhibit 6 anticipates growth in market share between startup and mature CIRIS services (assuming 250 annual working days and one empty trip for every load). At startup, and serving only the Stockton-Modesto market, CIRIS would be expected to handle about 28 container trips each way. At maximum buildout, CIRIS trains could replace as many as 776 daily truck trips at 2003 volumes. Containers would be mostly loaded in the westbound export direction and mostly empty in the eastbound import direction.

Exhibit 6: CIRIS Container Volume Estimates (2003)

Phase 1		Market Extension		Potential CIRIS Daily Round Truck Trips			
Stockton Modesto	**Fresno**	**Bakersfield**	**Sacramento**	**Perishable Food/Farm**	**Non-Perishable Food/Farm**	**Other**	**Total**
Startup				7	28	21	**56**
Mature				41	127	68	**237**
Startup	Startup			16	44	44	**104**
Mature	Mature			95	200	147	**442**
Startup	Startup	Startup		25	45	54	**124**
Mature	Mature	Mature		147	202	181	**530**
Startup	Startup	Startup	Startup	32	82	65	**179**
Mature	Mature	Mature	Mature	189	369	218	**776**

Source: Inland Port Feasibility Study, 2003

Central Valley locations are also prime candidates for transloading facilities relocating from Oakland due to urban development pressure. Rough and Ready Island at the Port of Stockton offers an ideal site, and transloading has been identified as an early CIRIS implementation objective. Exhibit 7 offers a rough estimate of the potential transloading market using comparable market penetration estimates to those in Exhibit 6.

Exhibit 7: Potential Transloading Market – Annual Container Loads

	Phase 1		Market Extension		CIRIS
	Stockton Modesto	Fresno	Bakersfield	Sacramento	Total
Statup	1,112	977	385	1,103	3,576
Mature	4,732	4,114	1,755	4,914	15,516

CIRIS Economics

Relevant railroad intermodal costs include rail operations, equipment, maintenance of way (MOW), overhead, and terminal lift on/lift off. The complete estimated per-container round trip CIRIS cost structure includes terminal, drayage, and overhead costs as well as railroad costs. Exhibit 8 gives the complete breakdown for round trips between Oakland and Central Valley points on the BNSF route.

Exhibit 8: CIRIS Per Container Cost Structure

BNSF Round Trip	Stockton Cost	Stockton Share	Fresno Cost	Fresno Share	Bakersfield Cost	Bakersfield Share
Rail Operations	**$ 71**	**14%**	**$ 104**	**17%**	**$ 135**	**19%**
Fuel	$ 6	1%	$ 14	2%	$ 22	3%
Labor	$ 26	5%	$ 51	8%	$ 74	10%
Switching	$ 34	7%	$ 33	5%	$ 33	5%
Loss/Damage	$ 5	1%	$ 5	1%	$ 5	1%
Rail Equipment	**$ 35**	**7%**	**$ 42**	**7%**	**$ 48**	**7%**
Locomotive	$ 5	1%	$ 12	2%	$ 18	3%
Railcars	$ 30	6%	$ 30	5%	$ 30	4%
Rail MOW	**$ 23**	**5%**	**$ 58**	**10%**	**$ 90**	**13%**
Rail Overhead	**$ 52**	**10%**	**$ 82**	**13%**	**$ 109**	**15%**
Rail Profit (20%)	**$ 36**	**7%**	**$ 57**	**11%**	**$ 76**	**11%**
Rail Terminal	**$ 140**	**28%**	**$ 140**	**23%**	**$ 140**	**20%**
Lift (4)	$ 140	28%	$ 140	23%	$ 140	20%
Rail Total	***$ 320***	***63%***	***$ 426***	***70%***	***$ 522***	***74%***
Drayage	**$ 160**	**32%**	**$ 160**	**26%**	**$ 160**	**23%**
Port (RT)	$ 70	14%	$ 70	11%	$ 70	10%
Valley (RT)	$ 90	18%	$ 90	15%	$ 90	13%
CIRIS Overhead	**$ 25**	**5%**	**$ 25**	**4%**	**$ 25**	**4%**
Total	**$ 505**	**100%**	**$ 611**	**100%**	**$ 707**	**100%**

The key to understanding the cost structure for CIRIS is the realization that only part of the total cost varies with the rail mileage. For the three BNSF trips shown in Exhibit 8, the combined cost per mile of rail operations, equipment, and maintenance of way averages just $0.51 per mile. As Exhibit 8 shows, the overall cost picture is heavily influenced by the terminal, drayage, and overhead costs. The estimates in Exhibit 8 allow $25 for CIRIS overhead, which is a typical figure for an Intermodal Marketing Company (IMC) or other third party.

Conceptual Short-Line/Contractor Costs. One of the potential attractions of using a contractor to operate CIRIS trains is a lower cost structure. For this report, Railroad Industries developed

conceptual cost estimates for an Oakland-Fresno operation over Altamont Pass by a contractor using UP trackage rights. This alternative has the potential benefit of economies of scale when combined with the current ACE operations out of the Stockton area. As indicated in Exhibit 9:

- The use of ACE locomotives and crews, coupled with favorable work rules and wage rates, results in significant savings in locomotive and labor costs.
- The trackage rights fees are less than the Class I maintenance of way allocation.
- Overhead and profit, calculated as a percentage of costs, are significantly less.

Exhibit 9: Conceptual Contractor Costing: Oakland - Fresno

Contractor Round Trip	Fresno Cost	Share	BNSF Round Trip	Fresno Cost	Share
Rail Operations	**$ 61**	**12%**	**Rail Operations**	**$ 104**	**17%**
Fuel	$ 14	3%	Fuel	$ 14	2%
Labor	$ 9	2%	Labor	$ 51	8%
Switching	$ 33	7%	Switching	$ 33	5%
Loss/Damage	$ 5	1%	Loss/Damage	$ 5	1%
Rail Equipment	**$ 33**	**7%**	**Rail Equipment**	**$ 42**	**7%**
Locomotive	$ 3	1%	Locomotive	$ 12	2%
Railcars	$ 30	6%	Railcars	$ 30	5%
Trackage Rights Fees	**$ 15**	**3%**	**Rail MOW**	**$ 58**	**10%**
Rail Overhead	**$ 31**	**6%**	**Rail Overhead**	**$ 82**	**13%**
Contractor Profit (20%)	**$ 28**	**6%**	**Rail Profit (20%)**	**$ 57**	**9%**
Rail Terminal	**$ 140**	**28%**	**Rail Terminal**	**$ 140**	**23%**
Lift (4)	$ 140	28%	Lift (4)	$ 140	23%
Rail Total	***$ 280***	***57%***	***Rail Total***	***$ 426***	***70%***
Drayage	**$ 160**	**32%**	**Drayage**	**$ 160**	**26%**
Port (RT)	$ 70	14%	Port (RT)	$ 70	11%
Valley (RT)	$ 90	18%	Valley (RT)	$ 90	15%
CIRIS Overhead	**$ 25**	**5%**	**CIRIS Overhead**	**$ 25**	**4%**
Total	**$ 493**	**100%**	**Total**	**$ 611**	**100%**

The end result, at least conceptually, is a cost reduction of $118 per Oakland-Fresno round trip. Comparable reductions should be possible for Stockton and Bakersfield trips but were not separately estimated. *Note that neither SJRRC nor any contractor participated in these preliminary estimates and that a significant amount of negotiation and due diligence would be required to develop a concrete service proposal on this basis.*

Rail – Truck Comparisons and Subsidy Needs

Current trucking rates differ significantly from what the study team found in 2003. The 2003 Feasibility Study cited a "going rate" of $250 for round trip drayage between Oakland and Stockton but noted the upward pressure on rates. The trucking rates in Exhibit 10 are split into a base rate and a fuel surcharge to illustrate the recent impact of fuel prices and allow for subsequent adjustments.

Exhibit 10: Class I Rail-Truck Cost Comparisons

	Port of Oakland Round Trip to:		
	Stockton	**Fresno**	**Bakersfield**
BNSF CIRIS Total	**$ 505**	**$ 611**	**$ 707**
Trucking			
Base Rate	$ 300	$ 520	$ 550
25% Fuel Surcharge	$ 75	$ 130	$ 138
Trucking Total	**$ 375**	**$ 650**	**$ 688**
Comparison			
Rate Target (Truck less 5%)	**$ 356**	**$ 618**	**$ 654**
Rail Intermodal Total	**$ 505**	**$ 611**	**$ 707**
Per Container RT Subsidy	**$ 149**	**$ (7)**	**$ 53**

The relatively low base rate for Bakersfield trucking is due to the prevalent service pattern. A drayage trip between Oakland and Stockton or Fresno is typically a genuine round trip. A drayage trip between Oakland and Bakersfield, however, is more typically made as one part of an Oakland-Southern California trip each way.

Exhibit 11 shows an Oakland-Fresno comparison for contractor and BNSF costing. If the conceptual contractor costing estimates are realistic, CIRIS service could potentially show an operating profit at Fresno and break even at Stockton.

Exhibit 11: Conceptual Contractor Rail-Truck Cost Comparisons

Conceptual 2005 Cost Comparisons		
Oakland - Fresno Round Trip		
	Contractor	**BNSF**
CIRIS Total	**$ 493**	**$ 611**
Trucking		
Base Rate	$ 520	$ 520
25% Fuel Surcharge	$ 130	$ 130
Trucking Total	**$ 650**	**$ 650**
Comparison		
Rate Target (Truck less 5%)	**$ 618**	**$ 618**
Rail Intermodal Total	**$ 493**	**$ 611**
Per Container RT Subsidy	**$ (125)**	**$ (7)**

Given the lack of precedent for contractor operations, however, these estimates must be regarded as conceptual and subject to significant changes in practice. In particular, if the Class I carriers regard capacity used for contractor operations as capacity lost to profitable long-haul traffic, they can be expected to charge much more for CIRIS trackage rights and terminal access than UP charges for ACE passenger operations.

Exhibit 12 provides estimates of the round-trip subsidy requirements based on Class I (BNSF) operation and key assumptions:

- That the CIRIS cost structure closely follows the estimates in Exhibit 10, including the amounts allowed for railroad profit and drayage.
- That CIRIS will be able to attract business with rates 5% below prevalent trucking rates. The 2003 Feasibility Study postulated a 10% discount, but with rising truck rates a smaller discount may suffice.

Under those circumstances and using the lower BNSF costs:

- CIRIS would require a $149 per round trip subsidy in the Stockton market.
- CIRIS could conceivably earn a $7 per round trip profit in the Fresno market.
- The cost disparity would be $53 per round trip in the Bakersfield market due to the effective cap on drayage rates.

To the extent that some containers can be reused instead of moved empty, the economics would improve. The economic leverage of consolidation would also improve the financial picture for those loads that could be consolidated.

Exhibit 12 estimates the annual subsidy costs under Class I startup and mature service scenarios.

Exhibit 12: Potential Subsidy Requirements

	Phase 1			Market Extension			
	Stockton Modesto	Fresno	Subtotal	Bakersfield	Sacramento*	Subtotal	Total
Startup							
Per Unit	$ 149	$ (7)	$ 76	$ 53	$ 149	$ 124	$ 96
Annual Units	6,950	6,106	13,056	2,405	6,892	9,297	22,353
Annual	$ 1,037,405	$ (44,144)	$ 993,260	$ 128,494	$ 1,028,732	$ 1,157,226	$ 2,150,487
Mature							
Per Unit	$ 149	$ (7)	$ 76	$ 53	$ 149	$ 124	$ 96
Annual Units	29,577	25,713	55,290	10,971	30,712	41,683	96,973
Annual	$ 4,414,962	$ (185,895)	$ 4,229,067	$ 586,112	$ 4,584,364	$ 5,170,476	$ 9,399,543

* Not costed separately - assumed equal to Stockton

The study team did not develop a separate subsidy estimate for the conceptual contractor operations. It is tempting to conclude that CIRIS could operate at a profit using contractor cost factors. If the conceptual estimates are realistic, any operating subsidy would be much smaller, but the actual need for subsidy would depend not only on contractor cost characteristics but on the trackage rights fees and /or terminal access changes levied by the Class I carriers.

It is generally agreed that CIRIS sponsors would have difficulty obtaining public funding for permanent operating subsidies. Operating subsidies are universal for public passenger transportation but largely unknown in the freight sector. One option available to CIRIS sponsors is to provide capital funding to cover some of the fixed costs or to offset some of the variable

costs. Public provision of locomotives and railcars would therefore reduce the average CIRIS operating cost and subsidy by about $38 per round trip.

Regional Benefits

Employment. A successful CIRIS operation would create or encourage new employment opportunities in several categories. CIRIS would require employees in rail operations, terminals, and management positions. CIRIS itself could thus create 25 to 60 employment opportunities, depending on how extensive the system ultimately becomes and what roles various organizations such as railroads and IMCs play in CIRIS development. Transloading operations hire unskilled labor, skilled equipment operators, supervisors, clerks, and managers. At 200 annual loads per employee, the 3,576 startup loads would generate about 18 transloading jobs, and the mature service total of 15,516 would generate about 78 jobs. Additional jobs would likely be created in customs brokerage, Free Trade Zones, and related functions.

Industrial Development. Issues such as traffic congestion and transportation costs are commanding greater attention in site selection for manufacturing plants and distribution centers. The availability of CIRIS as an alternative or supplement to highway trucking should improve the competitive position of San Joaquin County compared to other locations in Northern and Southern California and result in additional job creation.

Congestion Relief. Congestion relief is a major motivation for CIRIS. An estimated 1,480 container trucks travel I-580 each day to and from the prime CIRIS service territory. Coaxing traffic off the freeways is not cheap. Rail passenger services are heavily subsidized in California, as they are elsewhere, to relieve congestion on heavily traveled commuter routes. As Exhibit 13 shows, the subsidy required by CIRIS to take one truck off the freeway between Oakland and the Central Valley is significantly less than that required to take an equivalent number of passengers off I-80 between Oakland and Sacramento.

Exhibit 13: Congestion Relief Cost Comparison

Capital Corridor Congestion Relief Cost Oakland- Sacramento Round Trip (160 miles)		
Avg. Passenger Subsidy, One Way	$	17
Avg. Round Trip Passenger Subsidy	$	35
Avg. Passengers per Auto, All Trips		1.63
Avg. Subsidy per Auto	$	57
Truck Pasenger Car Equivalents, Congestion		4.0
Equivalent Subsidy per Truck	**$**	**226**
CIRIS Subsidy to Stockton, Preliminary	**$**	**149**

CIRIS should not be envisioned as a single solution to truck or traffic congestion on I-580 or other routes. Port truck traffic itself is a relatively small, but highly visible portion of the truck traffic on I-580. CIRIS would more accurately be viewed as one of a broad range of congestion management efforts brought to bear on the growing problem.

Exhibit 14 estimates truck VMT reductions and passenger car equivalent VMT for startup and mature CIRIS operations in 2003 and 2020.

Exhibit 14: Estimated Net VMT and Passenger Car Equivalent VMT Reductions

2003	Phase 1			Market Extension			CIRIS
	Stockton Modesto	Fresno	Subtotal	Bakersfield	Sacramento	Subtotal	Total
Startup							
Annual VMT Reduction	1,195,392	3,761,297	4,956,689	2,453,234	1,598,909	4,052,143	9,008,832
Annual PCE VMT Reduction	4,781,567	15,045,188	19,826,755	9,812,936	6,395,636	16,208,572	36,035,327
Mature							
Annual VMT Reduction	5,087,318	15,839,012	20,926,329	11,190,149	7,125,258	18,315,407	39,241,737
Annual PCE VMT Reduction	20,349,272	63,356,046	83,705,318	44,760,596	28,501,033	73,261,629	156,966,947

2020	Phase 1			Market Extension			CIRIS
	Stockton Modesto	Fresno	Subtotal	Bakersfield	Sacramento	Subtotal	Total
Mature							
Annual VMT Reduction	11,649,958	36,271,337	47,921,294	25,625,441	16,316,842	41,942,283	89,863,577
Annual PCE VMT Reduction	46,599,832	145,085,346	191,685,178	102,501,765	65,267,366	167,769,131	359,454,309

Highway Maintenance Savings. The total annual truck VMT diverted by CIRIS could range from about 5 million at the startup of Phase 1 to almost 90 million at maturity with 2020 traffic levels. Diversion of this volume of truck traffic could result in significant savings in highway maintenance. An FHWA study estimated that the year 2000 highway maintenance cost responsibility of combination trucks was 6.9 cents per mile. That figure translates into maintenance cost savings of $82,482 for Stockton-Modesto service in Phase 1 all the way up to $6,200,587 annually at full maturity in 2020.

Funding

Achieving the public benefits CIRIS can provide will require investments from both the public and private sectors.

Federal Funding. Under SAFETEA-LU, the Federal government has expanded funding and eligibility for several existing programs and created new opportunities for the states and local agencies to invest in freight rail in cooperation with the private sector. Exhibit 15 summarizes the applicable Federal grant programs. Both should be useable for CIRIS, but only the CMAQ program is accessible in the near future. The Freight Intermodal Distribution Pilot Grant Program should be applicable if renewed, but is at least two years away.

Exhibit 15: Federal CIRIS Grant Funding Summary

Grant Source	How Does CIRIS Qualify?	Program Administrator	Start of next funding cycle	Next Steps
CMAQ	Typically apply through local MPO. Must be in a non-attainment area and show a positive impact on air quality. Major federal source that can potential provide operating fund.	Local MPO	Based on one or two year MPO transportation improvement program cycle.	Work with MPOs on local application procedures.
Projects of Regional and National Significance	All money for this program in SAFETEA-LU is earmarked. Projects much larger than CIRIS	FHWA Office of Freight Management.	Start now to prepare for earmark in next reauthorization.	This is new and the application rules have not yet been released.
Freight Intermodal Distribution Pilot Grant Program	If this is program is expanded in the next reauthorization, would be a good potential source for a CIRIS earmark.	FHWA	Start now to prepare for earmark in next reauthorization.	Follow program to see if it will be expanded in next reauthorization.

The loan programs shown in Exhibit 16 are accessible, but restricted to capital projects. There may, however, be opportunities for tradeoffs between capital and operating funds. In particular, access to TIFIA funding may facilitate public investment in critical freight rail capacity.

Exhibit 16: Federal CIRIS Loan Funding Summary

Loan Source	How Does CIRIS Qualify?	Program Administrator	Start of next funding cycle	Next Steps
TIFIA	Application to the TIFIA office. Application available at: http://tifia.fhwa.dot.gov/	TIFIA office within FHWA.	Can submit anytime.	Loan program for large capital investments.
RRIF	Submit an application to the FRA. Application must come from a railroad.	Federal Railroad Administration	Can submit anytime.	Loans for capital investments.
Private Activity Bonds	Submit an application to the office of the Secretary of Transportation	Office of the Secretary of Transportation	New program, timing is unknown.	This is new and the application rules have not yet been released.

State Funding. The California Infrastructure and Economic Development Bank (I-Bank) finances public and private infrastructure to promote economic growth. The I-Bank administers several loan programs, of which the following have potential application to CIRIS.

- **Exempt Facility Revenue Bond Program.** The Exempt Facility Revenue Bond Program provides tax-exempt financing for government-owned projects or private improvements within publicly-owned facilities. This program could conceivably be applied to CIRIS terminal improvements or CIRIS-related improvements at the Ports or inland terminals.

- **Governmental Revenue Bond Program.** The Governmental Revenue Bond Program provides tax-exempt financing to governmental agencies. Examples

include $10 million for the Port of Stockton for infrastructure improvements at Rough and Ready Island.

- **California Infrastructure State Revolving Fund (ISRF)**. The ISRF provides low-cost loans for a variety of infrastructure projects. ISRF funding is available in amounts ranging from $250,000 to $10,000,000. Eligible project categories include environmental mitigation measures, port facilities, and public transit, so CIRIS would likely fit into the program. Eligible applicants include any subdivision of a local government, including special districts, JPAs, and non-profit corporations. Preliminary applications are continuously accepted.

Senate Bill SB 1266 – Bond Issue. The long road to new State infrastructure funding led to the approval of SB1266 on May 16, 2006. This measure, if approved by the voters in November 2006, would enact the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006. The Act would authorize $19.9 billion in State general obligation bonds for specified purposes, including emissions reductions, rail improvements, State-local partnership projects, congestion relief, and other categories that could benefit CIRIS. The California Transportation Commission would be responsible for developing project guidelines and approving Caltrans project nominations.

Port of Oakland Earmark Funds. The Port of Oakland received $720,000 from a Congressional earmark for the CIRIS pilot project. Since it is a congressional earmark, there are fewer constraints in the use of the available funds for implementing the CIRIS pilot project, and the port has 2 years to expend the amount. The Port is also looking at the potential for State funding from the Goods Movement Action Plan (GMAP).

County/Regional Funding. A vital potential funding source for pilot or ongoing operations is the membership of a JPA. One of the primary purposes of forming a JPA is to spread the costs of regional programs with regional benefits over the relevant jurisdictions. Each of the counties that would join a CIRIS JPA would obtain congestion management, emissions reduction, and economic development benefits. The member counties also have budgets for those functions. One distinct advantage of sharing the funding burden through a CIRIS JPA is the ability of each member to fund its share differently.

Statewide Coordination Potential

In the course of previous studies and parallel work in Southern California, it became apparent that the potential exists for authentic synergies if CIRIS implementation can be considered in a statewide context. This effort included contacts with agencies involved in rail and transportation planning statewide and in Southern California and reviews of state and regional planning documents to investigate parallel planning initiatives and the potential for statewide synergies.

There are some clear potential benefits to a statewide north-south system.

- **Funding.** A statewide consensus program would have a better chance of securing both state and federal funding.

- **Economics.** A broader multi-market system allows additional economic leverage.

- **Operations.** A linked north-south system might allow operational flexibility as well, including the repositioning of empty intermodal cars and empty containers between Oakland and the San Pedro Bay ports.

- **Seasonal congestion relief.** The existence of a functioning rail alternative for north-south repositioning would create a much-needed safety valve.

- **Statewide system capacity.** The development of a regular rail intermodal service linking existing, expanded, and new terminals would add to the state's overall goods movement capacity.

The CIRIS nomenclature – California Inter-Regional Intermodal System – was chosen in part to emphasize the inter-regional nature of the concept and to allow or even encourage expansion of the idea beyond an Oakland-Stockton rail shuttle. Exhibit 17 displays all of the major routes and terminal sites discussed to date from both Northern and Southern California perspectives.

- CIRIS Phase 1 would link the Port of Oakland with the Stockton and Fresno terminals, including a transloading operation at the Port of Stockton.

- CIRIS Phase 2 would seek expansion to cover the Sacramento and Bakersfield markets, and a separate terminal in the Modesto market.

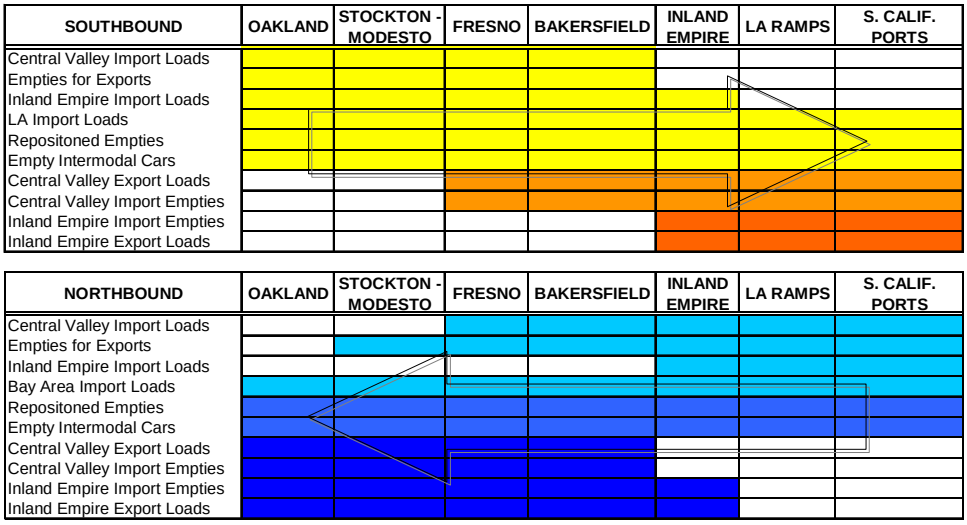
The Southern California system shown in Exhibit 17 is conceptual, linking the Ports of Los Angeles and Long Beach and the Los Angels intermodal terminals with the Inland Empire, the Victorville area, and the Bakersfield market. A more detailed system concept should emerge from the SCAG Inland Port Feasibility Study just begun.

Exhibit 17: Statewide System Potential

Exhibit 18 suggests the possible scope of a coordinated north-south service. Southbound trains from Oakland could carry empty and loaded containers for Central Valley and the Inland Empire, imports for the Los Angeles market, and empty intermodal cars being repositioned to Southern California. At Central Valley terminals a southbound train could add cars with export loads or empties headed for Southern California ports. At an Inland Empire Inland Port, the train could pick up export loads and import empties for San Pedro Bay, performing the function of a Southern California rail shuttle. A northbound train would reverse the flows. Some of these

flows could be quite small or intensely seasonal. The existence of a backbone CIRIS operation, however, could facilitate seasonal expansion and contraction as required.

Exhibit 18: Potential Statewide North-South Marine Container Flows



The first step in achieving statewide coordination could be creating a "California Inland Port Coalition" or equivalent organization. Such an organization would provide a framework for discussions, information sharing, concept recognition, and emergence of a permanent JPA or other umbrella organization. The emergence of a coalition or other organization, even without the legal standing of a JPA, would also signal the railroads and other stakeholders that the initiative was serious and progressing.

I. Introduction

Background

California has enjoyed growing prosperity over recent decades and foreign trade is one of the cornerstones of that prosperity. Transportation of international containers between the Central Valley and the Port of Oakland is Northern California's lifeline to foreign markets, but that lifeline is threatened. If exporters must rely on ever more congested freeways to move their goods, both their ability to compete and the region's ability to grow will be jeopardized.

Containerized exports heavily outnumber imports in the Sacramento, Stockton/Modesto, Fresno, Salinas/Monterrey, and other Northern California areas, making their economies particularly dependent on efficient foreign trade. Exporters and regional distribution centers are major sources of employment and tax revenue growth in Sacramento, San Joaquin, and Stanislaus Counties. The Central Valley's lifelines to the ports, I-80 and I-580, are becoming congested and slow. With no major capacity additions on the horizon, Northern California's importers and exporters can only expect increased costs and slower, less reliable service.

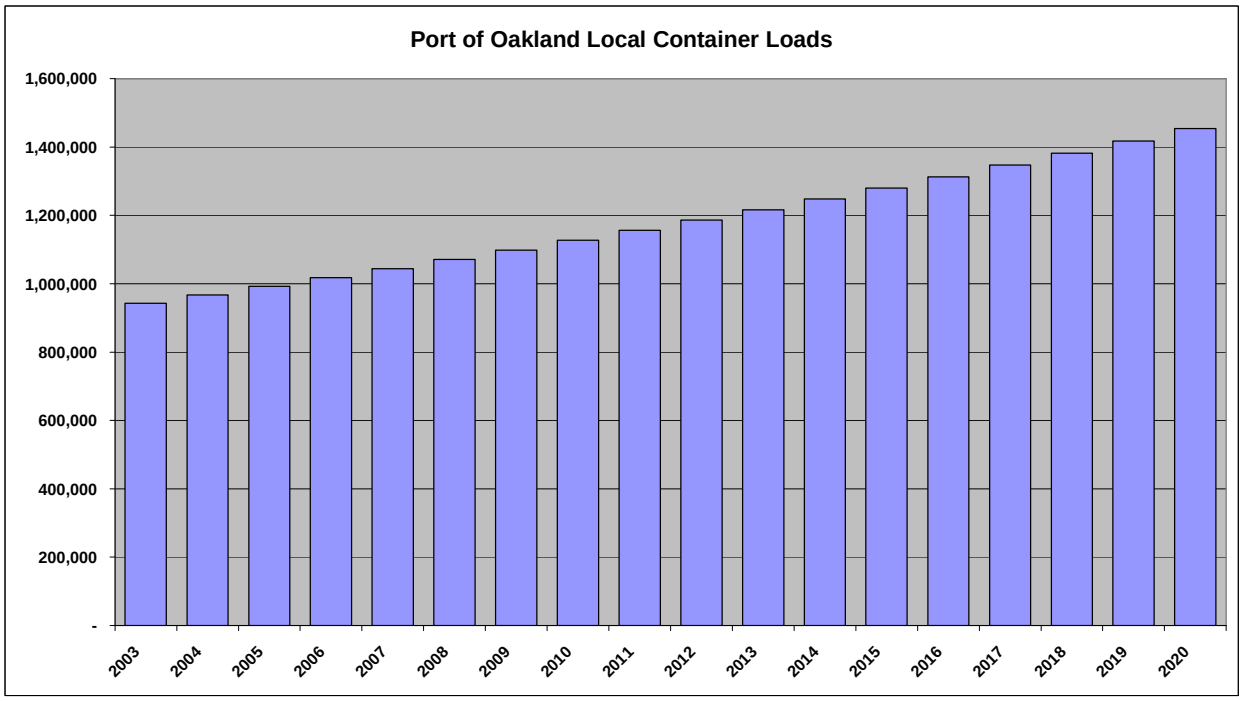
Inland intermodal facilities served by rail shuttle operations offer potential solutions to Northern California's looming need for better trade lifelines to Bay Area ports. A California Inter-Regional Intermodal System (CIRIS) could strengthen and preserve those lifelines, bring some much-needed relief to regional highways, and reduce emissions. The growing congestion on Northern California freeways and the competitive challenges faced by Northern California exporters suggest that time is running out. Previous feasibility studies have established the potential viability and value of the CIRIS concept. There is much to be done to move the CIRIS concept through the study and pilot phases and reap the benefits of a working intermodal system.

San Joaquin County and the Port of Oakland have a strong symbiotic relationship. The Port of Oakland is the gateway for containerized export of agricultural and other commodities from Central Valley producers, and for a growing flow of imports to Central Valley distribution centers. Both flows are a mainstay of the Port's business.

Over the last decade the containerized cargo flow between the Central Valley and the Port of Oakland has grown steadily to the benefit of the region as a whole. Cargo growth has paralleled population growth, however. As the highways connecting the Port of Oakland and the Central Valley approach capacity there has been increasing interest in alternative modes, particularly rail.

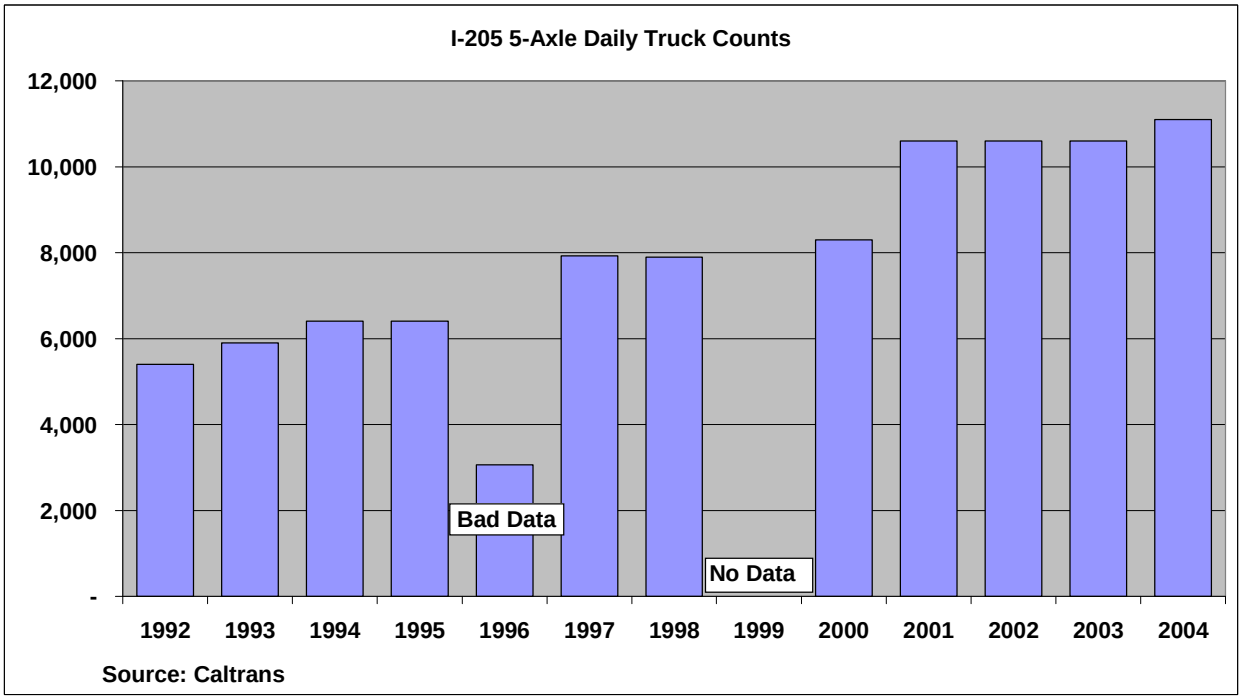
Exhibit 19 shows a recent cargo growth forecast for the Port of Oakland. The local portion of the cargo that is handled by truck is expected to grow and remain the largest segment.

Exhibit 19: Port of Oakland Local Containerized Cargo Growth Forecast



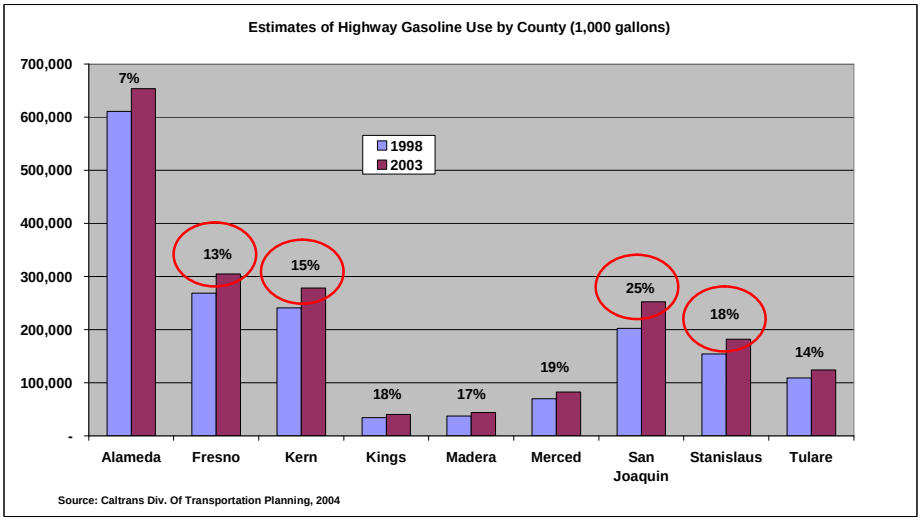
A large portion of this traffic is being trucked over Altamont Pass into San Joaquin County and the upper San Joaquin Valley. Exhibit 20 shows Caltrans data for the count of 5-axle trucks (which would include trucks pulling containers on chassis) over Interstate 205. Caltrans estimates that 5-axle trucks now account for 10% of all vehicles on that increasingly congested freeway.

Exhibit 20: Interstate 205 5-axle Truck Counts



The expansion in fuel use shown in Exhibit 21 dramatizes the background trend of Central Valley traffic growth in Central Valley Counties.

Exhibit 21: Growing Central Valley Fuel Use



The California Inter-Regional Intermodal System (CIRIS) was envisioned as an umbrella concept for development of rail intermodal service between the Port of Oakland and its Northern California hinterland. The Port of Stockton would be a logical participant in that development. There have been four studies and/or white papers prepared in support of the CIRIS concept, encompassing a rail intermodal operation connecting the Port of Oakland with points in the San

Joaquin Valley. The general consensus of the studies is that the concept is worth pursuing from many perspectives, and that a start-up implementation plan would be the logical next step toward obtaining the long-term regional benefits.

Recent developments have changed the context for CIRIS. A new intermodal facility has been proposed near Shafter, serving the Bakersfield market. The State of California has launched the Goods Movement Action Plan, which includes CIRIS. Passage of SAFTEA-LU has increased the federal funding available. Proposals for inland port and rail shuttle operations in Southern California have not matured, but are moving forward. At the same time, new state budgeting priorities may affect the political feasibility of subsidies.

Objective

The objective of this implementation planning effort is to develop and document a concrete plan for a near-term start-up/demonstration and lay out a logical progression toward a long-term business plan.

- The November, 2003 San Joaquin Council of Governments (SJCOG) *Inland Port Feasibility Study* analyzed costs, markets, and environmental impacts. Portions of that analysis are reexamined and updated in this report.

- While the November 2003 report described functions that must be performed to support CIRIS it did not discuss the necessary institutional arrangements. This report does so.

Scope

The scope of this effort included examination of CIRIS economics and benefits, operating options, and implementation choices.

The willing participation of either or both railroads is a prerequisite for success, as is the choice of the actual operator/manager of the service. Plans for rail participation in either start-up or long-term operations must encompass rail operating, pricing, and equipment options.

Both the BNSF Railway (BNSF) and Union Pacific Railroad (UP) have expressed varying degrees of interest in such an operation, as have independent operators such as Northwest Container. Short line operators have discussed the feasibility of linking dormant or underutilized routes under common operation. The study team explored the feasibility and benefits of various operating scenarios to determine which are sufficiently promising to warrant consideration in implementation planning.

The planning effort took the analysis of rail equipment options to the next level of detail, and determine what options are feasible and attractive for the near-term and long-term plans. The analysis included considerations of public sector equipment funding options.

Railroad commitments and public funding requirements can only be made concrete with indications of likely business volumes. The market survey work completed in previous studies showed that potential customers were interested in trying the service.

There is a wide spectrum of public agency stakeholders, ranging from Caltrans to local economic development groups. The examination of alternative routes and operating scenarios has added the San Joaquin Regional Rail Commission (SJRRC) and the Central California Traction Company (CCT) to the list of relevant stakeholders. Planning for start-up or long-term operations should include education of the affected stakeholders and solicitation of support.

Alternative rail technologies are discussed in Appendix C. A brief discussion of barge and short-sea options is provided in Appendix D.

In the course of previous studies and parallel work in Southern California, it became apparent that the potential exists for authentic synergies if potential CIRIS implementation can be considered in a statewide context. This effort investigated parallel planning initiatives and the potential for statewide synergies.

II. CIRIS Markets

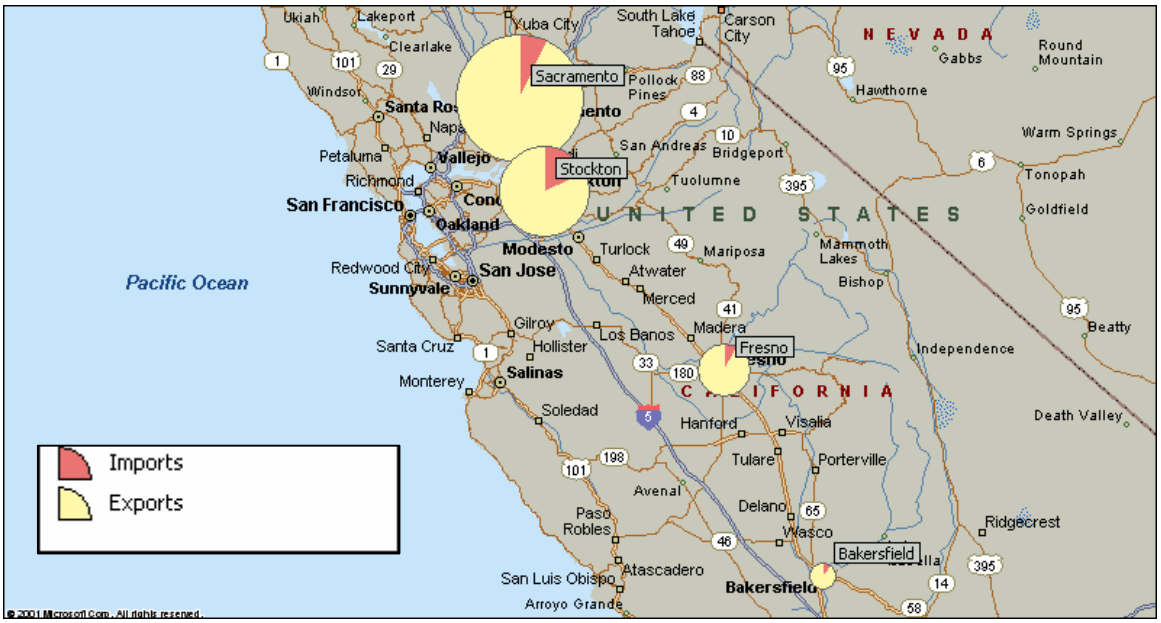
Market Size Estimates

The potential market for CIRIS must be defined in three dimensions:

- Location – in relation to existing and possible future intermodal facilities
- Volume – in total, and in the import/export balance.
- Timing – expected growth over time and in relation to multi-phase CIRIS implementation.

The 2003 Feasibility Study examined several data sources to locate and size the potential CIRIS market. The geographic location of major segments are shown in Exhibit 22. Exhibit 22 also displays the dramatic excess of exports over imports.

Exhibit 22: Geographic CIRIS Market Spread



The first phase of CIRIS service is targeted at the Stockton-Modesto and Fresno markets, which are served by active intermodal terminals. Exhibit 23 divides the market data into first phase markets (Stockton-Modesto and Fresno) and expansion markets (Sacramento and Bakersfield). Exhibit 23 also divides the market into broad commodity groups, illustrating the dominance of agricultural commodities in the flow of Central Valley exports.

Exhibit 23: Estimated 2001 Annual Total Market Volumes, Containers

	Exports	Imports	Total
Stockton-Modesto			
Perishable Food/Farm	16,895	369	17,264
Non-Perishable Food/Farm	33,852	1,369	35,221
Other	6,043	11,055	17,098
Subtotal	56,790	12,793	69,582
Fresno			
Perishable Food/Farm	22,352	72	22,424
Non-Perishable Food/Farm	19,554	756	20,310
Other	15,311	4,381	19,692
Subtotal	57,216	5,210	62,426
First Phase CIRIS Markets	**114,006**	**18,002**	**132,008**
Sacramento			
Perishable Food/Farm	17,341	277	17,618
Non-Perishable Food/Farm	45,299	905	46,204
Other	5,280	3,990	9,271
Subtotal	67,920	5,172	73,092
Bakersfield			
Perishable Food/Farm	21,093	475	21,568
Non-Perishable Food/Farm	243	424	667
Other	5,718	2,682	8,400
Subtotal	27,054	3,582	30,636
CIRIS Expansion Markets	**94,974**	**8,754**	**103,728**

Source: Inland Port Feasibility Study, 2003

Exhibit 23 extends the CIRIS volume estimates presented in the Feasibility Study to include the Sacramento market. The analysis presented in Exhibit 23 anticipates growth in market share between startup and mature CIRIS services as shown in Exhibit 24. The market share attracted by mature intermodal services nationwide ranges from a few percent in shorter, densely traveled corridors to over 50% in long-haul corridors such as Chicago-Los Angeles. Moreover, the larger intermodal market shares are driven by international container flows tendered by large ocean carriers, not by piecemeal traffic tendered by individual shippers and consignees. Rule-of-thumb markets shares are about 15% overall, with 40% an ambitious goal. Within that broad range, the largest shares are achieved in non-perishable traffic for which service standards are less critical and which do not require the on-board or independent power supplies needed for refrigerated containers. Based on these conceptual observations, the study team postulated the market shares shown in Exhibit 24 for use in impact modeling scenarios.

Exhibit 24: CIRIS Market Penetration Estimates

Service Phase	Perishable Food/Farm	Non-Perishable Food/Farm	Other
Startup	5%	10%	15%
Mature	30%	45%	50%

The bottom half of Exhibit 25 translates annual counts of loaded containers into daily round trips for CIRIS (Assuming 250 annual working days and one empty trip for every load). At startup and serving only the Stockton-Modesto market, CIRIS would be expected to handle about 28 container trips each way.

Containers would be mostly loaded in the westbound export direction and mostly empty in the eastbound import direction.

Exhibit 25: CIRIS Container Volume Estimates

Phase 1		Market Extension		Potential CIRIS Annual Container Loads			
Stockton Modesto	**Fresno**	**Bakersfield**	**Sacramento**	**Perishable Food/Farm**	**Non-Perishable Food/Farm**	**Other**	**Total**
Startup				863	3,522	2,565	**6,950**
Mature				5,179	15,849	8,549	**29,577**
Startup	Startup			1,984	5,553	5,518	**13,056**
Mature	Mature			11,906	24,989	18,395	**55,290**
Startup	Startup	Startup		3,063	5,620	6,778	**15,461**
Mature	Mature	Mature		18,377	25,289	22,595	**66,261**
Startup	Startup	Startup	Startup	3,944	10,240	8,169	**22,353**
Mature	Mature	Mature	Mature	23,662	46,081	27,230	**96,973**

Candidate San Joaquin Valley Industries

To strengthen the market analysis the study team looked to additional data sources on the number and location of Central Valley industries handling candidate commodities for CIRIS.

Exhibit 26 summarizes candidate industries for CIRIS by county and type. As expected agriculture-related industries predominate.

Exhibit 26: Large Candidate Industry Employers

County	SIC Name	Employment	Number of Businesses
FRESNO	FRUITS & VEGETABLES-GROWERS & SHIPPERS	7,080	28
FRESNO	PACKING & CRATING SERVICE	2,070	7
FRESNO	POULTRY FARMS	1,850	2
FRESNO	EXPORTERS	1,608	8
FRESNO	FROZEN FRUIT, FRUIT JUICES/VEGS (MFRS)	1,570	2
FRESNO	DRIED/DEHYDRATED FRUITS VEGETABLES (MFR)	1,240	5
FRESNO	IMPORTERS	1,149	7
FRESNO	HOME IMPROVEMENTS	1,148	7
FRESNO	FRUITS & VEGETABLES-WHOLESALE	971	5
FRESNO	PUMPS & PUMPING EQUIPMENT (MFRS)	556	2
FRESNO	CANNING (MANUFACTURERS)	549	2
FRESNO	GLASS-MANUFACTURERS	530	3
FRESNO	TILE-CERAMIC-CONTRACTORS & DEALERS	515	5
FRESNO	FOODS-DEHYDRATED (WHOLESALE)	500	1
FRESNO COUNTY SUBTOTAL		**21,336**	**84**
KERN	WINERIES	4,140	3
KERN	FRUITS & VEGETABLES-GROWERS & SHIPPERS	3,456	14
KERN	AGRICULTURAL PRODUCTS	1,700	1
KERN	FRUITS & VEGETABLES-WHOLESALE	889	3
KERN	POTATO CHIPS CORN CHIPS/SNACKS (MFRS)	650	1
KERN	OIL & GAS PRODUCERS	644	7
KERN	FOOD PRODUCTS (WHOLESALE)	600	1
KERN	POTATOES-WHOLESALE	520	2
KERN	PACKING & CRATING SERVICE	500	1
KERN COUNTY SUBTOTAL		**13,099**	**33**
KINGS	CANNED SPECIALTIES (MANUFACTURERS)	1,500	1
KINGS	CHEESE PROCESSORS	580	2
KINGS	FRUITS & VEGETABLES-GROWERS & SHIPPERS	500	1
KINGS COUNTY SUBTOTAL		**2,580**	**4**
MADERA	FRUITS & VEGETABLES-GROWERS & SHIPPERS	1,450	2
MADERA	FOOD PRODUCTS & MANUFACTURERS	570	2
MADERA	WINERIES	560	2
MADERA COUNTY SUBTOTAL		**2,580**	**6**
MERCED	POULTRY PROCESSING PLANTS	3,000	1
MERCED	CANNING (MANUFACTURERS)	894	4
MERCED	NUTS-EDIBLE-PROCESSING	841	7
MERCED	FRUITS & VEGETABLES-GROWERS & SHIPPERS	800	3
MERCED	CHEESE PROCESSORS	520	2
MERCED COUNTY SUBTOTAL		**6,055**	**17**
SAN JOAQUIN	CANNED SPECIALTIES (MANUFACTURERS)	4,120	5
SAN JOAQUIN	WAREHOUSES-COLD STORAGE	1,350	3
SAN JOAQUIN	GROCERS-WHOLESALE	970	5
SAN JOAQUIN	CANNING (MANUFACTURERS)	895	3
SAN JOAQUIN	WINERIES	800	3
SAN JOAQUIN	IMPORTERS	740	4
SAN JOAQUIN	FRUITS & VEGETABLES-WHOLESALE	625	3
SAN JOAQUIN	FRUITS & VEGETABLES-GROWERS & SHIPPERS	605	4
SAN JOAQUIN	CEREALS (MANUFACTURERS)	600	1
SAN JOAQUIN	EXPORTERS	600	2
SAN JOAQUIN	CORRUGATED & SOLID FIBER BOXES (MFRS)	550	2
SAN JOAQUIN COUNTY SUBTOTAL		**11,855**	**35**
STANISLAUS	POULTRY PROCESSING PLANTS	2,775	3
STANISLAUS	CANNED SPECIALTIES (MANUFACTURERS)	2,600	2
STANISLAUS	VINEYARDS	2,500	1
STANISLAUS	CANNING (MANUFACTURERS)	1,600	1
STANISLAUS	FROZEN FOOD PROCESSORS	1,200	1
STANISLAUS	CANDY & CONFECTIONERY-MANUFACTURERS	800	1
STANISLAUS	FOOD PRODUCTS (WHOLESALE)	692	4
STANISLAUS	POTATO CHIP FACTORIES	650	1
STANISLAUS	NURSERIES-PLANTS TREES & ETC-WHOLESALE	650	3
STANISLAUS	NUTS-EDIBLE-PROCESSING	610	6
STANISLAUS	FRUITS & VEGETABLES-WHOLESALE	525	3
STANISLAUS	PAPER-MANUFACTURERS	500	3
STANISLAUS COUNTY SUBTOTAL		**15,102**	**29**
TULARE	FRUITS & VEGETABLES-GROWERS & SHIPPERS	4,784	25
TULARE	FROZEN FOOD PROCESSORS	1,500	1
TULARE COUNTY SUBTOTAL		**6,284**	**26**
SAN JOAQUIN VALLEY TOTAL		**78,891**	**234**

Table Contains County-SIC Combinations with a Total of 500 or More Employees

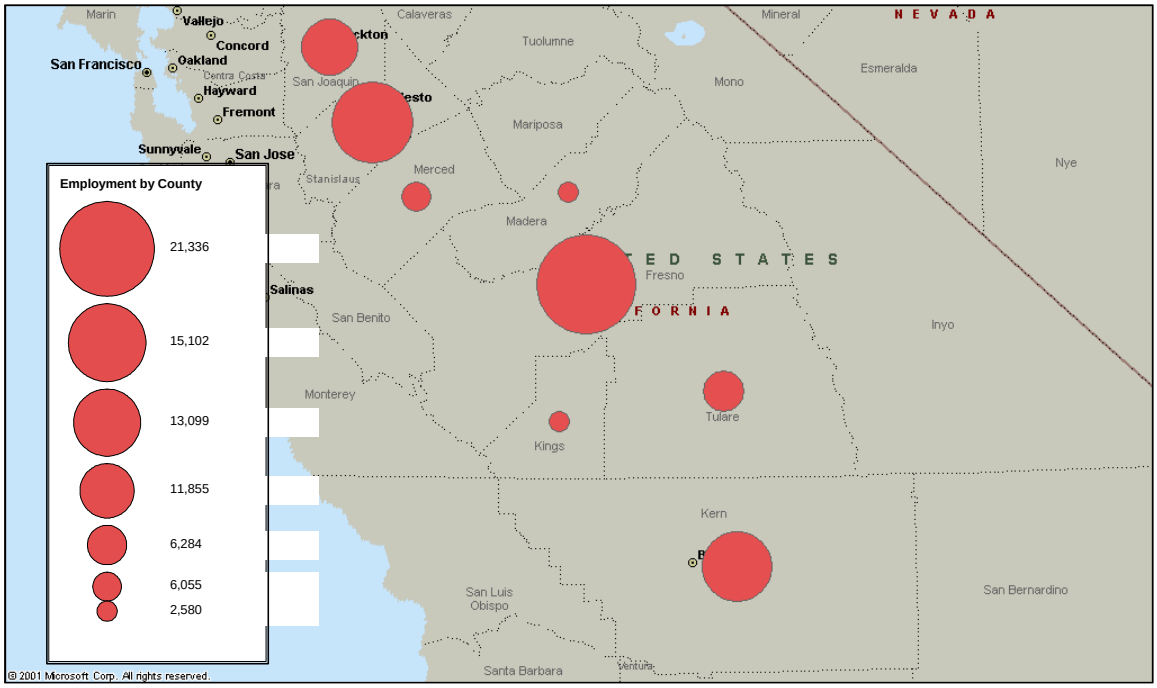
Source: InfoUSA 2005 Data for Alameda, Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus, and Tulare Counties

NOTE: Data Purchase Included Businesses with 50 or More Employees, Therefore Employment & Business Counts Are Understated

Note: Data Purchase Did Not Include Service Sector Businesses

The employment totals by county are mapped in Exhibit 27. The importance of the four major markets, Stockton, Modesto, Fresno, and Bakersfield, is clear.

Exhibit 27: Candidate Industry Employment by County



San Joaquin County Importers and Exporters

The San Joaquin Partnership provided the study team with a list of San Joaquin County firms believed to import or export containerized cargo. These firms are listed in Exhibit 28 and mapped in Exhibit 29. The major clusters are:

- in west Stockton around Charter Way and Rough and Ready Island;
- south of Stockton around Stockton Metropolitan Airport;
- west of Manteca near the I-5/SR120 interchange;
- in and around Lodi; and
- in the Tracy I-205/I-5/I-580 "triangle."

The Lodi sites may be difficult to reach economically until Sacramento service is begun, and the Tracy "triangle" is probably too close to Oakland for truckers to backtrack to Lathrop or Stockton. As Exhibit 29 shows, however, the majority of the Stockton-area sites are with a 30-minute driving radius of the BNSF and UP terminals.

Exhibit 28: Candidate San Joaquin County Importers and Exporters

City	Company	Product
Acampo	Woodbridge Winery	Wine
French Camp	AAFES	Grocery/Retail
Lathrop	California Natural Products	Food Product
Lathrop	Daimler Chrysler	Auto Parts
Lathrop	Diamond Pet Foods	Pet Food
Lathrop	Fuel Total Systems	Auto Parts
Lathrop	Home Depot	Home Improvement Materials
Lathrop	Longs Drugs	Retail
Lathrop	Medline Industries	Medical Supplies
Lodi	General Mills	Food Product
Lodi	Kubota Tractor	Tractors
Lodi	Oakridge Winery	Wine
Lodi	Talus Collection (Turner Road Vintners)	Wine
Manteca	Delicato Vineyards	Wine
Manteca	Ford Motor Company	Auto Parts
Manteca	MarMaxx Group	Retail Items
Stockton	Advanced Polymer Technology	
Stockton	Aisen Electronics, Inc. (AEI)	Auto Parts
Stockton	Applied Aerospace	Aerospace & Honeycomb Structures
Stockton	BMW-North America	Auto Parts
Stockton	Coastal Pacific Food Distribution	Food
Stockton	Cost Plus Distribution	Retail
Stockton	Crown Bolt	Construction Materials
Stockton	Dana Corporation	Auto Parts
Stockton	Diamond of California	Food Product
Stockton	Dollar Tree	Retail
Stockton	Feralloy	Steel Manufacturer
Stockton	H.J. Heinz	Food Product
Stockton	Hormel Foods Corp.	Food Product
Stockton	Iris Ohyama USA	Plastic Products
Stockton	PDM - Strocal	Structural Steel Fabrication
Stockton	Raley's	Grocery/Retail
Stockton	Simpson Strong Tie	Construction Materials
Stockton	Staples	Retail
Stockton	Toys R Us	Retail
Stockton	Whirlpool Corp. (Penske Logistics)	
Tracy	Costco	Retail
Tracy	Leprino Foods Company	Food Product
Tracy	Musco Olive Products, Inc.	Food Product
Tracy	Orchard Supply Hardware	Retail
Tracy	Safeway	Retail

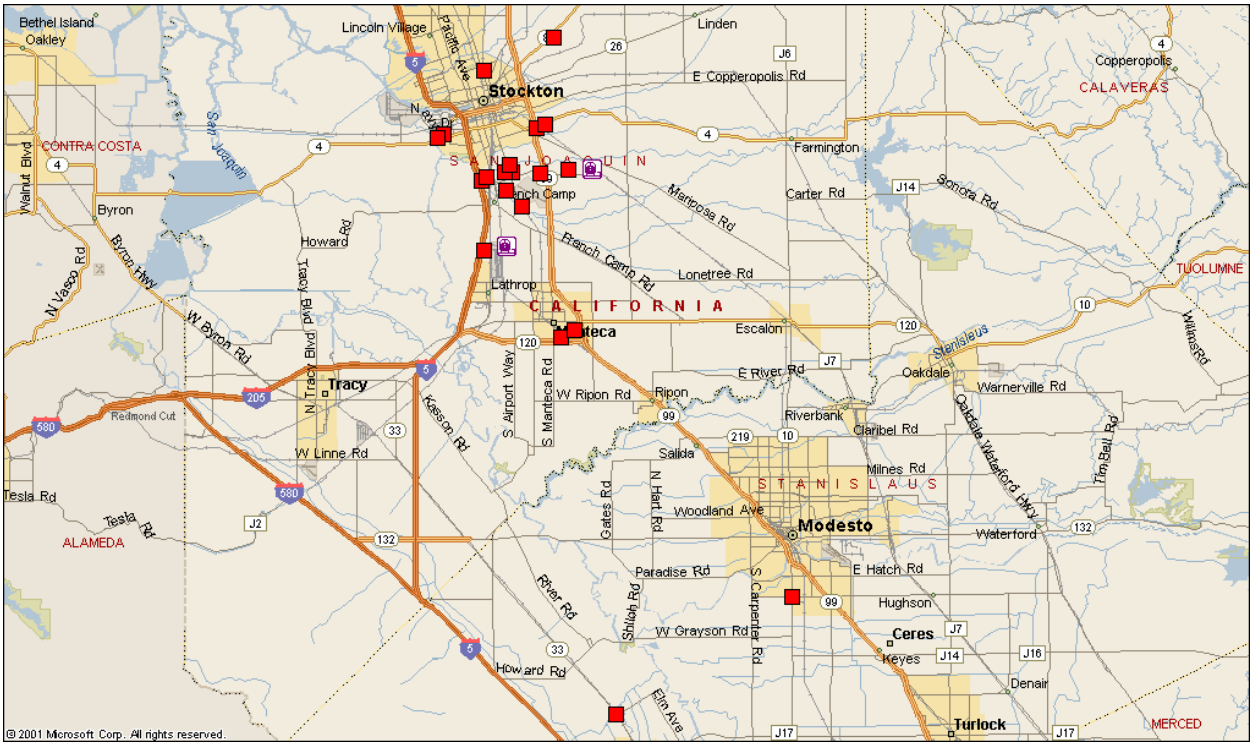
Source: San Joaquin Partnership

Exhibit 29: San Joaquin County Importer and Exporter Locations

Future Industrial Development Sites

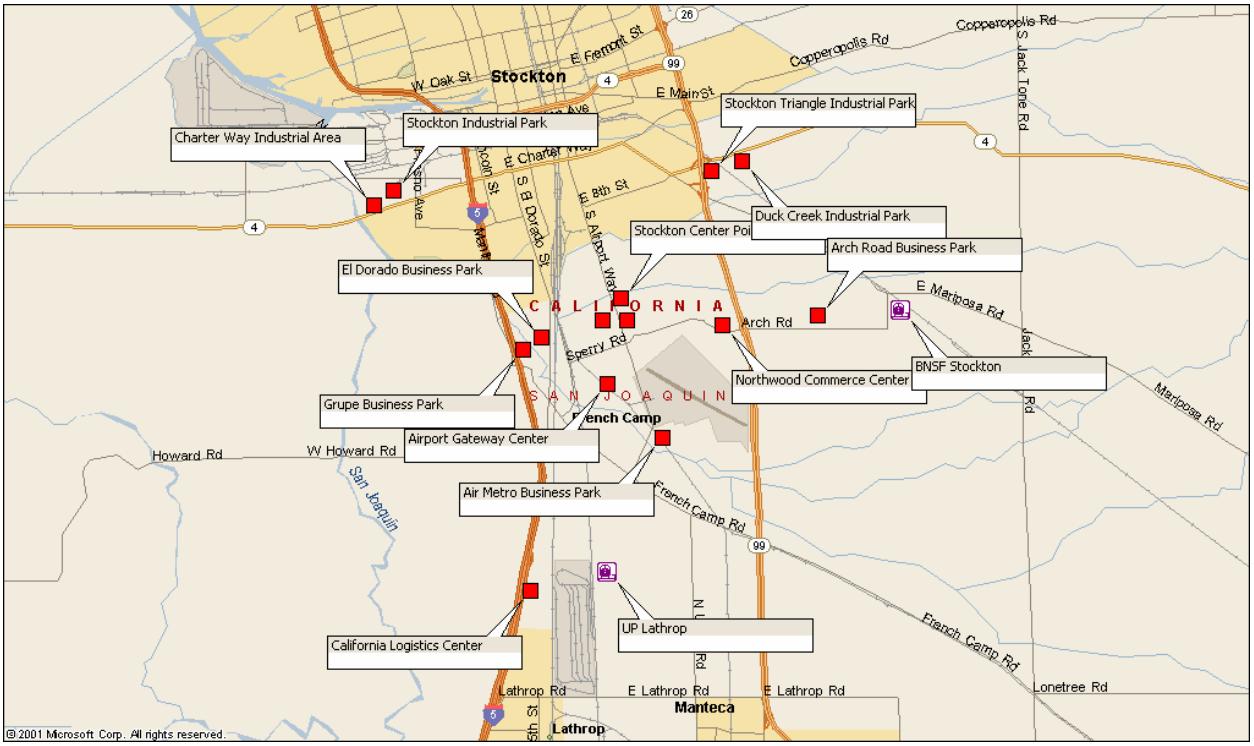
New potential CIRIS customers are likely to be large distribution or manufacturing facilities located in major industrial parks. Exhibit 30 shows the locations of major Stockton-Lathrop area industrial parks under current development.

Exhibit 30: Regional Industrial Parks Under Development



As the closer view in Exhibit 31 shows, most of these sites are clustered between Stockton and Lathrop with good access from either the UP Lathrop terminal or the BNSF Stockton terminal.

Exhibit 31: Stockton-Lathrop Industrial Park Access



Potential Transloading Market

"Transloading" in this case involves transferring import or export loads between highway trailers, which are constrained by highway weight limits, and marine containers that can hold more weight on a rail or ocean trip. The market for transloaded exports and imports is of particular interest. Transloading offers:

- An additional source of volume for CIRIS
- Economic and financial leverage due to the consolidation process
- Congestion relief leverage for the same reason
- Additional economic development and jobs opportunities.

Transloaded exports and imports move between Central Valley markets and the Port of Oakland area in conventional trucks and are therefore not recognized as port traffic. The goods are typically containerized at facilities near the Port, listed in Exhibit 32.

Exhibit 32: Oakland Area Transloaders

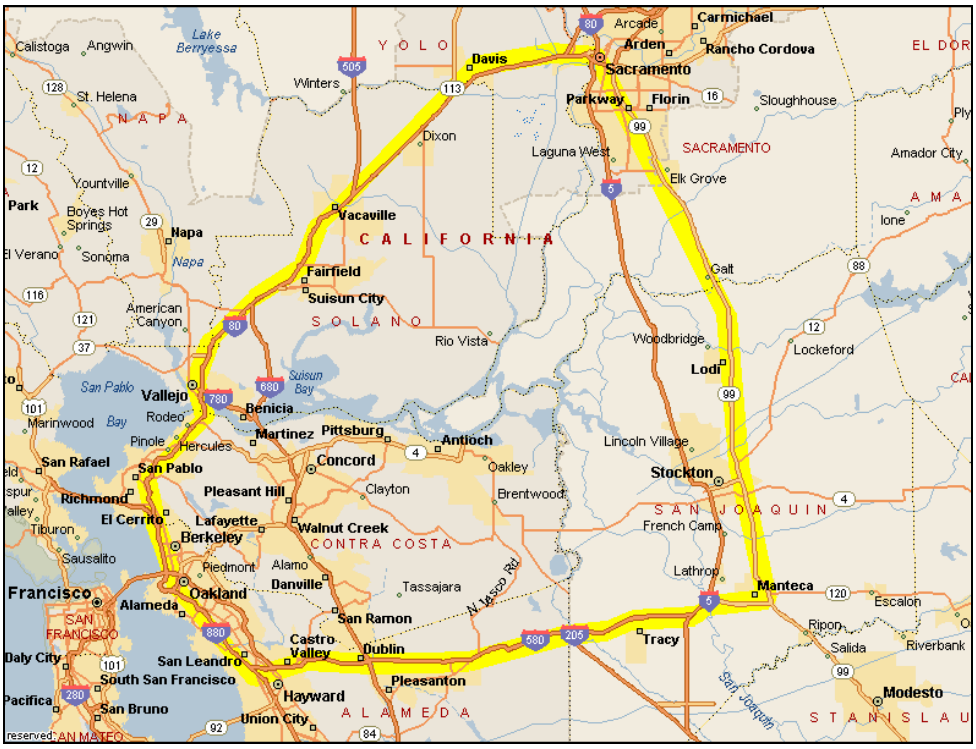
Name	Address	City
AFA Services, Inc.	707 2nd Street	Oakland
American Pride Consolidators	855 San Leandro Blv	San Leandro
Boland Container Freight Station	Maritime & W.Grand	Oakland
Chipman Freight Svc	1700 Ferro St	Oakland
Container Freight	250 Bataan St	Oakland
International Triax, Inc.	915 66th Ave	Oakland
Island Cargo Consolidators Inc	1700 24th St	Oakland
J L Henderson & Co	2533 Peralta St	Oakland
La Xpress Assembly	4909 Tidewater Ave	Oakland
Lynn Import/Export Services	707 2nd St	Oakland
Marine Air Land Intl Services	3777 Depot Road Suite 418	Hayward
Marine Marketing Of Ca	4721 Tidewater Ave # C	Oakland
Mutual Express Company	1700 West Grand Avenue	Oakland
P C Tax Free	727 Kennedy St	Oakland
Pacific American Svc	9401 San Leandro St	Oakland
Pacific Coast Container	2099 7th St	Oakland
Pacific Coast Container / Direct Delivery	70 Washington Street	Oakland
Pacific Coast Storage	6401 San Leandro St	Oakland
Pacific Commodities	1749 Middle Harbor Road	Oakland
Pacific Transload Services	737 Bay St	Oakland
Schou-Gallis Co	2533 Peralta St	Oakland
Seamodal Transport Corp. - CA	475 14th Street, Suite 220	Oakland
Triple B Forwarders	2976 Alvarado St # K	San Leandro
Unicold	500 Ferro Street	Oakland
West Coast Ship Chandlers Inc	2665 Magnolia St	Oakland

The *Port Services Location Study*, completed for the Port of Oakland by a Tioga Group team in 2001, defined a "hinterland loop" for the Port of Oakland (Exhibit 33) and noted:

- "Most of the 'market-based' trucking firms that serve the Port are located in these cities."
- "Average asking rents are significantly lower in the hinterland, ranging from 64% of the Oakland average in Benicia to 49% in Stockton and Fairfield."
- "Hinterland loop locations would likely be candidates for any non-core services that are land-sensitive rather than distance sensitive, including facilities served by rail shuttles."

The hinterland loop includes the Stockton/Modesto market defined in subsequent report sections. Asking prices for industrial space in the Stockton/Modesto area are 49% to 54% of typical Oakland figures, making the San Joaquin Valley an attractive alternative for businesses that require inexpensive space and that can be efficiently connected to the Port of Oakland.

*Exhibit 33: Port of Oakland "Hinterland Loop"**



Central Valley locations are thus prime candidates for transloading facilities relocating from Oakland due to urban development pressure. In specific, Rough and Ready Island at the Port of Stockton offers an ideal site.

Exhibit 34 offers a rough estimate of the potential transloading market using comparable market penetration estimates as in Exhibit 24.

Exhibit 34: Potential Transloading Market – Annual Container Loads

	Phase 1		Market Extension		CIRIS
	Stockton Modesto	Fresno	Bakersfield	Sacramento	Total
Statup	1,112	977	385	1,103	3,576
Mature	4,732	4,114	1,755	4,914	15,516

Transloading has been identified as an early CIRIS implementation objective and is discussed at greater length in Section IX.

III. CIRIS Terminals and Routes

Overview

The rail network linking Central Valley markets with the Port of Oakland includes multiple routes, multiple rail operators and a mix of active, dormant, and potential intermodal terminals. The challenge to the study team and to CIRIS implementers is to identify and assemble the best workable system from the available pieces.

CIRIS Rail Intermodal Terminals

As shown in Exhibit 35 there are two intermodal terminals serving the Port of Oakland.

The Union Pacific facility was recently expanded and renovated with the assistance of the Port. This is currently the busier of the two facilities as it handles domestic as well as international intermodal business.

The facility used by BNSF is called the Oakland International Gateway (OIG). It was developed by the Port as the Joint Intermodal Terminal (JIT) with access for both BNSF and UP. BNSF reached an agreement with the Port to oversee operation of the facility and contracts out actual operation to OmniTRAX. (The future location of an expanded Oakland facility is at the top of the picture.)

Exhibit 35: Port of Oakland Rail Intermodal Terminals

Both of these terminals are separated from the marine container terminals by public streets, requiring commercial drayage to move containers back and forth. The cost of these drayage trips must be included in door-to-door CIRIS costs.

Exhibit 36 and Exhibit 37 show the BNSF and UP intermodal terminals serving the Stockton market. The BNSF terminal is southeast of Stockton and the UP facility in French Camp south of Stockton. Both are relatively new but are approaching capacity. Both railroads have plans to use these terminals primarily for domestic traffic in containers and trailers and concentrate international traffic in Oakland.

Exhibit 36: BNSF Stockton Intermodal Terminal (Mariposa)

Exhibit 37: UP Lathrop Intermodal Terminal (French Camp)

The BNSF intermodal terminal in Fresno is shown in Exhibit 38.

Exhibit 38: BNSF Fresno Intermodal Terminal

UP has a "paper ramp" in Fresno, a location from which intermodal trailers and containers are drayed to and from the actual ramp at Lathrop (Exhibit 39). This service is presently limited to customers using UP's own intermodal equipment, but could be expanded. Service to Fresno via UP would entail development of a new intermodal terminal in that market.

Exhibit 39: UP "Paper Ramp" in Fresno

The potential for facilities at Rough and Ready Island, Modesto, Sacramento, Crows Landing, and Bakersfield is discussed in later chapters.

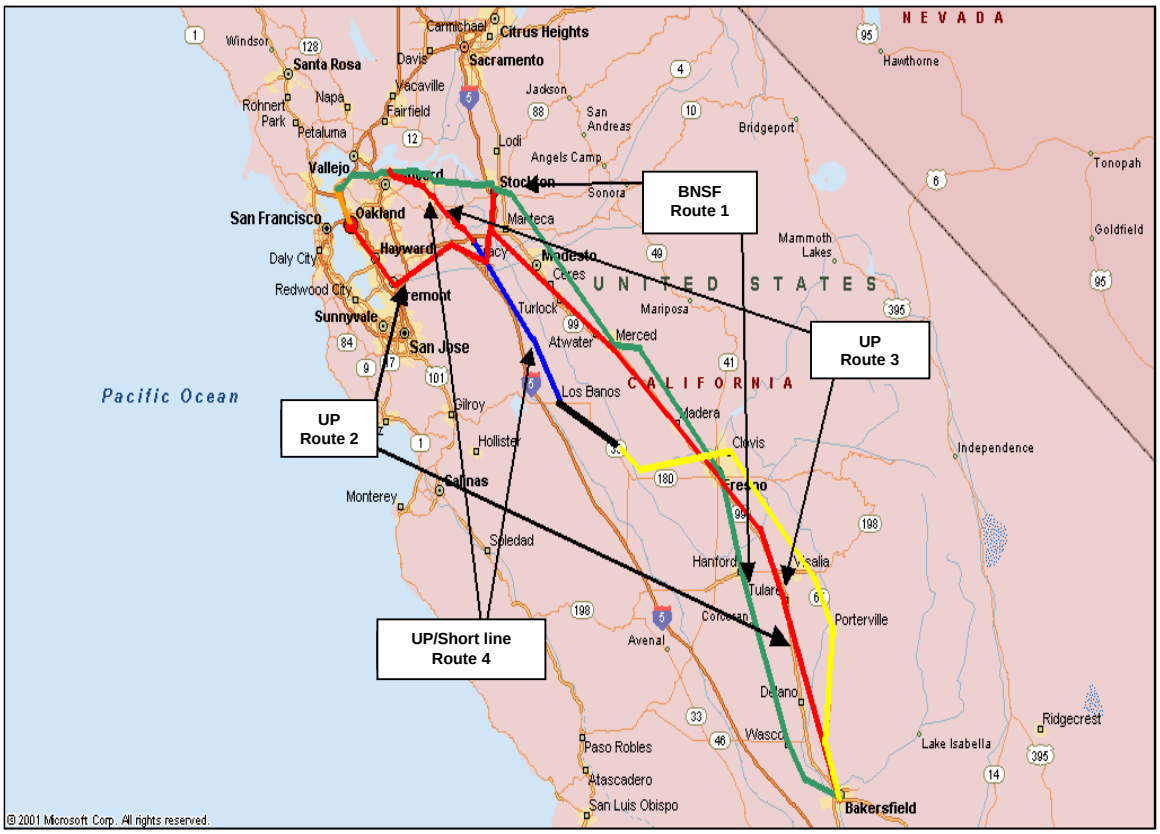
CIRIS Routes

Railroad Industries, Inc. (RII) analyzed the potential rail routes for initial CIRIS service to Stockton and Fresno, and expansion to Bakersfield. There are four possible rail routes between the Port of Oakland and Bakersfield, CA. (Exhibit 40) Two of the four routes are currently in use. The other two have portions of the route that are currently not serviceable.

- Route Option 1: BNSF Railway Richmond to Stockton to Bakersfield (in use)
- Route Option 2: Union Pacific Altamont Pass to Fresno Line (in use)
- Route Option 3: Union Pacific Mococo Line to Fresno Line (not serviceable)
- Route Option 4: UP/ Mococo Line-Short Line to West Valley Line to Fresno Line (potentially serviceable)

As the first two routes are serviceable at present they are discussed in this chapter. A more detailed discussion of all four routes is given in Appendix A.

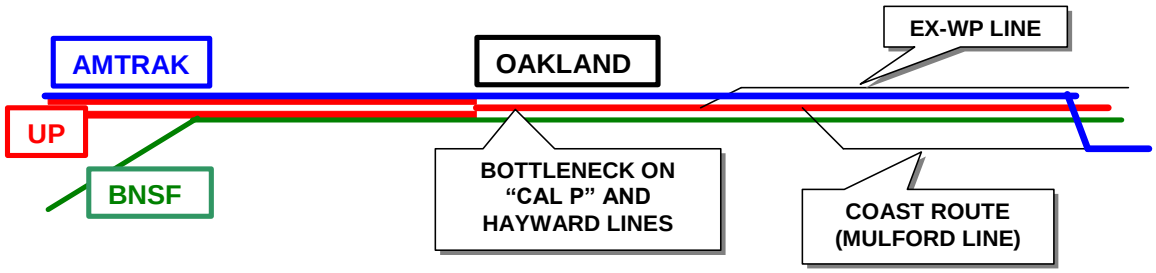
Exhibit 40: Possible CIRIS Rail Routes



In addition to the route-specific features such as mileage and capacity, there are two network issues of special concern.

One issue is the East Bay rail "bottleneck" shown in Exhibit 41. Between Oakland and Richmond, the two UP main lines are used by UP, Amtrak, and BNSF. Between Richmond and Port Chicago the tracks are used by UP and Amtrak. This route segment is the beginning of the Capital Corridor and the San Joaquin Corridor. It handles the multiple daily Capital and San Joaquin passenger trans as well as the daily Amtrak Coast Starlights and California Zephyrs. The high frequency of Amtrak operations on this route on top of the freight operations produces congestion. The Port of Oakland is pursuing initiatives to increase capacity through this bottleneck, but for the present it is a handicap for potential CIRIS routing.

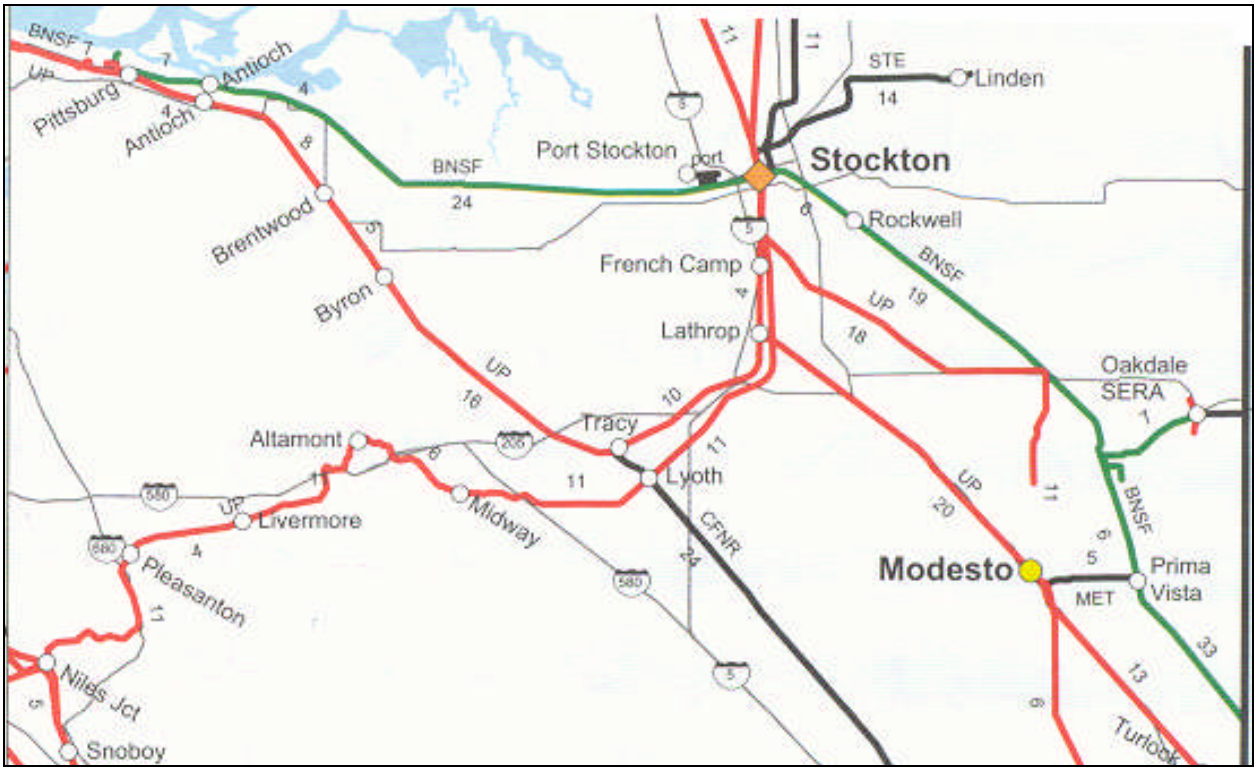
Exhibit 41: East Bay Rail "Bottleneck"



South of Oakland UP has three lines, a legacy of mergers with Western Pacific and Southern Pacific. Amtrak Capitals use one of these routes to reach San Jose and others are used by UP to reach the Altamont Pass route and the Coast line and by BNSF under trackage rights to reach Warm Springs.

Exhibit 42 shows the complex rail network in the Stockton area, also a legacy of mergers and acquisitions. The BNSF route from Richmond passes by the Port of Stockton where it connects with Central California Traction (CCT), operator of rail service at the Port. After crossing through Stockton the BNSF route reaches the Mariposa intermodal terminal and runs south through Modesto, Fresno, and Bakersfield. The UP routes are more complex. On the west, UP's former SP Mococo Line to Martinez is in place but used to store rail cars. UP uses the former WP line over Altamont Pass, over which SJRRC has trackage rights to run Altamont Commuter Express (ACE) trains. At Tracy the Mococo Line connects to the Former SP "West Valley" line to the south, but that route is operated by a short line (California Northern, "CFNR") and no longer connects to Fresno. The former SP Fresno Line connects south of UP's Lathrop intermodal terminal, which would impose a small detour on CIRIS trains using that route. In Stockton UP connects to BNSF and CCT.

Exhibit 42: Stockton Area Rail Network



Route Option 1: Burlington Northern Santa Fe Oakland to Bakersfield

The BNSF route from the Port of Oakland to Bakersfield is the shortest route (314 miles) of all of the alternatives. The BNSF operates over the UP lines to Richmond and then its own lines all the way to Bakersfield (Exhibit 43).

Exhibit 43: BNSF San Joaquin Valley Route

The BNSF route has the following advantages.

- Shortest, flattest route with lowest line-haul costs.
- Direct access to active Stockton and Fresno intermodal terminals.
- Direct access to potential CIRIS terminals at Modesto and Bakersfield
- Efficient interchange with CCT at the Port of Stockton and Mormon Yard.

The BNSF route has the following disadvantages.

- Potential congestion due to Amtrak operations between Port Chicago and Bakersfield.
- Use of UP trackage rights through the East Bay bottleneck north of Oakland.
- Limited capacity at the Stockton (Mariposa) terminal.

The BNSF has no intermodal service connecting the Port of Oakland (Richmond) and the San Joaquin cities or the Los Angeles area. But the BNSF does have several intermodal trains per day moving from the Port of Oakland and Richmond to the southern portion of the United States. These trains utilize the San Joaquin Valley route, and some stop at Stockton and Fresno to pick up cars with eastbound trailers or containers (or drop off cars with westbound trailers or containers from the East). One option that the BNSF may consider is stopping these trains to allow for a pick up or drop off of containers moving to or from the Port of Oakland. The stop would increase the transit times by approximately 30 minutes per stop. If the trains are not at

full capacity, the additional San Joaquin traffic might improve the economics of the trains. If the trains are at full capacity, BNSF would not be interested in intermediate stops.

Route Option 2: Union Pacific: Altamont Pass to Fresno Line

The Union Pacific has a route (Exhibit 44) from the Port of Oakland that moves to the south over the Altamont Pass to the San Joaquin Valley and then on to Bakersfield (326 miles). The entire route is owned by the UP, but the BNSF has trackage rights over the line between the Port of Oakland and Niles, CA.

Exhibit 44: UP Altamont Pass Route

The UP route over Altamont Pass has the following advantages.

- Less congestion than the Oakland-Port Chicago bottleneck.
- Existing "tenant" operations of ACE trains by Herzog under contract to SJRRC.
- Potential future purchase of the Altamont Pass route by SJRRC.
- Access to Shafter interim intermodal or transloading site.

The UP route has the following disadvantages.

- Additional mileage and steeper grades, with higher operating costs.
- Short sidings, with the potential for future train schedule interference.
- Access to Lathrop terminal requires a detour.

- No active Fresno terminal.
- No direct access to Modesto terminal.
- Indirect access to CCT at Port of Stockton.

The UP currently operates both domestic and international intermodal trains between Oakland and Los Angeles. The chart below summarizes the cities included in the service. These trains do not stop at Bakersfield or Fresno, as UP does not have terminals in either of those cities.

Exhibit 45: Union Pacific Intermodal Service

Origin Station	********** Destination Station **********				
	Lathrop	Oakland	LATC	ICTF	City of Industry
Lathrop	No	No	Yes	No	No
Oakland	No	No	Yes	Yes	No
LATC	Yes	Yes	No	No	No
ICTF	No	No	No	No	No
City of Industry	No	No	No	No	No

Service ranges from four to seven days per week and the time between cut off (the time when an outbound unit must be ready) and availability (the soonest time when an inbound unit can be picked up) ranges from 18 hours to 57 hours.

Exhibit 46: Union Pacific Intermodal Transit Times

Origin Station	Destination Station	Days per Week	Hours	Equipment
Lathrop	LATC	5	35	Containers
Oakland	LATC	7	33	Containers
	ICTF	7	57	Containers
LATC	Lathrop	4	18	Containers
	Oakland	5	32	Containers

RII estimated the run time between the San Joaquin cities and the Port of Oakland to be between 3 and 7 hours depending upon the distance traveled and the speed limit on the line. This time estimate is for only train transit times and does not include a cushion for the set up and set out process at both ends, which is estimated to be an additional 8 to 10 hours

Exhibit 47: Union Pacific Estimated Total Time

Origin	Destination	Route	Miles	Estimated Running Time	Estimated Total Time
Bakersfield	Port of Oakland	UP	326	7	17
Fresno	Port of Oakland	UP	219	5	15
Lathrop	Port of Oakland	UP	104	3	13

Other Potential Operators and Shortlines

Considerable interest has been expressed in "shortline" alternatives to service via UP or BNSF. Some of the potential participants are listed below.

Central California Traction

The Central California Traction Company (CCT) is a short-line and switching railroad jointly owned by UP and BNSF. CCT operates rail services at the Port of Stockton, including on Rough and Ready Island. By virtue of its joint ownership and short line/switching status, CCT enjoys greater flexibility in its operations than BNSF or UP. Major railroads such as BNSF or UP typically avoid complex switching tasks or stopping trains to set out or pick up cars at intermediate points due to the expense and potential for schedule disruption. CCT, in contrast, is set up to perform such tasks. Development of transloading operations, intermodal facilities, or both at the Port of Stockton would involve CCT rail service, as explained in more detail in Sections IX and XII.

Herzog

Herzog is a rail and transit operations and rail services firm headquartered in St. Joseph, Missouri. Besides ACE, Herzog Transit Services also operates Tri-Rail in Miami, Trinity Rail Express in Dallas, and the Port of Los Angeles Red Car Line. Herzog also provides railroad construction and rolling stock maintenance services, and rail car leasing. Herzog is typical of many potential contract operators.

Richmond Pacific

The Richmond Pacific Railroad (RPRC) is a terminal/switching railroad owned by the Levin-Richmond Terminal Corporation. The RPRC operates on 2.5 miles of track in the shipping terminal and wharves at Richmond, California. The RPRC interchanges with UP and BNSF, performs local switching for both railroads, and has limited access to main line trackage in conjunction with that task. RPRC represents a potential Oakland-area connection and contract operator.

California Northern

California Northern (CFNR) operates 57.2 miles of track from Tracy to Los Banos, the former SP West Valley Line (Exhibit 42). CFNR is based in American Canyon, CA and owned by RailAmerica (RRA), which is a public corporation based in Boca Raton FL. CFNR would be in a position to link potential new facilities, such as at Crows Landing, with UP in Tracy, but cannot reach Oakland.

IV. CIRIS Economics

CIRIS Cost Structure

Analysis to date has focused on estimating rail operating costs using industry-standard methods. Where railroads are attempting to secure highly completive business, they may choose to exclude broader system costs from their calculations, price on an "incremental" basis, or accept lower margin contribution. They may also offer lower rates on some portion of a large customers' business in order to secure the whole volume. Railroads may also choose to price new business aggressively where they see it as a good "fit" with existing operations and flows.

Intermodal freight transportation is complex by nature, and its cost characteristics reflect that complexity. Appendix B presents the details of the study team's rail cost analysis. That analysis is summarized here.

Class I Railroad Costs

Railroad costs include rail operations, equipment, maintenance of way (MOW), overhead, and terminal lift on/lift off.

Rail line haul operating costs are determined primarily by the weight of the freight hauled and the characteristics of the route. As Exhibit 48 shows, the two routes for which costs were estimated vary in length, most significantly in the Oakland-Stockton segment. They also vary in the grades encountered, with the UP Altamont Pass route being steeper.

Exhibit 48: CIRIS Route Mileage

	Miles from Port of Oakland		
	Stockton/ Lathrop	Fresno	Bakersfield
BNSF	80.2	204.2	314.5
UP Altamont	104.2	218.2	326.0
UP Mococo	115.2	229.3	337.0
UP Short Line	115.2	255.1	362.8

Exhibit 49 displays the estimated per container Short Run Variable Cost (SRVC) and Long Run Variable Cost (LRVC) for the two routes and three markets. The difference between SRVC and LRVC is a proportionate allocation of railroad overhead, which magnifies the SRVC differences. SRVC includes: direct rail operating costs for fuel, labor, and switching and an allowance for loss and damage; rail equipment costs for locomotives and cars; an allocation of rail maintenance of way costs.

Exhibit 49: BNSF Per Container Rail Line Haul Costs

BNSF Line Haul Costs	Stockton		Fresno		Bakersfield	
One Way						
Fuel	$ 6	6%	$ 14	9%	$ 22	10%
Labor	$ 13	14%	$ 26	16%	$ 37	17%
Locomotive	$ 5	5%	$ 12	7%	$ 18	8%
Switching	$ 17	17%	$ 17	10%	$ 17	8%
M of W	$ 12	12%	$ 29	18%	$ 45	21%
Loss/Damage	$ 2	3%	$ 2	2%	$ 2	1%
Equipment	$ 15	15%	$ 15	9%	$ 15	7%
Short-run Variable Costs	$ 70	71%	$ 115	71%	$ 157	71%
Overhead	$ 28	29%	$ 46	29%	$ 63	29%
Long-run Variable Costs	**$ 97**	**100%**	**$ 161**	**100%**	**$ 220**	**100%**
Round Trip						
Fuel	$ 6	3%	$ 14	5%	$ 22	6%
Labor	$ 26	15%	$ 51	18%	$ 74	19%
Locomotive	$ 5	3%	$ 12	4%	$ 18	5%
Switching	$ 34	19%	$ 33	12%	$ 33	9%
M of W	$ 23	13%	$ 58	20%	$ 90	24%
Loss/Damage	$ 5	3%	$ 5	2%	$ 5	1%
Equipment	$ 30	17%	$ 30	10%	$ 30	8%
Short-run Variable Costs	$ 129	71%	$ 204	71%	$ 273	71%
Overhead	$ 52	29%	$ 82	29%	$ 109	29%
Long-run Variable Costs	**$ 180**	**100%**	**$ 286**	**100%**	**$ 382**	**100%**

Exhibit 50: UP Rail Line Haul Costs

UP Line Haul Costs	Stockton		Fresno		Bakersfield	
One Way						
Fuel	$ 8	6%	$ 18	10%	$ 28	11%
Labor	$ 21	17%	$ 32	17%	$ 42	17%
Locomotive	$ 5	4%	$ 12	7%	$ 19	8%
Switching	$ 26	20%	$ 26	14%	$ 26	11%
M of W	$ 12	10%	$ 28	15%	$ 43	18%
Loss/Damage	$ 2	2%	$ 2	1%	$ 2	1%
Equipment	$ 15	12%	$ 15	8%	$ 15	6%
Short-run Variable Costs	$ 90	71%	$ 134	71%	$ 175	71%
Overhead	$ 36	29%	$ 53	29%	$ 70	29%
Long-run Variable Costs	**$ 127**	**100%**	**$ 187**	**100%**	**$ 245**	**100%**
Round Trip						
Fuel	$ 8	3%	$ 18	5%	$ 28	7%
Labor	$ 43	18%	$ 63	19%	$ 83	20%
Locomotive	$ 5	2%	$ 12	4%	$ 19	4%
Switching	$ 52	22%	$ 52	16%	$ 53	12%
M of W	$ 24	10%	$ 56	17%	$ 86	20%
Loss/Damage	$ 5	2%	$ 5	1%	$ 5	1%
Equipment	$ 30	13%	$ 30	9%	$ 30	7%
Short-run Variable Costs	$ 168	71%	$ 237	71%	$ 304	71%
Overhead	$ 67	29%	$ 95	29%	$ 121	29%
Long-run Variable Costs	**$ 235**	**100%**	**$ 332**	**100%**	**$ 425**	**100%**

- LRVC does not include profit, which is addressed in the next section.

- Estimated costs are $40 – $50 higher per container on the UP route.
- About $24 per container is due to the costs of the locomotive and cars, which might be provided by the public sector.
- A significant cost is in maintaining the right of way, which in some cases might be alleviated or subsidized through public purchase of lines (e.g. Altamont) or reduced through public sector capacity investment (e.g. in the Amtrak corridors).
- The remainder of the SRVC is fuel, labor, switching, etc. that is unlikely to be replaced by public sector investment or activity.
- The overhead estimate allows some leeway for negotiations, as does the profit margin over LRVC.

Complete Class I CIRIS Costs

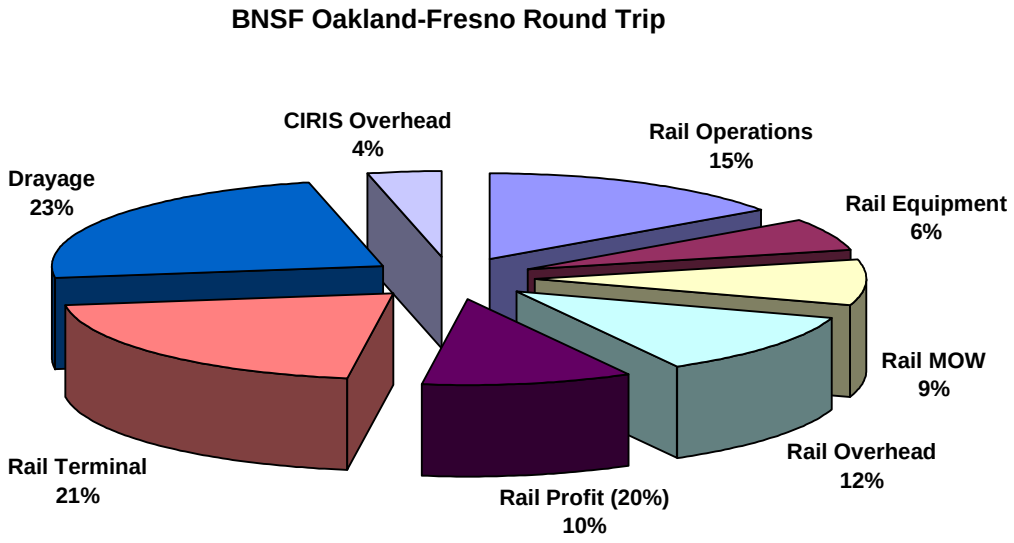
The complete per-container round trip CIRIS cost structure includes terminal, drayage, and overhead costs as well as railroad costs. Exhibit 51 gives the complete breakdown for round trips between Oakland and Central Valley points on the BNSF route.

Exhibit 51: CIRIS Per Container Cost Structure

BNSF Round Trip	Stockton Cost	Stockton Share	Fresno Cost	Fresno Share	Bakersfield Cost	Bakersfield Share
Rail Operations	**$ 71**	**14%**	**$ 104**	**17%**	**$ 135**	**19%**
Fuel	$ 6	1%	$ 14	2%	$ 22	3%
Labor	$ 26	5%	$ 51	8%	$ 74	10%
Switching	$ 34	7%	$ 33	5%	$ 33	5%
Loss/Damage	$ 5	1%	$ 5	1%	$ 5	1%
Rail Equipment	**$ 35**	**7%**	**$ 42**	**7%**	**$ 48**	**7%**
Locomotive	$ 5	1%	$ 12	2%	$ 18	3%
Railcars	$ 30	6%	$ 30	5%	$ 30	4%
Rail MOW	**$ 23**	**5%**	**$ 58**	**10%**	**$ 90**	**13%**
Rail Overhead	**$ 52**	**10%**	**$ 82**	**13%**	**$ 109**	**15%**
Rail Profit (20%)	**$ 36**	**7%**	**$ 57**	**11%**	**$ 76**	**11%**
Rail Terminal	**$ 140**	**28%**	**$ 140**	**23%**	**$ 140**	**20%**
Lift (4)	$ 140	28%	$ 140	23%	$ 140	20%
Rail Total	***$ 320***	***63%***	***$ 426***	***70%***	***$ 522***	***74%***
Drayage	**$ 160**	**32%**	**$ 160**	**26%**	**$ 160**	**23%**
Port (RT)	$ 70	14%	$ 70	11%	$ 70	10%
Valley (RT)	$ 90	18%	$ 90	15%	$ 90	13%
CIRIS Overhead	**$ 25**	**5%**	**$ 25**	**4%**	**$ 25**	**4%**
Total	**$ 505**	**100%**	**$ 611**	**100%**	**$ 707**	**100%**

Exhibit 52 displays the shares within major categories.

Exhibit 52: CIRIS Cost Shares



The key to understanding the cost structure for CIRIS is the realization that only part of the total cost varies with the rail mileage. As Exhibit 52 shows, the overall cost picture is heavily influenced by the terminal, drayage, and overhead costs. The cost estimates include terminal lift costs, but not the capital or land costs of the terminals themselves.

An analysis of the Oakland-Fresno costs is illustrative. The direct cost of round trip rail operations between Oakland and Fresno, to take the middle point, is $104, just 17% of the total.

Rail equipment – locomotives and cars – accounts for $42, or 7%. The supply of locomotives and cars creates a significant opportunity for the public sector to support the service through capital rather than operating subsidies. This topic is explored at greater length in a subsequent section.

The contribution to rail maintenance of way, $58 or 10%, is based on incremental tonnage and mileage generated by providing the service. This is necessarily somewhat arbitrary. The jointly used asset of track, right of way, signal system, etc., must be maintained at some expected cost and that cost apportioned to the traffic working over the line. RII used the standard industry allocation methods in arriving at this estimate. Railroads are not necessarily bound by this allocation. The possible purchase of the Altamont Pass Line by SJRRC presents an opportunity to allocate MOW costs in an entirely different fashion if desired.

Railroad overhead, which in Exhibit 51 is $82 for 13% of the total, is the difference between SRVC and LRVC. In the short run the railroad will incur the variable costs included in SRVC; in the long run, the movement in question must also contribute to corporate overhead and infrastructure. Here, too, the allocation follows industry practice.

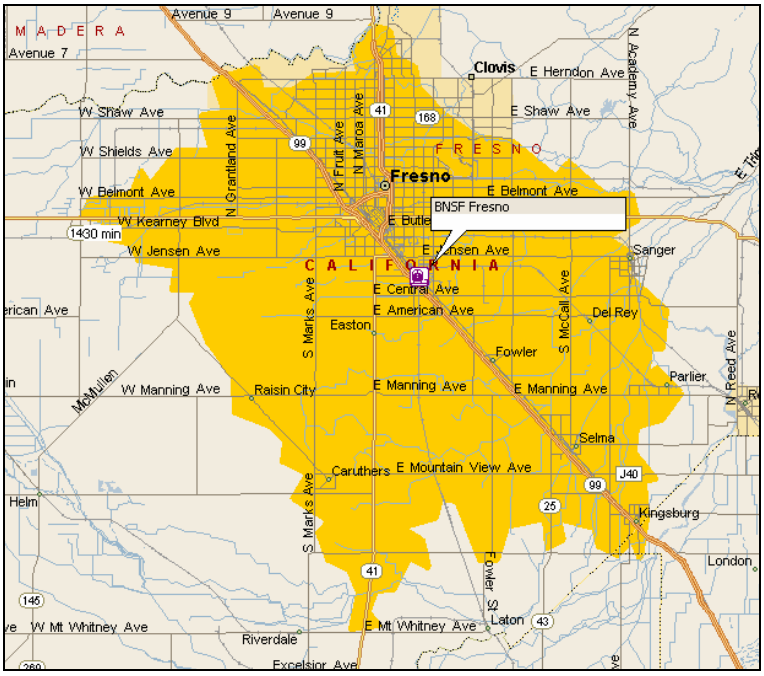
Allowance must be made for a railroad profit, since expecting the railroad to supply service at cost would be diverting resources from other profit making opportunities. Moreover, the costs for all other categories include an operator profit. Railroads typically seek a 10-12% annual

return on capital, which would add roughly 40% to the LRVC. On highly competitive traffic, however, railroads typically have to accept lower profit margins. The estimates in Exhibit 51 allow for a 20% "mark-up" over LRVC, a total of $57.

The Central Valley intermodal terminals under consideration are owned by the railroads and operated by contractors. The cost per lift of an efficient operation is typically $30 – 40, and the cost estimate in Exhibit 51 allows $35 each for four lifts (loading at Oakland, unloading in the Central Valley, reloading in the Central Valley, and unloading at Oakland), for a total of $140, or 23%. The terminal cost is independent of the route or length of haul.

Drayage – local trucking to pick up and deliver the container at both ends of the rail move – is the single largest cost element at $160 or 26% of the total. The amount shown for port drayage, $35 each way, is on the low end of rates commonly cited. Most of the cost is in waiting time for the driver and tractor at the marine and rail terminals, since the port drayage distance is always under 2 miles and frequently much shorter. In the valley the actual drayage rate can vary widely depending on the distance from the rail terminal and the time required. The $90 roundtrip estimate is for a typical movement taking no more than about 2 hours, of which half would be waiting time and half driving time. This allowance corresponds to a 30-minute driving radius from the rail terminal. As shown in Exhibit 53 below, a 30-minute radius from the BNSF Fresno terminal covers most of the metropolitan area.

Exhibit 53: 30-Minute Driving Zone from BNSF Fresno



The estimates in Exhibit 51 allow $25 for CIRIS overhead, which is a typical figure for an Intermodal Marketing Company (IMC) or other third party.

For the three BNSF trips shown in Exhibit 51, the combined cost per mile of rail operations, equipment, and maintenance of way averages just $0.51 per mile per container.

Conceptual Short-Line/Contractor Costs

One of the potential attractions of using a contractor (e.g. Herzog) to operate CIRIS trains is a lower cost structure. For this report, Railroad Industries developed conceptual cost estimates for an Oakland-Fresno operation over Altamont Pass by Herzog using UP trackage rights. **Note that neither SJRRC nor Herzog participated in these preliminary estimates and that a significant amount of negotiation and due diligence would be required to develop concrete service proposal on this basis.**

This alternative has the benefit of economies of scale when combined with the current ACE operations out of the Stockton area:

- Access to existing ACE locomotives and crews that are currently not fully utilized
- An established relationship with the UP for the operation of trains over their Altamont Pass route into the Bay Area.

As indicated in Exhibit 54, there are these additional potential advantages:

- The use of ACE locomotives and crews, coupled with favorable work rules and wage rates, results in significant savings in locomotive and labor costs.
- The trackage rights fees are less than the Class I maintenance of way allocation.
- Overhead and profit, calculated as a percentage of costs, are significantly less.

Exhibit 54: Conceptual Contractor Costing: Oakland - Fresno

Contractor Round Trip		Fresno Cost	Share	BNSF Round Trip		Fresno Cost	Share
Rail Operations	**$**	**61**	**12%**	**Rail Operations**	**$**	**104**	**17%**
Fuel	$	14	3%	Fuel	$	14	2%
Labor	$	9	2%	Labor	$	51	8%
Switching	$	33	7%	Switching	$	33	5%
Loss/Damage	$	5	1%	Loss/Damage	$	5	1%
Rail Equipment	**$**	**33**	**7%**	**Rail Equipment**	**$**	**42**	**7%**
Locomotive	$	3	1%	Locomotive	$	12	2%
Railcars	$	30	6%	Railcars	$	30	5%
Trackage Rights Fees	**$**	**15**	**3%**	**Rail MOW**	**$**	**58**	**10%**
Rail Overhead	**$**	**31**	**6%**	**Rail Overhead**	**$**	**82**	**13%**
Contractor Profit (20%)	**$**	**28**	**6%**	**Rail Profit (20%)**	**$**	**57**	**9%**
Rail Terminal	**$**	**140**	**28%**	**Rail Terminal**	**$**	**140**	**23%**
Lift (4)	$	140	28%	Lift (4)	$	140	23%
Rail Total	***$***	***280***	***57%***	***Rail Total***	***$***	***426***	***70%***
Drayage	**$**	**160**	**32%**	**Drayage**	**$**	**160**	**26%**
Port (RT)	$	70	14%	Port (RT)	$	70	11%
Valley (RT)	$	90	18%	Valley (RT)	$	90	15%
CIRIS Overhead	**$**	**25**	**5%**	**CIRIS Overhead**	**$**	**25**	**4%**
Total	**$**	**493**	**100%**	**Total**	**$**	**611**	**100%**

The end result, at least conceptually, is a cost reduction of $118 per Oakland-Fresno round trip. Comparable reductions would be possible for Stockton and Bakersfield trips but were not separately estimated.

Rail – Truck Comparisons and Subsidy Needs

Current trucking costs differ significantly from what the study team found in 2003. The 2003 Feasibility Study noted a "going rate" of $250 for round trip drayage between Oakland and Stockton but noted the upward pressure on rates. Since 2003 rates have risen for four reasons.

- **Fuel costs.** Diesel costs are at an all-time high and drayage firms have instituted fuel cost surcharges. When this report was being prepared the fuel surcharge was 20—25%. In the long term the surcharge may level off or decline.

- **Labor costs.** Facing periodic driver shortages and dissatisfaction with earnings, drayage firms have had to raise rates to increase driver compensation.

- **Insurance rates.** Insurance rates have pushed steadily upward over the past few years.

- **Congestion.** Increased highway congestion has reduced the number of Oakland—Valley trips a driver can expect to make in a day or week and raised the cost of each trip.

The trucking rates in Exhibit 55 are split into a base rate and a fuel surcharge to illustrate the impact of fuel prices and allow for subsequent adjustments.

The relatively low base rate for Bakersfield trucking is due to the prevalent service pattern. A drayage trip between Oakland and Stockton or Fresno is typically a genuine round trip. A drayage trip between Oakland and Bakersfield, however, is more typically made as one part of an Oakland-Southern California trip each way. The driver will position an empty container in Bakersfield from either Oakland or Los Angeles and finish the trip with some other load. A second driver will bring some other load to Bakersfield and pick up the loaded container bound for Oakland. This practice effectively puts an upper cap on the drayage rate so that Bakersfield drayage is just a little more expensive than Fresno drayage.

Exhibit 55: Class I Rail-Truck Cost Comparisons

	Port of Oakland Round Trip to:		
	Stockton	**Fresno**	**Bakersfield**
BNSF CIRIS Total	**$ 505**	**$ 611**	**$ 707**
Trucking			
Base Rate	$ 300	$ 520	$ 550
25% Fuel Surcharge	$ 75	$ 130	$ 138
Trucking Total	**$ 375**	**$ 650**	**$ 688**
Comparison			
Rate Target (Truck less 5%)	**$ 356**	**$ 618**	**$ 654**
Rail Intermodal Total	**$ 505**	**$ 611**	**$ 707**
Per Container RT Subsidy	**$ 149**	**$ (7)**	**$ 53**

Exhibit 56 shows an Oakland-Fresno comparison for contractor and BNSF costing. If the conceptual contractor costing estimates are realistic, CIRIS service could potentially show an operating profit at Fresno and break even at Stockton.

Exhibit 56: Conceptual Contractor Rail-Truck Cost Comparisons

Conceptual 2005 Cost Comparisons		
Oakland - Fresno Round Trip		
	Contractor	**BNSF**
CIRIS Total	**$ 493**	**$ 611**
Trucking		
Base Rate	$ 520	$ 520
25% Fuel Surcharge	$ 130	$ 130
Trucking Total	**$ 650**	**$ 650**
Comparison		
Rate Target (Truck less 5%)	**$ 618**	**$ 618**
Rail Intermodal Total	**$ 493**	**$ 611**
Per Container RT Subsidy	**$ (125)**	**$ (7)**

Given the lack of precedent for such operations, however, these estimates must be regarded as conceptual and subject to significant changes in practice. In particular, if the Class I carriers regard capacity used for contractor operations as capacity lost to profitable long-haul traffic, they can be expected to charge much more for CIRIS trackage rights and terminal access than UP charges for ACE passenger operations.

Subsidy Implications

Exhibit 57 provides estimates of the round-trip subsidy requirements based on Class I (BNSF) operation and key assumptions.

- The CIRIS cost structure closely follows the estimates in Exhibit 51, including the amounts allowed for railroad profit and drayage.
- CIRIS will be able to attract business with rates 5% below prevalent trucking rates. The 2003 Feasibility Study postulated a 10% discount, but with rising truck rates a smaller discount may suffice. Under those circumstances and using the lower BNSF costs:
- CIRIS would require a $149 per round trip subsidy in the Stockton market.
- CIRIS could conceivably earn a $7 per round trip profit in the Fresno market.
- The cost disparity would be $53 per round trip in the Bakersfield market due to the effective cap in drayage rates.

To the extent that some containers can be reused instead of moved empty, the economics would improve. The economic leverage of consolidation would also improve the financial picture for those loads that could be consolidated.

Exhibit 57 estimates the annual subsidy costs under Class I startup and mature service scenarios.

Exhibit 57: Potential Subsidy Requirements

	Phase 1			Market Extension			
	Stockton Modesto	Fresno	Subtotal	Bakersfield	Sacramento*	Subtotal	Total
Startup							
Per Unit	$ 149	$ (7)	$ 76	$ 53	$ 149	$ 124	$ 96
Annual Units	6,950	6,106	13,056	2,405	6,892	9,297	22,353
Annual	$ 1,037,405	$ (44,144)	$ 993,260	$ 128,494	$ 1,028,732	$ 1,157,226	$ 2,150,487
Mature							
Per Unit	$ 149	$ (7)	$ 76	$ 53	$ 149	$ 124	$ 96
Annual Units	29,577	25,713	55,290	10,971	30,712	41,683	96,973
Annual	$ 4,414,962	$ (185,895)	$ 4,229,067	$ 586,112	$ 4,584,364	$ 5,170,476	$ 9,399,543

* Not costed separately - assumed equal to Stockton

The study team did not develop a separate subsidy estimate for the conceptual contractor operations. It is tempting to conclude that CIRIS could operate at a profit using contractor cost factors. If the conceptual estimates are realistic, any operating subsidy would be much smaller, but the actual need for subsidy would depend not only on contractor cost characteristics but on the trackage rights fees and /or terminal access changes levied by the Class I carriers.

It is generally agreed that CIRIS sponsors would have difficulty obtaining public funding for permanent operating subsidies. Operating subsidies are universal for public passenger transportation but largely unknown in the freight sector. One option available to CIRIS sponsors is to provide capital funding to cover some of the fixed costs or to offset some of the variable costs.

As explained later, CIRIS sponsors could purchase or lease locomotives for use in CIRIS service. The estimated costs of the locomotive itself and annual maintenance range from a minimum of

$5.46 per round trip to a maximum of $8.72 per round trip. The CIRIS locomotive cost estimates shown in Exhibit 51 range from $5 at Stockton to $18 at Bakersfield, using the lower BNSF costs. These estimates suggest that the use of publicly funded and maintained locomotives would cover roughly 66% of the locomotive cost (i.e. about $8 of the $12 Fresno cost).

It would also be possible for CIRIS sponsors to purchase or lease the rail cars, as discussed in Chapter XIV. This step would offset all of the $30 per round trip equipment cost shown in Exhibit 51.

Together, public provision of locomotives and railcars would therefore reduce the average CIRIS operating cost and subsidy by about $38 per round trip.

V. Regional Benefits

Employment Benefits

A successful CIRIS operation would create or encourage new employment opportunities in several categories.

CIRIS Operations

CIRIS itself would require employees in rail operations, terminals, and management positions.

- Freight trains typically have two-person crews. Operating two trains per night over a seven-day week would require 8 to 12 operating positions.
- Incremental additions to terminal operating labor at existing Oakland, Stockton, and Fresno terminals would likely add 5 to 10 positions.
- Opening new terminals at Sacramento and Shafter/Bakersfield and reactivating the Empire (Modesto) terminal could create an additional 10 to 30 positions.
- CIRIS management, administration, marketing and sales could create an additional 2 to 10 positions, some of which may be with IMC's or other participant organizations.

CIRIS itself could thus create 25 to 60 employment opportunities, depending on how extensive the system ultimately becomes and what roles various organizations such as railroads and IMCs play in CIRIS development.

Transloading and Related Services

Transloading operations hire unskilled labor, skilled equipment operators, supervisors, clerks, and managers. One major logistics and transloading firm operating three facilities in the Stockton area has about 25 direct or contract employees: about 15 in administration and management and about 10 in warehousing and freight handling. These 50 employees handle about 5,000 annual truckload or container shipments, or roughly 200 truck or container loads per employee.

As noted in the 2003 Feasibility Study, an estimated 16% of Oakland's container cargo is transloaded. Applying this yields the following estimated transload volumes.

Exhibit 58: Estimated Transload Volumes – Loaded Containers

	Phase 1		Market Extension		CIRIS
	Stockton Modesto	Fresno	Bakersfield	Sacramento	Total
Statup	1,112	977	385	1,103	3,576
Mature	4,732	4,114	1,755	4,914	15,516

At 200 annual loads per employee, the 3,576 startup loads would generate about 18 jobs and the mature service total of 15,516 would generate about 78 jobs.

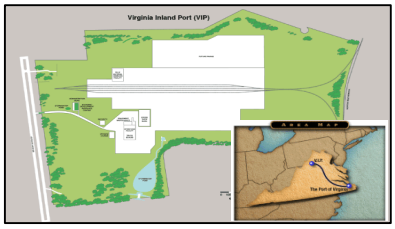
Additional jobs would likely be created in container chassis storage and repair, customs brokerage, Free Trade Zones, and related functions but no specific estimates are available.

Industrial Development

Issues such as traffic congestion and transportation costs are commanding greater attention in site selection for manufacturing plants and distribution centers. San Joaquin County has become an attractive location in recent years. The availability of CIRIS as an alternative or supplement to highway trucking should improve the competitive position of San Joaquin County compared to other locations in Northern and Southern California and result in additional job creation.

There are a number of inland port-like facilities, operations, and proposals that can provide valuable information and insights about the feasibility of various inland port concepts in the San Joaquin Valley. For example:

- **Virginia Inland Port (VIP)**. VIP (right) is the original and best-known Inland Port. VIP is roughly 220 miles west of the seaport and is connected by Norfolk Southern rail service. VIP handles container movements much as if it were an actual marine terminal.

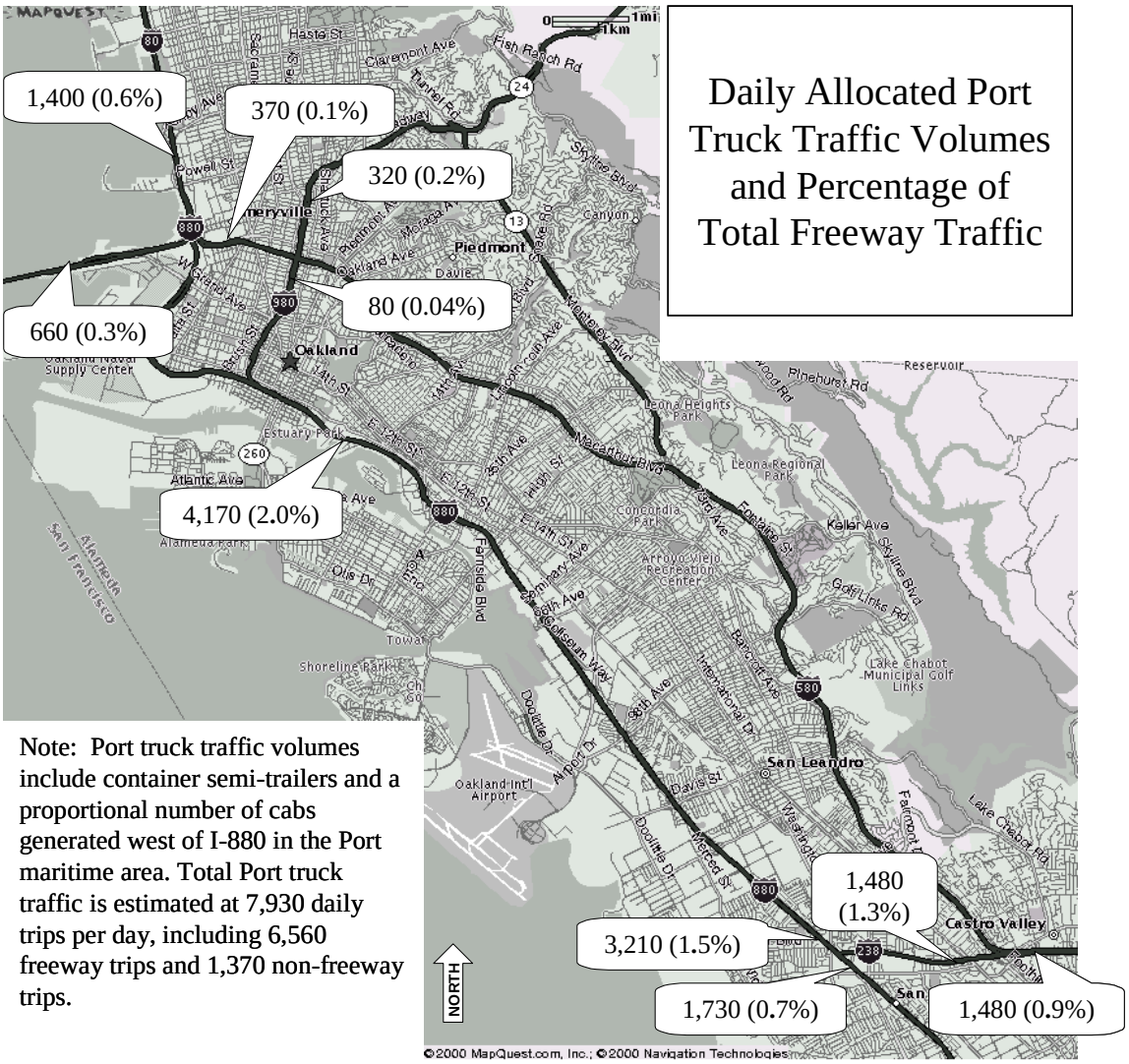


- **Alliance Texas Logistics Park.** The Alliance development (below) is a large industrial park with air, rail, and truck service. Alliance is unique in its successful concentration of multiple modes and its emphasis on logistics businesses. One of the nation's largest intermodal hubs, Logistics Park-Alliance integrates direct rail, intermodal, truck and transload services with distribution and warehousing within close proximity of one another and to one or more blocks of developable land for distribution centers. This creates the density needed to build one train, rather than several groups of rail cars. Shippers benefit from more reliable and consistent service with a reduction in operational costs.

Congestion Relief

Congestion relief is a major motivation for CIRIS. Exhibit 59, drawn from the Port Services Location Study, shows estimated allocations of truck traffic to and from the Port of Oakland. An estimated 1,480 container trucks travel I-580 each day to and from the prime CIRIS service territory.

Exhibit 59: Port Truck Traffic Volumes 2000



Note: Port truck traffic volumes include container semi-trailers and a proportional number of cabs generated west of I-880 in the Port maritime area. Total Port truck traffic is estimated at 7,930 daily trips per day, including 6,560 freeway trips and 1,370 non-freeway trips.

Coaxing traffic off the freeways is not cheap. Rail passenger services are heavily subsidized in California, as they are elsewhere, to relieve congestion on heavily traveled commuter routes.

As Exhibit 60 shows, the subsidy required by CIRIS to take one truck off the freeway between Oakland and the Central Valley is significantly less than that required to take an equivalent number of passengers off I-80 between Oakland and Sacramento.

Exhibit 60: Congestion Relief Cost Comparison

Capital Corridor Congestion Relief Cost Oakland- Sacramento Round Trip (160 miles)		
Avg. Passenger Subsidy, One Way	$	17
Avg. Round Trip Passenger Subsidy	$	35
Avg. Passengers per Auto, All Trips		1.63
Avg. Subsidy per Auto	$	57
Truck Pasenger Car Equivalents, Congestion		4.0
Equivalent Subsidy per Truck	**$**	**226**
CIRIS Subsidy to Stockton, Preliminary	**$**	**149**

Exhibit 61 compares the "farebox recovery" potential of CIRIS with Northern California rail passenger services. On average CIRIS could recover roughly 88% of its total cost from the "farebox," a higher share than is being achieved by BART or ACE trains.

Exhibit 61: Farebox Recovery Comparisons

	Port of Oakland Round Trip to:		
	Stockton	**Fresno**	**Bakersfield**
Summary			
Rate Target (Truck less 5%)	**$ 356**	**$ 618**	**$ 654**
Rail Intermodal Total	**$ 505**	**$ 611**	**$ 707**
Per Container RT Subsidy	**$ 149**	**$ (7)**	**$ 53**
CIRIS "Farebox Recovery"	**70%**	**101%**	**92%**

	BART	**ACE**	**CIRIS AVG**
Farebox Recovery	**47%**	**60%**	**88%**

CIRIS should not be envisioned as a single solution to truck or traffic congestion on I-580 or other routes. Port truck traffic itself is a relatively small, but highly visible portion of the truck traffic on I-580. CIRIS would more accurately be viewed as one of a broad range of congestion management efforts brought to bear on the growing problem.

Exhibit 62, drawn from the 2003 Feasibility Study (and using the most recent PIERS data made available), shows the potential round trips diverted from the highway in 2003 and 2020, based on Port of Oakland cargo growth forecasts.

Exhibit 62: Divertible Round Trips

2003	Phase 1			Market Extension			CIRIS
	Stockton Modesto	Fresno	Subtotal	Bakersfield	Sacramento	Subtotal	Total
Startup							
Daily Round Trips	56	49	104	19	55	74	179
Mature							
Daily Round Trips	237	206	442	88	246	333	776

2020	Phase 1			Market Extension			CIRIS
	Stockton Modesto	Fresno	Subtotal	Bakersfield	Sacramento	Subtotal	Total
Startup							
Daily Round Trips	127	112	239	44	126	170	410
Mature							
Daily Round Trips	542	471	1,013	201	563	764	1,777

These trips translate into truck VMT reductions based on the following assumptions:

The truck trips avoided would be equivalent to:

- Oakland – Lathrop (65 miles) from the Stockton-Modesto market.
- Oakland – Fresno (176 miles) for the Fresno market.
- Oakland – West Sacramento (80 miles) for the Sacramento market.
- Oakland – Bakersfield (277 miles) for the Bakersfield market.

The CIRIS drayage distances would be:

- Port of Oakland drayage: 2 miles each way
- Valley drayage: 20 miles each way.

The net VMT change for a round trip in each market would therefore be:

- Stockton-Modesto: 130-mile round trip diverted to CIRIS, 44 miles of drayage required, 86 net VMT reduction for each round trip.
- Fresno: 352-mile round trip diverted to CIRIS, 44 miles of drayage required, 308 net VMT reduction for each round trip.
- Sacramento: 160-mile round trip diverted to CIRIS, 44 miles of drayage required, 116 net VMT reduction for each round trip.
- Bakersfield: 554-mile round trip diverted to CIRIS, 44 miles of drayage required, 510 net VMT reduction for each round trip.

In congested freeway conditions one semi has the impact of about 4.0 passenger car equivalents (PCE).

Exhibit 63 estimates truck VMT reductions and passenger car equivalent VMT for startup and mature CIRIS operations in 2003 and 2020.

Exhibit 63: Estimated Net VMT and Passenger Car Equivalent VMT Reductions

2003	Phase 1			Market Extension			CIRIS
	Stockton Modesto	Fresno	Subtotal	Bakersfield	Sacramento	Subtotal	Total
Startup							
Daily Round Trips	56	49	104	19	55	74	179
Miles Diverted	130	352	-	554	160	-	-
Drayage Miles	44	44	-	44	44	-	-
Net VMT reduction per trip	86	308	-	510	116	-	-
Daily VMT Reduction	4,782	15,045	19,827	9,813	6,396	16,209	36,035
Annual VMT Reduction	**1,195,392**	**3,761,297**	**4,956,689**	**2,453,234**	**1,598,909**	**4,052,143**	**9,008,832**
Annual PCE VMT Reduction	**4,781,567**	**15,045,188**	**19,826,755**	**9,812,936**	**6,395,636**	**16,208,572**	**36,035,327**
Mature							
Daily Round Trips	237	206	442	88	246	333	776
Miles Diverted	130	352	-	554	160	-	-
Drayage Miles	44	44	-	44	44	-	-
Net VMT reduction per trip	86	308	-	510	116	-	-
Daily VMT Reduction	20,349	63,356	83,705	44,761	28,501	73,262	156,967
Annual VMT Reduction	**5,087,318**	**15,839,012**	**20,926,329**	**11,190,149**	**7,125,258**	**18,315,407**	**39,241,737**
Annual PCE VMT Reduction	**20,349,272**	**63,356,046**	**83,705,318**	**44,760,596**	**28,501,033**	**73,261,629**	**156,966,947**

2020	Phase 1			Market Extension			CIRIS
	Stockton Modesto	Fresno	Subtotal	Bakersfield	Sacramento	Subtotal	Total
Startup							
Daily Round Trips	127	112	239	44	126	170	410
Miles Diverted	130	352	-	554	160	-	-
Drayage Miles	44	44	-	44	44	-	-
Net VMT reduction per trip	86	308	-	510	116	-	-
Daily VMT Reduction	10,950	34,453	45,403	22,472	14,646	37,118	82,521
Annual VMT Reduction	**2,737,447**	**8,613,370**	**11,350,817**	**5,617,906**	**3,661,501**	**9,279,407**	**20,630,224**
Annual PCE VMT Reduction	**10,949,787**	**34,453,481**	**45,403,269**	**22,471,624**	**14,646,005**	**37,117,629**	**82,520,898**
Mature							
Daily Round Trips	542	471	1,013	201	563	764	1,777
Miles Diverted	130	352	-	554	160	-	-
Drayage Miles	44	44	-	44	44	-	-
Net VMT reduction per trip	86	308	-	510	116	-	-
Daily VMT Reduction	46,600	145,085	191,685	102,502	65,267	167,769	359,454
Annual VMT Reduction	**11,649,958**	**36,271,337**	**47,921,294**	**25,625,441**	**16,316,842**	**41,942,283**	**89,863,577**
Annual PCE VMT Reduction	**46,599,832**	**145,085,346**	**191,685,178**	**102,501,765**	**65,267,366**	**167,769,131**	**359,454,309**

- Phase I start up serving Stockton-Modesto and Fresno would divert nearly 20 million annual PCE VMT from the highways. A mature Phase I system would divert an estimated 83.7 million annual PCE VMT at 2003 traffic levels.

- Expanding CIRIS to Bakersfield and Sacramento could divert 16.2 million PCE VMT at startup and 73.3 million at maturity.

- The "full buildout' CIRIS system could divert 157 million annual PCE VMT at 2003 traffic levels.

- At 2020 traffic levels, a mature Stockton-Modesto/Fresno CIRIS could divert 191.7 million annual PCE VMT, and a "full buildout" CIRIS could divert a total of 359.5 million annual PCE VMT.

Highway Maintenance Savings

As Exhibit 64 shows, the total annual truck VMT diverted by CIRIS could range from about 5 million at the startup of Phase 1 to almost 90 million at maturity with 2020 traffic levels. Diversion of this volume of truck traffic could result in significant savings in highway maintenance. An FHWA study estimated that the year 2000 highway maintenance cost responsibility of combination trucks was 6.9 cents per mile. That figure translates into maintenance cost savings (also shown in Exhibit 64) of $82,482 for Stockton-Modesto service in Phase 1 all the way up to $6,200,587 annually at full maturity in 2020.

Exhibit 64: Highway Maintenance Cost Savings

2003	Phase 1			Market Extension			CIRIS
	Stockton Modesto	Fresno	Subtotal	Bakersfield	Sacramento	Subtotal	Total
Startup							
Annual VMT Reduction	1,195,392	3,761,297	4,956,689	2,453,234	1,598,909	4,052,143	9,008,832
Estimated Highway Maintenance Cost Savings	$ 82,482	$ 259,529	$ 342,012	$ 169,273	$ 110,325	$ 279,598	$ 621,609
Mature							
Annual VMT Reduction	5,087,318	15,839,012	20,926,329	11,190,149	7,125,258	18,315,407	39,241,737
Estimated Highway Maintenance Cost Savings	$ 351,025	$ 1,092,892	$ 1,443,917	$ 772,120	$ 491,643	$ 1,263,763	$ 2,707,680

2020	Phase 1			Market Extension			CIRIS
	Stockton Modesto	Fresno	Subtotal	Bakersfield	Sacramento	Subtotal	Total
Startup							
Annual VMT Reduction	2,737,447	8,613,370	11,350,817	5,617,906	3,661,501	9,279,407	20,630,224
Estimated Highway Maintenance Cost Savings	$ 188,884	$ 594,323	$ 783,206	$ 387,636	$ 252,644	$ 640,279	$ 1,423,485
Mature							
Annual VMT Reduction	11,649,958	36,271,337	47,921,294	25,625,441	16,316,842	41,942,283	89,863,577
Estimated Highway Maintenance Cost Savings	$ 803,847	$ 2,502,722	$ 3,306,569	$ 1,768,155	$ 1,125,862	$ 2,894,018	$ 6,200,587

VI. Funding Sources

Funding Overview

Achieving the public benefits CIRIS can provide will require investments from both the public and private sectors. This chapter addresses potential public sector funding sources, especially Federal sources included in the recently passed Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). Under SAFETEA-LU, the Federal government has expanded funding and eligibility for several existing programs and created new opportunities for the states and local agencies in cooperation with the private sector to invest in freight rail.

Grants from surface transportation programs. Grants give states and the federal government the best control over the use of funds. Funds can be targeted to specific projects that solve freight and passenger rail needs. At the Federal level, the long standing FHWA Sec. 130 Rail grade crossing program provides dedicated funding to improve safety at rail grade crossings. The Congestion Mitigation and Air Quality Program (CMAQ), created in ISTEA and continued in SAFETEA-LU, has funded passenger and freight rail intermodal projects where there is an air quality benefit. SAFETEA-LU has also continued the Corridors and Borders discretionary grant programs and created programs for Projects of National and Regional Significance and Capital Grants for Rail Line Relocation. Within SAFETEA-LU, a portion of the funding for Intermodal Connectors has been set aside for the Freight Intermodal Distribution Pilot Grant Program (Section 1307), which is a prime candidate for funding a demonstration project.

Loan and credit enhancement programs such as the Rail Revitalization and Improvement Funding Program (RRIF), Transportation Infrastructure Finance and Innovation Act (TIFIA) program, and State Infrastructure Banks (SIBs).

- TIFIA provides loans, loan guarantees, and lines of credit for large projects. The program is modeled after a loan provided for the Alameda Corridor Transportation Project, a truck and rail corridor project improving access to the ports of Los Angeles and Long Beach.

- RRIF is a loan and credit enhancement program for freight rail. It is primarily directed to the needs of regional and shortline railroads.

- State Infrastructure Banks. California has an SIB that provide loans for highway and in some cases transit improvements.

Tax-expenditure financing programs, including accelerated depreciation, tax-exempt bond financing, and tax-credit bond financing. A tax-exempt bond is an obligation issued by a state or local government where the interest received by the investor is not taxable for federal income tax purposes. SAFETEA-LU contains an expansion of tax exempt private activity bonds for surface transportation up to a national cap of $15 billion; these could potentially be beneficial for rail investment. Tax-credit bond financing is a new form of federally subsidized debt financing, where the investor receives a federal tax credit in lieu of interest payments on the bonds. From

the borrower's perspective, it provides a zero-interest-cost loan. These programs can be used to provide targeted, income-tax benefits for investments made to improve the efficiency or increase the capacity of the freight-rail system. They have the potential to elevate the rail system's rate of return and simultaneously reduce its cost of capital.

The most beneficial Federal programs for freight rail to date have been the Federal Highway Section 130 grade crossing, CMAQ programs, and the FTA Rail Modernization Program which has funded commuter rail improvements beneficial to freight rail. Changes under SAFETEA-LU have the potential to spur additional investment in freight rail projects.

Exhibit 65 summarizes the current Federal programs that can potentially benefit freight rail, shows the impacts of SAFETEA-LU, and discusses the implications for CIRIS. Potential Federal funding sources analyzed for CIRIS include:

- CMAQ
- Freight Intermodal Distribution Pilot Grant Program
- Projects of National and Regional Significance
- RRIF
- TIFIA
- Private Activity Bonds

CMAQ and Projects of National and Regional Significance are grant programs. RRIF, TIFIA, and Private Activity Bonds are all loan programs. All programs can be used for capital investments in infrastructure, but loan programs are only applicable to capital projects.

Exhibit 65: Current Federal Funding Programs for Freight Rail Related Investment

Current Federal Programs	Current eligibility for freight rail related improvements	SAFETEA-LU Changes	Implications for CIRIS
NHS	Can fund highway intermodal connectors to rail terminals. Connectors are normally lower priority on NHS system and there is no eligibility for rail improvements.	SAFETEA-LU did not include set-asides for intermodal connectors as had been proposed.	Could improve road access to Oakland or San Joaquin terminals, but seems an unlikely source for CIRIS.
Surface Transportation Planning (including Section 130 Grade Crossing Program)	Section 130 funds rail-highway grade crossings. STP in general can fund improvements for rail freight, provided the improvements enhance grade crossing safety. Work allowed includes: "…lengthening or increasing vertical clearances of bridges, adjusting drainage facilities, lighting, signage, utilities, or making minor adjustments to highway alignment …".[i]	Increased funding from $165M/year to $220M/year under SAFETEA–LU.	Only useful to CIRIS if there are road-rail grade crossings in need of safety improvements.
CMAQ	Can fund any transport project that improves air quality in a non-attainment area. Can be used for up to 3 years. Is being used to offset Amtrak operating expenses on the Downeaster service.	Freight projects remain eligible. This program contains $8.6B under SAFETEA-LU.	Potential source of CIRIS capital and/or operating funds, but must demonstrate air quality improvement.
TIFIA	Provides loans and credit assistance for highway and public intermodal rail facilities. Total project costs threshold was $100M minimum, but this was reduced to $50M.	SAFETEA-LU made private rail projects eligible. Project cost threshold reduced to $50M. SAFETEA-LU set funding at $610M for this program.	Possible, if CIRIS meets the minimum cost threshold. due to track or terminal capacity additions. Need to have a recurring revenue steam, similar to Alameda Corridor.
RRIF	Provides loans and credit assistance to private railroads.	Program was changed to remove Credit Risk Premium and 'lender of last resort' features that restricted use of these funds. Funding up under SAFETEA-LU from a $3.5M to $35M loan limit.	This is for the railroads, mostly the Class IIs and IIIs. Unlikely source for CIRIS unless a short line operates the service.
State Infrastructure Banks (SIBs)	Federally capitalized SIBs can provide loans for eligible highway and transit projects.	SAFETEA-LU expands SIB opportunity to all states; no change in eligibility.	No direct funding for freight rail, but could indirectly benefit CIRIS (e.g. road access).

[i] FHWA Information Memo entitled Use of Federal-Aid Highway Funds for Improvements to Rail Facilities, dated February 9, 1993 and signed by Anthony R. Kane

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Current Federal Programs	Current eligibility for freight rail related improvements	SAFETEA-LU Changes	Implications for CIRIS
Borders and Corridors	Corridor and Border programs are for improvements to highway trade corridors and border crossings; has been used for rail grade crossings, e.g. FAST in Washington State. Freight rail projects are eligible.	Programs separated in SAFETEA-LU. Corridor program is discretionary and has been entirely earmarked. The Border programs is allocated by formula to border states. SAFETEA-LU expanded funding for Corridors to $1.949B and for Borders to $833M.	Possible source for CIRIS, but corridor funding has all been earmarked in SAFETEA-LU. Possible Border funding with ties to Port of Oakland international traffic.
Freight Intermodal Distribution Pilot Grant Program	A new program providing $30M to five demonstration projects. Each project will receive $1M per year for six years. All funds are currently earmarked.	New program.	All funds in current program are earmarked. If program is expanded, this could be a good source of funds for CIRIS.
Rail Modernization	Public transit program- can fund commuter rail improvements that have associated benefits for freight. Must have primarily passenger benefit.	New Starts Program ($1.3B - $1.8B) received a modest expansion of funds for major transit capital investments. Add a new Small Starts Program ($200M/yr) for projects under $75M.	Unlikely source of funds for CIRIS.
Projects of National and Regional Significance	Normally focused on large highway projects, but freight rail projects are eligible if they demonstrate regional or national benefits.	A new program that contained earmarks in SAFETEA-LU for CREATE and the Heartland project. Program total is $1.69B.	Would have to show that CIRIS has regional or national significance. Possibility for earmark in the next reauthorization.
Capital Grants for Rail Line Relocation	Used for relocating existing rail lines.	A new program. SAFETEA-LU sets a $350M/yr limit from 2006-2009, but this program is not yet funded.	Not yet funded, and CIRIS does not involve rail line relocation.
Private Activity Bonds	Highway and rail projects are eligible under SAFETEA-LU	SAFETEA-LU contains a $15B national cap on private activity bonds for highway and rail projects. This would allow railroads to participate in tax exempt borrowing along with State and local governments.	Possible source for CIRIS.
Tax Credit Bonds	Currently not available for transportation	AASHTO proposed a Transportation Investment Corporation to issue $80B in tax credit bonds, a portion to benefit intermodal freight. An institutional mechanism, Bonds for America, was proposed but not enacted in SAFETEA-LU. S1516 proposes tax credit bonds for intercity rail passenger.	Not available today, but perhaps if S1516 passes (S1516 is the Passenger Rail Investment and Improvement Act of 2005).

Congestion Mitigation and Air Quality Improvement Program (Grant)

In 1991, Congress authorized the Congestion Mitigation and Air Quality Improvement Program (CMAQ) to help areas fight highway congestion, thereby helping to maintain air quality conformity. Congress reauthorized the CMAQ program in SAFETEA-LU and increased it to $8.6 billion. The main goal of CMAQ is to fund transportation projects that reduce emissions in non-attainment and maintenance areas. A second goal of CMAQ is to fund projects that slow the growth of congestion, reduce emissions, and maintain economically viable and mobile communities. CMAQ is the major potential federal funding source for operating expense support. Eligibility has been expanded to include projects and programs that "improve transportation systems management and operations that mitigate congestion and improve air quality". CIRIS appears to be a good fit with the goals of CMAQ.

CMAQ funding is apportioned to the states by means of a formula that takes into account the severity of air quality problems and the size of affected populations. The states are required to spend the money in non-attainment areas and maintenance areas. CMAQ funds are focused primarily on the transportation control measures contained in the 1990 Clean Air Act Amendments. The primary purpose of these measures is to lessen the pollutants emitted by motor vehicles by decreasing travel demand and decreasing congestion. Over the first 8 years of the CMAQ program, funding has been concentrated in two areas – transit and traffic flow improvements. Freight rail projects that remove heavy trucks from the roadways have also received CMAQ funding in some areas of the country.

Examples of CMAQ funding comparable to CIRIS thus far include mostly capital projects.

- Stark County Intermodal Facility, Stark County, OH. Construction of an intermodal facility which will allow truck trailers and freight containers to be loaded onto railroad cars. Total cost, $32 million, includes $7 million in CMAQ funding as a loan under the Innovative Financing program to be repaid to the Ohio DOT and $25 million in private funds.

- Columbia Slough Intermodal Expansion Bridge, Portland, OR: Construction of a bridge for railroads to directly access a deep water port facility, eliminating truck trips. Total cost of the project, $6.1 million, includes $1 million in CMAQ funds and $2.1 million in demonstration funds. The Port of Portland is providing $1.5 million and private railroads $1.5 million.

- Auburn Truck to Rail Transfer Facility, Auburn, ME: Construction of an intermodal facility owned by the City of Auburn and leased to Maine Intermodal Transportation, Inc. This facility is expected to redirect substantial truck traffic to rail. $2.3 million in CMAQ funds were used in conjunction with $600,000 in local match and $200,000 in private funds.

CMAQ funding is typically apportioned through the Transportation Improvement Programs (TIP) at MPOs.

Freight Intermodal Distribution Pilot Grant Program (Grant)

Among the freight programs established in SAFTEA-LU is a new intermodal distribution pilot program. The program theoretically provides grants to States to facilitate and support intermodal freight transportation initiatives. Projects are to reduce congestion into/out of ports and establish/expand intermodal facilities and inland freight distribution centers, a perfect match for CIRIS.

Current funding is $30 million over 5 years (2005-2009) for 6 designated projects. While the program is completely earmarked, selection criteria for the future will be developed as required. The criteria are expected to be coordinated with those for projects of national and regional significance.

One of the projects funded by this program is a $5 million port project in Southern California. ACTA believes this money is theirs to spend on a proposed rail shuttle demonstration project with Union Pacific, and a UP contact confirmed that they expect to go ahead with the demonstration in 2006. This demonstration project would reportedly include development of a small scale intermodal terminal at West Colton and a multi-year operating subsidy for UP to run a shuttle between the Ports and the West Colton terminal, very similar to a CIRIS demonstration project. The Ports, however, apparently believe the earmarked funds are theirs, and that the earmark does not specify the projects to be funded. In either case, the process involves an application by Caltrans to the US Secretary of Transportation to actually receive the funds. It appears unlikely that these funds could be diverted to CIRIS.

To obtain support for CIRIS, a sponsor would have to wait for the next funding cycle, in roughly two years.

Projects of National and Regional Significance (Grant)

This grant program funds high-cost, high-priority projects with total cost of over $500,000,000. It has little near-term application to CIRIS, but could come into play for long-term expansion. Examples include:

- The Chicago Region Environmental and Transportation Efficiency Project (CREATE) calls for rationalization, reconstruction, and upgrade of five cross-town corridors in Chicago. This project received a $100 million earmark under Projects of National and Regional Significance.

- The Heartland Corridor Double-Stack Initiative is a plan to provide height clearances and improve track along existing rail routes that were primarily designed to haul coal. This project received a $90 million earmark under Projects of National and Regional Significance.

This is a new program under SAFETEA-LU. Applications will go to the FWHA, but the criteria for the applications is still under development.

Transportation Infrastructure Finance and Innovation Act (Loan)

TIFIA is a loan and loan guarantee program that can be used for capital projects whose total size is over $50 million. The loan itself does not need to be that large; TIFIA is authorized at $122 million annually for fiscal years 2005-2009. The Alameda Corridor was funded through a combination of railroad revenues; port revenues; state, local, and regional funds; bonding, and a $400 million federal loan. The Alameda Corridor loan became the model for TIFIA. The Reno "rail trench" is another TIFIA example.

The large minimum size and the emphasis on capital projects implies that TIFIA could be useful to CIRIS in:

- financing large intermodal terminal expansions or construction of new intermodal terminals; or
- purchase and upgrading of rail lines (e.g. the Altamont Pass route, CCT's Lodi-Sacramento line, or the Mococo Line if sale to BARTD falls through).

TIFIA is a financing program rather than a grant program. TIFIA requires a means for repaying the loan. The most direct means for CIRIS would be intermodal revenue, but since CIRIS is not expected to earn a net profit TIFIA would really be a means of financing capital projects that would eventually be funded from other sources.

SAFETEA-LU allows TIFIA loan applications from "a state, local government, public authority, public-private partnership, or any other legal entity undertaking the project and authorized by the Secretary [of Transportation]", which would likely include any JPA or another organization managing CIRIS. TIFIA is managed by the TIFIA Joint Program Office within FHWA. The TIFIA application process can begin at any time with a letter of interest to the DOT.

Railroad Rehabilitation & Improvement Financing (Loan)

The Railroad Rehabilitation & Improvement Financing (RRIF) Program was established by TEA-21 and amended by SAFETEA-LU. Under this program the FRA Administrator is authorized to provide direct loans and loan guarantees up to $35.0 billion. Loans since 2003 have ranged from $2.3 million to $233 million.

The funding may be used to acquire, improve, or rehabilitate intermodal or rail equipment or facilities, or establish new intermodal or railroad facilities. Direct loans can fund up to 100% of a railroad project with repayment periods of up to 25 years and interest rates equal to the cost of borrowing to the government.

Eligible borrowers include railroads, state and local governments, government-sponsored authorities and corporations (e.g. JPAs), and joint ventures that include at least one railroad. Although state and local governments are eligible for loans, all existing loans have gone directly to railroads, many of which have been short lines or regionals. Up to $7.0 billion is reserved for projects benefiting freight railroads other than Class I carriers. CCT might be eligible should there be a need for CIRIS-related capital investment, such as reopening the line between Lodi and Sacramento and building an intermodal facility to serve the Sacramento market.

The RRIF is managed by the FRA Office of Freight Programs. Applications are received continuously.

Private Activity Bonds (Loan)

This is a new program under SAFETEA-LU. Applications will go to the office of the Secretary of Transportation, but the criteria for the applications is still under developed.

Federal CIRIS Funding Summary

Exhibit 66 summarizes the applicable Federal grant programs. Both should be useable for CIRIS, but only the CMAQ program is accessible in the near future. The Freight Intermodal Distribution Pilot Grant Program should be applicable if renewed, but is at least two years away.

Exhibit 66: Federal CIRIS Grant Funding Summary

Grant Source	How Does CIRIS Qualify?	Program Administrator	Start of next funding cycle	Next Steps
CMAQ	Typically apply through local MPO. Must be in a non-attainment area and show a positive impact on air quality. Major federal source that can potential provide operating fund.	Local MPO	Based on one or two year MPO transportation improvement program cycle.	Work with MPOs on local application procedures.
Projects of Regional and National Significance	All money for this program in SAFETEA-LU is earmarked. Projects much larger than CIRIS	FHWA Office of Freight Management.	Start now to prepare for earmark in next reauthorization.	This is new and the application rules have not yet been released.
Freight Intermodal Distribution Pilot Grant Program	If this is program is expanded in the next reauthorization, would be a good potential source for a CIRIS earmark.	FHWA	Start now to prepare for earmark in next reauthorization.	Follow program to see if it will be expanded in next reauthorization.

The loan programs shown in Exhibit 67 are accessible, but restricted to capital projects. As discussed later, there may be opportunities for tradeoffs between capital and operating funds.

Exhibit 67: Federal CIRIS Loan Funding Summary

Loan Source	How Does CIRIS Qualify?	Program Administrator	Start of next funding cycle	Next Steps
TIFIA	Application to the TIFIA office. Application available at: http://tifia.fhwa.dot.gov/	TIFIA office within FHWA.	Can submit anytime.	Loan program for large capital investments.
RRIF	Submit an application to the FRA. Application must come from a railroad.	Federal Railroad Administration	Can submit anytime.	Loans for capital investments.
Private Activity Bonds	Submit an application to the office of the Secretary of Transportation	Office of the Secretary of Transportation	New program, timing is unknown.	This is new and the application rules have not yet been released.

State Funding Programs

California Infrastructure and Economic Development Bank (I-Bank)

The California I-Bank finances public and private infrastructure to promote economic growth. The I-Bank administers several loan programs, of which the following have potential application to CIRIS.

Exempt Facility Revenue Bond Program. The Exempt Facility Revenue Bond Program provides tax-exempt financing for government-owned projects or private improvements within publicly-owned facilities. This program could conceivably be applied to CIRIS terminal improvements or CIRIS-related improvements at the Ports or inland terminals.

Governmental Revenue Bond Program. The Governmental Revenue Bond Program provides tax-exempt financing to governmental agencies. Examples include $10 million for the Port of Stockton for infrastructure improvements at Rough and Ready Island.

California Infrastructure State Revolving Fund (ISRF). The ISRF provides low-cost loans for a variety of infrastructure projects. ISRF funding is available in amounts ranging from $250,000 to $10,000,000. Eligible project categories include environmental mitigation measures, port facilities, and public transit, so CIRIS would likely fit into the program. Eligible applicants include any subdivision of a local government, including special districts, JPAs, and non-profit corporations Preliminary applications are continuously accepted.

Carl Moyer Program

California's Carl Moyer Memorial Air Quality Standards Attainment Program (CMP), administered by Air Districts in partnership with the California Air Resources Board (ARB), provides incentive funding for heavy-duty diesel engine, infrastructure demonstration, and advanced technology projects aimed at providing surplus emission reductions over that required by state and federal standards. The CMP could be of limited, but significant value to CIRIS once a need to acquire locomotives, lift equipment, or yard tractors is identified. A major constraint of the CMP for application to CIRIS is that it cannot be used to fund administrative or operational costs of air quality improvement projects. Thus, CMP cannot provide funding for CIRIS operational subsidies. Exhibit 68 summarizes the CMP.

Exhibit 68: Carl Moyer Memorial Air Quality Standards Attainment Program

Program	Current eligibility for freight rail related improvements	Comments	Implications for CIRIS
Carl Moyer Program (CMP)	To help California meet the requirements of the Federal Clean Air Act, this incentive program has been funded at a level of approximately $25M per year since 1998. The CMP provides incentive funding for three types of projects: heavy-duty diesel engine; infrastructure demonstration; and advanced technology projects. Local matching funds are required.	The heavy-duty diesel engine program is the core component of CMP, absorbing more than 90% of the funds. The funds are used to purchase cleaner engines that reduce NOx (ozone-forming pollutant) and diesel particular matter emissions. The funds could be used for locomotives.	This is a potential funding source for CIRIS, especially for locomotive purchases.

The heavy-duty diesel engine program, which is the CMP's core component administered by ARB, can be a potential funding source for CIRIS. The heavy-duty diesel engine program provides funds for the implementation of three types of projects, which include new vehicles/equipment, engine repowers, and engine retrofits.

For CIRIS applications, a new or rebuilt locomotive purchase would be eligible for funding from the heavy-duty diesel engine program of the CMP, provided that the new locomotive reduces NOx emissions by at least 30% below the applicable baseline standards, in addition to meeting the baseline standards for Reactive Organic Gas (ROG) and Particulate Matter (PM) emissions. The maximum funding available from the heavy-duty diesel engine program equals the equipment's incremental cost, which is defined as the difference between the cost of purchasing the new equipment (with lower-than-baseline emissions) and the cost of equipment that would meet baseline emission requirements. The total capital cost of purchasing a rail locomotive for CIRIS cannot thus be covered entirely by the CMP. The minimum project life of a new locomotive to be eligible for CMP funding is 10 years for Class I locomotives, and 3 years for all others. New rail locomotives funded through the CMP will also be required to have an Electronic Monitoring Unit (GPS, Transponder device, or Automatic Vehicle Locator) installation for tracking geographic location and equipment activity over the project life.

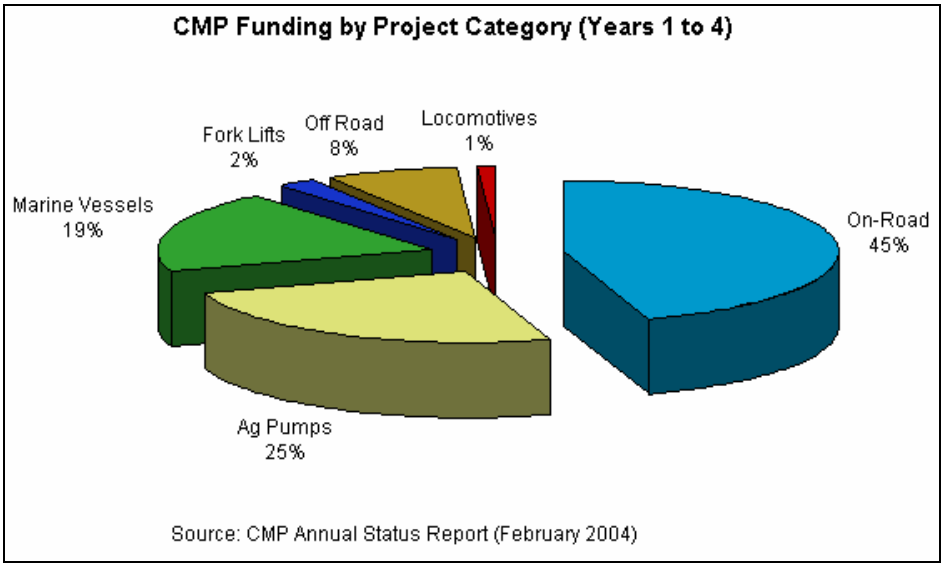
The ARB is presently developing regulations for cargo handling equipment at California's ports and intermodal rail terminals, which is scheduled for Board consideration in December 2005. Equipment covered in the regulation include yard tractors, rubber tire gantry cranes and lift machines. With the approval of this regulation, CMP project criteria are proposed to be developed for cargo handling equipment, offering the future potential for the incremental funding of low-emissions intermodal handing equipment such as lift machines or yard tractors for CIRIS at the Ports of Oakland and Stockton, or the inland rail intermodal terminals.

Cost-effectiveness is the primary criterion used for the selection of projects for CMP funding. Cost-effectiveness of a new equipment purchase project is calculated by dividing the total CMP funding by the total project emission reductions. Only those projects that achieve a cost-

effectiveness of $14,300 or less of CMP funds per ton of emission reductions will be eligible for CMP funding.

Increased and continued funding has been provided for CMP implementation, on the order of $140 million a year (statewide) through 2015, based on legislation enacted in 2004 (Senate Bill 1107 and Assembly Bill 923). CMP funding for rail locomotive and forklift projects in California accounted for a marginal fraction (3%) of the total funds in the first 4 years of CMP implementation, as shown in Exhibit 69.

Exhibit 69: CMP Funding Categories



The ARB requires each district to obligate its CMP funds to projects within a year of the CMP grant award to ensure the timely utilization of state funds as required by law, which forms the framework for the annual CMP funding cycle of the CMP. Districts are also required to expend all the CMP funds by June 30 within two years of the year the grant.

Senate Bill SB 1266 – Bond Issue

California Senate Bill 1266 was approved on May 16, 2006. This measure, if approved by the voters in November 2006, would enact the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006. The Act would authorize $19.9 billion in State general obligation bonds for specified purposes, of which the following could likely benefit CIRIS:

- $2.0 billion for the Trade Corridors Improvement Fund, for which eligible projects would include "Freight rail systems improvements to enhance the ability to move goods from seaports, land ports of entry, and airports to warehousing and distribution centers throughout California…"

- $1.0 billion for "emissions reductions…from activities related to the movement of freight along California's trade corridors."

- $2.0 billion for projects in the state transportation improvement plan (STIP).
- $400 million for intercity rail improvements which, while intended for passenger rail service, could benefit CIRIS or figure in partnership agreements.
- $300 million for rail-highway grade crossing improvements, which could also benefit CIRIS.

The California Transportation Commission would be responsible for developing project guidelines and approving Caltrans project nominations.

Port of Oakland Earmark Funds

The Port of Oakland received $720,000 from a Congressional earmark for the CIRIS pilot project. Since it is a congressional earmark, there are fewer constraints in the use of the available funds for implementing the CIRIS pilot project, and the Port has two years to expend the amount. The components of the CIRIS pilot project that are planned to be funded by the congressional earmark are:

- Administrative structure/setup (JPA)
- Rail carrier administrative fee to run the pilot project
- Terminal infrastructure improvements (intermodal cargo-handling/lift equipment)

The Port is also looking at the potential for State funding from the Goods Movement Action Plan (GMAP).

County/Regional Funding

A vital potential funding source for pilot or ongoing operations is the membership of a JPA. One of the primary purposes of forming a JPA is to spread the costs of regional programs with regional benefits over the relevant jurisdictions. Each of the counties that would join a CIRIS JPA would obtain congestion management, emissions reduction, and economic development benefits. Each of the member counties also have budgets for those functions.

An approximate subsidy cost of $1 million per year for a startup or pilot CIRIS service would be $333,333 for each of the three counties (Alameda, San Joaquin, Stanislaus) involved in a "core" CIRIS service between Oakland and Stockton-Modesto. If service to Fresno can be added with little or no additional subsidy, as estimated, splitting a $1 million annual subsidy four ways would reduce each county's share to $250,000.

A mature Stockton/Modesto/Fresno CIRIS service, with an annual subsidy of approximately $4 million, would cost each county $1 million annually.

One distinct advantage of sharing the funding burden through a CIRIS JPA (or through membership in SJRRC) is the ability of each member to fund its share differently. The Federal

and State programs described above are accessible to counties or other government units, but counties also have a broad range of conventional revenue options.

Funding Outlook

Pilot Project Funding

There appear to be several options for pilot project funding.

- The Port of Oakland has some CIRIS funding in place for start up/pilot efforts.
- Formation of a CIRIS JPA would allow the remaining pilot project costs to be split among three or more counties (or other members).
- CMAQ funding through SJCOG, SFMTC, or STANCOG would also be potentially applicable to a CIRIS pilot, but would have to wait for the next funding cycle unless sponsoring MPOs have uncommitted CMAQ funds available. CMAQ funds are some of the few that can be used for operating costs.

The most direct pilot funding strategy would be for the Port of Oakland to use its funds to support part of the pilot cost and form a JPA (or utilize SJRRC to split the remaining burden. The JPA, or the county members, could then apply for CMAQ funding. The pilot project could start whenever sufficient funds were assembled (assuming institutional agreements were in place with the railroads).

Transload/Facility Funding at the Port of Stockton

If, as anticipated, a CIRIS transloading operation at the Port of Stockton can cover its operating costs, then the funding sources would be tapped to cover any capital or startup costs.

There are many more options to fund capital equipment or facility costs, although the time required to obtain such funding may be several months at a minimum. The alternatives are:

- The Port of Stockton could finance any capital or startup costs on its own, seeking lower cost replacement financing from Federal or State programs later.
- The service could be started with leased equipment or facilities, and permanent capital investment made once funding is secured.
- The Port of Oakland could use some of its CIRIS funds to start a transload operation as a joint venture or a JPA with the Port of Stockton.

The choice of near-term mechanism is essentially a strategic decision for the Port of Stockton.

On-going Subsidy

Funding an on-going subsidy is the single most difficult funding issue facing CIRIS. The only applicable Federal programs are CMAQ and the Freight Intermodal Distribution Pilot Grant Program.

- CMAQ funding is possible, but would be a slight stretch of previous CMAQ precedents. Moreover, CMAQ funding is not guaranteed in perpetuity, and would be limited to three years of support under current rules.

- The Freight Intermodal Distribution Pilot Grant Program is fully committed and there is no certainty that it will be funded again in the next transportation legislation. It is also intended specifically for pilot projects, not for ongoing operations.

The most feasible option for ongoing funding is through JPA (or SJRRC) members. As noted above this approach has the twin advantages of sharing the burden and offering flexibility to the members. This funding option is a strong argument for either establishing a JPA early in the implementation process or establishing SJRRC as the sponsor.

Long-term Capital Funding

With the multiple options and programs available for capital projects funding the long-term facility or equipment needs of CIRIS would become a strategic function of the sponsoring agency.

Capital needs could include locomotives, cars, terminal lift equipment, and terminal expansion. If CIRIS is able to expand into the Sacramento, Bakersfield, or stand-alone Modesto markets there may be capital requirements for track rehabilitation, terminal upgrades, or even new terminals. There are multiple funding options for each.

As noted in the subsidy discussion there may be scope for tradeoffs between capital investment and operating cost. These would require ongoing negotiations with railroads and funding agencies.

VII. Overall Implementation Plan

Approach

As the study team considered the options available for CIRIS implementation, the inherent uncertainties in a new service, and the time required for institutional adjustments, the desirability for a multi-step implementation plan became clear.

- The need for a sponsoring organization is clear, but there are options to be explored before making a definitive choice. It makes sense, then, to start the demonstration service and the transloading effort before attempting to create a permanent organization.

- The Class I railroads (BNSF, UP) own the terminals and lines at issue and are therefore the gatekeepers for both pilot and long-term operating options. It would not be possible to operate CIRIS without their willing cooperation. Operation by a Class I railroad over its own tracks is the simplest option, but is not the only option and may not be the most economical.

- In the long term there may be opportunities to expand market coverage and a need to acquire rail and terminal equipment or expand terminal capacities. The timing and requirement for these long-term commitments will depend on how well CIRIS does and how it has been organized.

There is also a geographic component to the implementation plan. As Exhibit 70 below suggests, the affected counties can be divided into:

- An initial CIRIS "core" of Alameda, San Joaquin, and Stanislaus County for service between the Port of Oakland and the Stockton-Modesto market;

- Fresno County, which could be part of the initial service or added later;

- Sacramento and Kern Counties, which need terminals before service can be offered; and

- Merced, Madera, and Tulare Counties, whose participation is optional in the sense that they would befit from CIRIS but would not have terminals.

Exhibit 70 thus could be interpreted as a multi-stage CIRIS membership map.

Exhibit 70: CIRIS Territories

To accommodate these needs the study team has laid out an implementation plan summarized below and discussed in greater detail in the chapters that follow.

Pilot/Demonstration Project

The purpose of a start-up or pilot CIRIS service would be to:

- Verify the ability of the railroads, terminal operators, and trucking companies to maintain competitive service and reliability standards;
- Determine actual operating costs and explore system efficiencies;
- Verify market acceptance and long-term volume potential; and
- Enable customers, ocean carriers, drayage firms, and other participants to adjust to new operating methods.

Although the effort may be regarded as a demonstration project for funding purposes, it should be planned as the initial stage of a system that will eventually attain long-term operation and

significant volume. The development of a start-up implementation plan should consider scope, organization, and funding. The need for a separate CIRIS organization during the start-up phase will depend on funding and administrative requirements.

Transloading at the Port of Stockton

The Port of Stockton has developed a strong market niche in rail-truck transloading for bulk and similar commodities. Transloading from truck to container is a logical extension of the Port's existing market and offers specific attractions as part of an overall CIRIS strategy.

- Transloading five truckloads to four containers creates economic "leverage" and increases the favorable impacts on congestion and emissions.
- The lack of existing or planned "overweight" highway routes to the BNSF or UP intermodal terminals prevent those facilities from handling the best commodity candidates for transloading.

If successful, the intermodal movement of transloaded containers to and from the Port of Stockton could either be integrated into a regional system or continue as a parallel service to CIRIS trains.

CIRIS Organization and Management

Assuming a pilot or demonstration project yields favorable results, the next step would be to establish a permanent sponsoring organization in anticipation of long-term operation. The requirements of a sponsoring organization will vary somewhat depending on how the service is organized and what relationship is established with the railroads.

The study team analyzed the two most promising organizational options: formation of a Joint Powers Authority, or use of the San Joaquin Regional Rail Commission as a sponsor.

Long-term Market Extension

CIRIS service is expected to be offered initially in the Stockton/Modesto and Fresno markets. Once established there, long-term implementation options would include expansion to other markets.

Bakersfield. As explained elsewhere the Shafter initiative currently contemplates service by separate non-CIRIS trains, but does not yet have a terminal. If a terminal is eventually established in the Bakersfield market, regardless of the actual site, it could be integrated into CIRIS.

Modesto. The Modesto and Empire Traction (M&ET) Valley Lift facility in Empire was served by BNSF until BNSF opened their Stockton facility, and the Empire terminal has been put to other uses. The initial CIRIS implementation envisions serving the Modesto market from

Stockton or Lathrop but the long-term CIRIS implementation could include direct Modesto service.

Sacramento. The November 2003 Feasibility Study excluded the Sacramento market from consideration on the grounds that it lacked an intermodal terminal for direct service and was too far for competitive drayage from Stockton. The Sacramento market could generate substantial volume however, particularly in export fruit and nuts. Development of a modest intermodal facility and a creative approach to rail service could bring Sacramento into CIRIS.

Additional Central Valley Terminals. The viability of additional future terminals in the Central Valley will depend on access by the operating railroad or contractor, sufficient volume to justify a terminal and service, and the availability of a terminal or funding to build one.

Long-term Rail and Terminal Equipment Acquisition

As the discussion of economics established, acquisition of rail cars or locomotives would be one means of supporting CIRIS with public capital investment instead of an operating subsidy. Options include purchasing or leasing rail equipment for use in exclusive CIRIS shuttle trains or for pooling in combined trains.

Investment in terminal capacity, either terminal infrastructure or lift equipment, is another opportunity for non-operating public sector funding. The Oakland International Gateway has adequate capacity for near-term CIRIS business, but the Port plans to augment the OIG in the near future. The UP Oakland facility has less reserve capacity. The BNSF Stockton terminal is becoming crowded and BNSF is attempting to use it for domestic traffic only. The UP Lathrop facility is also nearing capacity. The BNSF Fresno terminal is relatively small and may or may not be able to handle long-term CIRIS growth. UP has no rail intermodal terminal in Fresno, so Fresno service via UP would require building one. There is no permanent terminal in the Bakersfield market yet. The existing Shafter terminal on the UP line is a small facility used for limited transloading, and although a track connection is being built to the BNSF line there is no concrete plan or funding yet for an intermodal terminal there.

VIII. Pilot/Demonstration Service

Purpose

As noted in the 2003 Feasibility Study, there are several reasons to implement a pilot or demonstration CIRIS operation before attempting full-scale start-up.

- Research and analysis to date confirm the existence of potential container volume and customer interest, but there are still elements of uncertainty in any business venture.
- CIRIS container volume will build over time. Volumes will be small at the outset and the greater capacity required for long-term operation would be underutilized and unproductive.
- Since CIRIS has been planned to connect existing terminal facilities, a small-volume pilot or demonstration phase could likely be accommodated without changes to terminal operation or additions to capacity.
- There are existing funding sources that have been used to support rail intermodal pilot or demonstration projects. While the source of long-term CIRIS operating subsidy remains problematical, the opportunity exists to demonstrate the feasibility and effectiveness of CIRIS while building support for long-term funding.

The purpose of a pilot program would be to:

- Verify the ability of the railroad and its terminal operators to maintain competitive service and reliability standards.
- Determine actual operating costs and explore system efficiencies.
- Test market acceptance without long-term funding.
- Enable drayage firms, customers, ocean carriers, and other participants to adjust to new operating methods.
- Establish a performance record and seek long-term volume commitments.
- Measure potential impact and evaluate the case for long-term subsidies.

A multi-year demonstration project would be ideal, but would entail substantial financial resources. A shorter period would probably be sufficient to establish a performance record and evaluate results. The seasonality of agricultural exports and holiday-driven imports, however, will affect short-term traffic levels depending on where the pilot starts and ends within the twelve-month shipping cycle. The key difference between a pilot program and a long-term operation are in the funding of capital items, notably rail equipment.

Class I Pilot Service Options

Both UP and BNSF could implement a pilot CIRIS operation between Oakland and Stockton. BNSF could also serve Fresno. (UP has a "paper ramp" at Fresno that would require drayage to Lathrop). The essential steps in implementing a pilot project are as follows.

- Identify a sponsoring agency. The sponsoring agency would develop the detailed proposal, seek and obtain funding, and either manage the pilot project or contract for management.

- Obtain funding. Funding will be required to manage and market the pilot project and to cover the expected operating deficit.

- Arrange for pilot project administration, management, and marketing. CIRIS will need someone to perform the business solicitation, booking management, invoicing, and tracking functions of an Intermodal Marketing Company (IMC).

- Reach rate and service agreements with the railroad. Most intermodal customers, including IMCs and ocean carriers, sign contracts with the railroads specifying service standards, rates, and terms. An agreement between a sponsoring agency and one of the two railroads would likely consist of a railroad commitment to make CIRIS service available to existing and new intermodal customers at specific rates in return for a sponsor commitment to the negotiated subsidy.

In both near term and the long term, the key factors in obtaining cooperation from the Class I railroads are cost and capacity, and the tradeoffs between them. As the costing discussion explains, the railroads are reluctant to use scarce capacity for low-revenue, short-haul intermodal moves if those moves displace higher-yielding long-haul business. To be as attractive to the railroads, a CIRIS pilot service must either offer a comparable profit margin, arrange to augment capacity, or achieve some balance between profit and capacity.

Intermodal contracts typically include volume considerations. In a pilot project, it would be more appropriate to give the railroad a commitment to the negotiated subsidy in return for a railroad commitment to offer the service for the duration of the demonstration project. A one-time demonstration grant rather than a per-container subsidy would facilitate a pilot project without the need for a large administrative effort.

Near term pilot-phase capacity increases are unlikely. A pilot program with BNSF or UP, therefore, should mesh the CIRIS business as closely as possible with existing operations. Both railroads operate at least some of their intermodal services to Stockton terminals by picking up and setting out cars from long-distance trains.

- Some eastbound intermodal trains from Oakland or Richmond pickup eastbound intermodal cars at Stockton. If CIRIS cars were moved east from Oakland on the same train they would not require additional stops. Moreover, if the existing eastbound trains have sufficient motive power leaving Oakland to pick up cars at Stockton they presumably have sufficient power to move a similar number of CIRIS cars east from Oakland.

- Some westbound intermodal trains heading for Richmond or Oakland stop at Stockton to set out cars from eastern intermodal terminals. These trains could move CIRIS cars from Stockton to Richmond or Oakland.

- Adding CIRIS cars to these trains would have the least possible impact on line capacity. Service to and from Fresno could be handled similarly.

As long as the schedules and transit times met customer requirements there is no need for CIRIS movements to ride the same trains in each direction or even the same trains every day.

Shortline/Contractor Pilot Services Options

BNSF and UP control the only line-haul rail routes, so if they will not operate a pilot service themselves they may allow either a shortline railroad (e.g. CCT) or a contractor (e.g. Herzog under SJRRC) to operate between one or more Central Valley intermodal terminals and the Port of Oakland. Developing a pilot service without the direct participation of the Class I carriers would be difficult, but may be possible.

Possible pilot project configurations include:

- Establishing an intermodal terminal at the Port of Stockton, served by CCT, and operated in conjunction with the transloading program described in Section IX. CIRIS intermodal movements would be combined with Class I carload traffic between Stockton and Oakland.

- Trackage rights for CCT to operate between an intermodal facility at the Port of Stockton (or one of the Class I Stockton terminals) and either the UP terminal or the Port/BNSF OIG at Oakland. This could be difficult to arrange for institutional reasons, including possible labor rule conflicts between CCT and Class I agreements.

- Operation by a contactor over Altamont Pass using SJRRC's trackage rights over UP. UP would ordinarily not want a contractor carrying freight in competition, but if the business were not attractive to UP there may be more flexibility. SJRRC and the contractor would need to arrange access to UP intermodal terminals on both ends of the movement, and trackage rights between Niles Junction and Oakland.

- Operation by a contractor over BNSF's route, which would entail similar considerations of access and capacity.

The key to such arrangements would be creating incentives for all the parties involved.

Pilot Program Organization

A pilot program will require a sponsor, if only to act as a conduit for funding. Chapter X discuses long-term CIRIS organizational issues. If it appears that pilot funding can be secured

relatively quickly, it may be expedient to use an existing organization as a sponsor. In Southern California, the Port of Los Angeles and Long Beach are the designated recipients of funding for the rail shuttle demonstration project described in Chapter VI.

- Formation of a JPA or other CIRIS-specific organization would be a logical first step if consistent with the best funding opportunities.

- SJCOG has been the sponsor of the research and planning work to date, with funding from Caltrans and the Ports. SJCOG is not set up as an operating agency, but might serve as a funding conduit.

- The Port of Oakland has already secured a small amount of funding towards a CIRIS startup. If that funding and level of participation can be used as leverage for additional support, it may make sense to pursue a CIRIS pilot with the Port of Oakland as the sponsor. If, on the other hand, funding sources view the initial level of Port funding as a near-term limit, it would be more effective to use another organization as a sponsor.

- The Port of Stockton would be involved in the transloading efforts described in the next chapter, and in any search for public support for that start-up. If the transloading were to become the initial CIRIS focus, the Port might also serve as a funding conduit.

- SJRRC or another regional organization might also serve as a pilot sponsor, again if consistent with funding opportunities.

IX. Port of Stockton Container Transloading

Transloading Advantages and Potential

Rail access and facility infrastructure on Rough and Ready Island at the Port of Stockton (Exhibit 71) create a unique opportunity for transloading import and export containerized cargo.

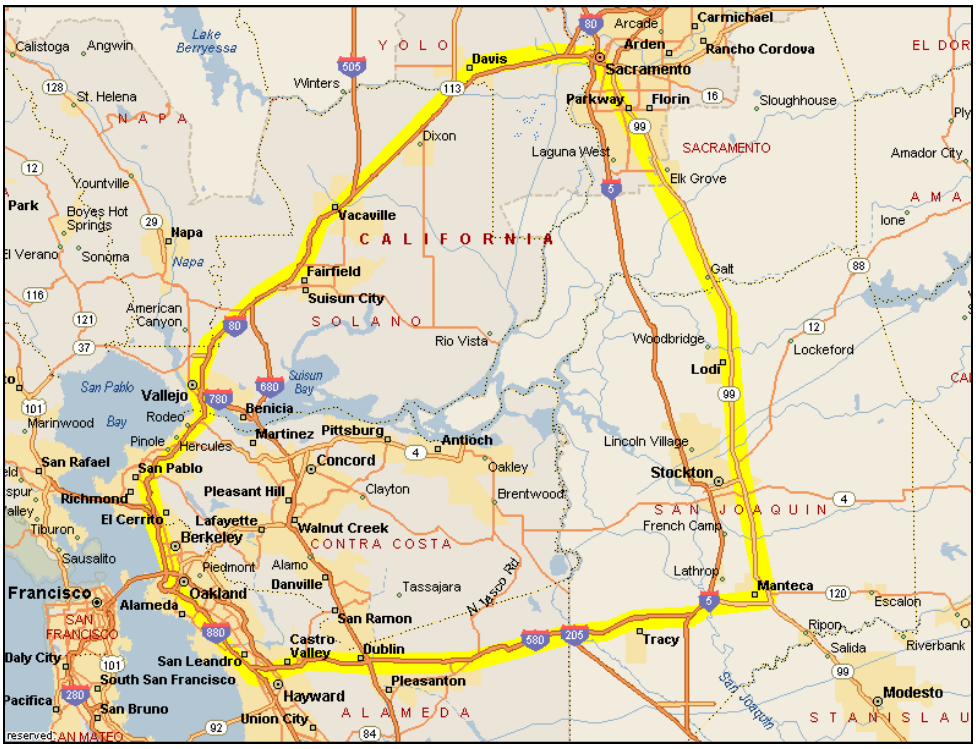
Exhibit 71: Port of Stockton, Rough & Ready Island

The *Port Services Location Study*, completed for the Port of Oakland by a Tioga Group team in 2001, defined a "hinterland loop" for the Port of Oakland (Exhibit 72) and noted:

- "Almost all of the 'market-based' trucking firms that serve the Port are located in these cities.
- Average asking rents are significantly lower in the hinterland, ranging from 64% of the Oakland average in Benicia to 49% in Stockton and Fairfield.
- Hinterland loop locations would likely be candidates for any non-core services that are land-sensitive rather than distance sensitive, including facilities served by rail shuttles."

The hinterland loop includes most of the Stockton/Modesto market defined in subsequent report sections. Asking prices for industrial space in the Stockton/Modesto area are 49% to 54% of typical Oakland figures, making the San Joaquin Valley an attractive alternative for businesses that require inexpensive space and that can be efficiently connected to the Port of Oakland.

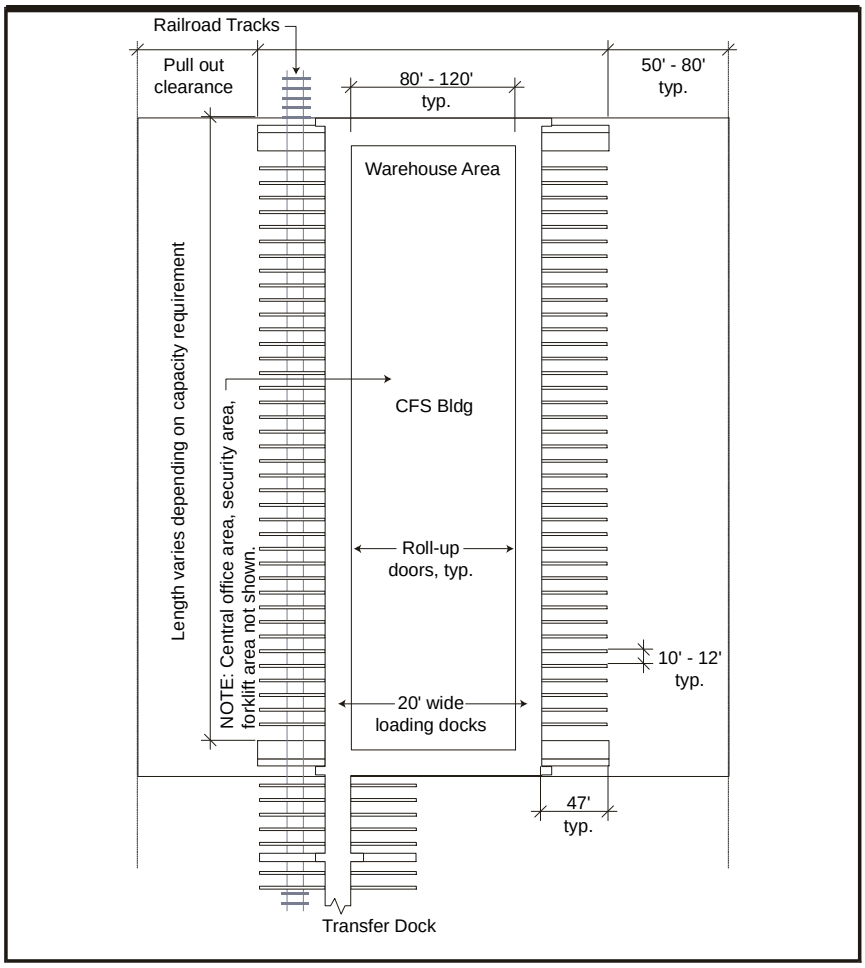
Exhibit 72: Port of Oakland "Hinterland Loop"



Transloaders in Northern California usually specialize in exports transferring freight from domestic trailers to marine containers. Some also transfer imports from marine containers to domestic equipment, a pattern more prevalent in Southern California.

A representative transloading facility configuration is shown in Exhibit 73. The floor space typically ranges from 40,000 to 200,000 square feet. Similar facilities already exist on Rough and Ready Island.

Exhibit 73: Typical Consolidator or Transloading Facility



There are several other varieties of cargo-handling services, and few of the operators have single-purpose facilities.

Container Freight Stations

A Container Freight Station (CFS) typically stores cargo for a short period as its purpose is to transfer individual shipments between marine containers and domestic trucks. In the past, Container Freight Stations were often located within the marine container terminal and operated by Longshore labor. In the 1980s CFS facilities relocated nearer the port while those within marine terminals were gradually phased out.

Bonded Customs Warehouses

Imported goods must be "cleared" by Customs before the consignee can take possession. To be "cleared", the consignee or his agent (a Customs Broker) must complete electronic or paper forms, pay any applicable duties, and make the cargo available for inspection if required. Import shipments can be "bonded" and move "in bond" if a Customs Broker has posted a bond

sufficient to cover any applicable duties. Once "bonded" a shipment can be moved inland or to a Customs Bonded Warehouse to await final clearance.

Foreign Trade Zones

A Foreign Trade Zone (FTZ), also known as a Free Trade Zone, is a federally sanctioned site where foreign and domestic goods are considered to be outside of the U.S. Customs territory. Merchandise can be brought into an FTZ to be stored, exhibited, repackaged, assembled or used for manufacturing free of customs duty, quota and other import restrictions until the decision is made to enter the goods into the U.S. market. Foreign Trade Zones are used for a variety of purposes and commodities within complex global supply chains. For example:

- Cash Flow. Customs duties are paid only when imported merchandise is shipped into the U.S. Customs territory. Merchandise may be held in inventory in the FTZ without Customs duty payment. Merchandise Processing Fees are owed only when and if merchandise is transferred into the U.S. Customs territory.

- Exports. No customs duties are paid on merchandise exported from a FTZ.

- Spare Parts. To service many products, spare parts must be on hand in the United States for prompt shipment. Spare parts may be held in the FTZ without Customs duty payment.

- Quota Management. Merchandise may be held in a FTZ even if it is subject to U.S. quota restriction. When the quota opens, the merchandise may be immediately shipped into U.S. Customs territory.

- Quality Control. The FTZ may be used for quality control inspections to insure that only merchandise that meets specifications is imported and duty paid. All other materials may be repaired, returned to the foreign vendor, or destroyed under Customs' supervision.

- Inventory Control. The FTZ is subject to U.S. Customs Service supervision and security requirements. Operations in a FTZ require careful accounting of receipt, processing and shipment of merchandise. Firms have found that the increased accountability cuts down on inaccurate inventory, receiving and shipping concerns, and waste and scrap. Merchandise consumed in processing in a FTZ generally is not subject to U.S. Customs duties.

- Exhibition. Merchandise may be held for exhibition without Customs duty payment.

- Reduced Insurance Costs. The insurable value of merchandise held in a FTZ need not include the Customs duty payable on the merchandise. Some users of FTZs have negotiated a reduction in cargo insurance rates because imported merchandise is shipped directly to a FTZ without the opportunity for potential pilferage at deepwater ports or major international airports.

The advantages of a Foreign Trade Zone are, of course, highly specific to the import flows and company circumstances involved. Most of all, an FTZ offers flexibility and potential savings to creative shippers and receivers who can take advantage of these opportunities. The existence of an FTZ at the Port of Stockton linked with in-bond container movement via CIRIS effectively creates a true "inland port" for such customers.

Container Depots

Although empty ISO and domestic containers are parked at a number of locations in the Stockton area ranging from trucking facilities to dirt lots, there are no established container depots in the San Joaquin Valley. Container depots have three major functions: storing containers that are currently surplus, acting as a supply point for empty containers, and servicing/repairing containers under contract. There are some potential advantages to locating a container depot on Rough and Ready Island.

- Container depots need inexpensive space away from sensitive residential and commercial development, where Rough and Ready Island has an advantage.
- The availability of a container depot could be major step in encouraging reuse of empty containers, as discussed below.
- Were the container depot to become a source of "pre-tripped" refrigerated containers as well as dry vans, truckers could drastically reduce the need to dray pre-tripped refrigerated containers from Oakland.
- A container depot would add to the ancillary services in support of eventual container business at the Port of Stockton itself.

Refrigerated container depots service, maintain, and store refrigerated ("reefer") containers. At present, about 18% of Oakland's tonnage is in refrigerated containers, primarily fruit, vegetables, meat, and poultry.

Reefer containers are heavily insulated ocean-going boxes with refrigeration equipment. The power supply for refrigeration is either a detachable diesel-powered generator ("genset") that can travel with the container or electrical power from a fixed outlet in a container yard. Reefer containers are used for produce, meat, dairy products, frozen foods, and other import or export commodities requiring refrigeration or temperature control. These commodities are sensitive, so the containers must be clean, in good operating condition, and often chilled before loading. Collectively, the activities required before loading are called "pre-tripping." After the container is loaded, the container may be returned to the depot to adjust the operation, make repairs, add controlled-atmosphere gasses (often nitrogen), or maintain the generator set that supplies mobile electrical power.

In the past, all these functions were typically performed in the marine terminal. Off-terminal reefer container depots emerged to perform these functions more efficiently, conserve terminal space, and give truckers more flexible access to reefer services.

Reefer depots also typically store containers for longer periods (e.g. more than a week and up to several months) between peak season demands, or while awaiting repair or disposition. Longer-term storage does not have the same need for port proximity, and more closely resembles the storage of dry containers without routine servicing or frequent truck trips. The bulk of the longer-term storage functions could be relocated inland.

Transloading Volumes

Most commonly, a transloading operator starts out in one line of business and expands to others as opportunities arise. Some of the larger operators offer all of the above services, plus warehousing, packing and crating, Customs brokerage, domestic services, etc. Informal contacts with shippers, transloaders, and truckers of transloaded commodities suggest that concrete opportunities exist for development of such traffic in the San Joaquin Valley. There are numerous details involved, such as the availability of Customs inspectors for imports and USDA inspectors for food products. Rough and Ready Island at the Port of Stockton has many of the features such businesses will look for: existing low-cost facilities, rail carload access, a Free Trade Zone, and Customs representatives.

The Port of Oakland estimates that about 16% of its total volume is transloaded, consolidated, or otherwise undergoes intermediate handling. Based on the adjusted PIERS market data analyzed in detail later in this report, there would be roughly 21,121 annual transloaded containers in the relevant Stockton/Modesto and Fresno markets (Exhibit 74).

Exhibit 74: Estimated Transload Share of Rail Shuttle Market – Annual Loads

Market	Imports	Exports	Total	Transload Potential
Stockton	12,793	56,790	69,582	11,133
Fresno	5,210	57,216	62,426	9,988
Total	**18,002**	**114,006**	**132,008**	**21,121**

The Port of Stockton has several existing tenants engaged in transloading on Port property (e.g. *Best Logistics* and *Keep On Trucking*). Lower transloading costs in the Stockton area could provide economic leverage to rail service that might otherwise be too costly compared to trucking.

As discussed elsewhere, "drayage" firms and drivers that provides local and regional trucking service for containers are typically paid by the trip. As the productivity of Oakland trips has declined, drayage firms have had a harder time recruiting and retaining drivers for such business. Relocation of transloaders and consolidators to the San Joaquin Valley with a rail link to Oakland would free up driver and tractor time and increase driver productivity. This would be a hard-to-measure but nonetheless tangible reason for drayage firms to support inland port developments in San Joaquin County and a rail service to Oakland.

Heavy Commodities and "Overweights"

A major reason for transloading or consolidation is the opportunity to load an international container with more net weight than can be legally handled over the highway.

Since ocean rates are typically based on the containerload rather than the cargo weight, customers have an incentive to maximize the amount of heavy cargo they can pack into each container.

As Exhibit 75 shows, the Port of Oakland's traffic is dominated by heavy commodities such as beverages, wood pulp, and agricultural products. The heavy commodities are overwhelmingly exports, and interviews confirm that about 70% of the transloading business is export commodities. The list reflects major Northern California agricultural production as well as frozen meat and poultry produced inland. There are firms that specialize in "legalizing" individual import loads (e.g. Italian marble tile, or steel manhole covers) which have been loaded too heavily for U.S. highway limits. These loads are typically "legalized" by splitting them into to two or more highway trailer shipments.

Exhibit 75: Major Port of Oakland Commodities

Port of Oakland 2003 Export & Import Commodities			
Exports	**Metric Tons**	**Imports**	**Metric Tons**
Woodpulp, Etc.	1,413,040	Beverages	377,635
Iron and Steel	684,788	Machinery	328,207
Edible Fruit and Nuts	457,220	Mineral Fuel, Oil, Etc.	298,894
Beverages	414,265	Wood	296,727
Meat	335,111	Furniture and Bedding	291,469
Misc Grain, Seed, Fruit	266,268	Vehicles, Not Railway	264,333
Cotton & Yarn, Fabric	220,879	Iron/Steel Products	238,136
Mineral Fuel, Oil, Etc.	205,257	Plastic	204,225
Cereals	195,566	Preserved Food	178,611
Preserved Food	148,219	Electrical Machinery	176,875
Food Waste; Animal Feed	132,285	Stone, Plaster, Cement, Etc.	161,491
Vegetables	128,889	Toys and Sports Equipmt	124,078
Plastic	118,955	Ceramic Products	123,795
Hides and Skins	112,789	Glass and Glassware	109,039
Sugars	79,067	Paper, Paperboard	160,927
Other Commodities	869,142	Other Commodities	1,292,894
Total	**5,781,740**	**Total**	**4,573,336**

As Exhibit 76 shows, the State highway gross weight limit of 80,000 lbs. limits the load capacity of a typical 40' ISO container to 47,300 lbs. The rail option would allow the container to be loaded to its full maximum load of 59,000 lbs., a 25% advantage. Exhibit 76 also shows that there is no real advantage for 20' containers since the highway limit permits loading them to their full capacity.

Exhibit 76: Highway and Rail Weight Limits

Category	40' ISO Box Typical	20' ISO Box Typical
Tractor Weight	18,000	18,000
Chassis Weight	6,500	6,600
Container Weight	8,200	4,890
Total Tare	**32,700**	**29,490**
Highway Max	80,000	80,000
Highway Load Max	**47,300**	**50,510**
Container Load Limit	**59,000**	**48,020**
Rail Weight Advantage	11,700	-
% Rail Advantage	**25%**	**0%**

Exhibit 77 shows the resulting 5:4 ratio for highway versus rail shipment and the implied consolidation opportunity.

Exhibit 77: Consolidation Ratio

40' ISO Container	By Highway	By Rail
Load Limit	47,300	59,000
Containers to Ship 236,000 lbs	5	4
Shipment capacity	236,500	236,000

A concrete, real-world example of the potential economic leverage of overweight commodities and consolidation can be found in wine exports. Information from one shipper indicates that existing containers can be loaded to an average of about 45,000 lbs. to be consistently within highway weight limit due to variations in tractor and chassis weight. If the customer could load the same container to 55,000 lbs. in a CIRIS service there would be substantial savings in both drayage and ocean carriage.

The shipper currently exports about 560 annual loads from a single Central Valley location. Round trip Oakland drayage is about $625 per container for an annual cost of $350,000. At 55,000 lbs. each the shipper would move only 457 containers for the same export volume. If the shipper paid a CIRIS rate equal to the drayage cost ($625), the company would save $64,205 annually, some of which would have to cover the cost of consolidation near one of the intermodal terminals.

There would also be savings on the ocean freight. Each container load costs roughly $4,000 to ship to its European destination. The 560 containers shipped at present cost about $4,000. Shipping 457 loads at 55,000 lbs. each instead would save the company $410,909 annually.

Overweight Routes

Regulatory agencies can designate highway and surface street routes with higher weight capacities, so-called "overweight" routes. In the vicinity of the Port of Oakland, a network of such routes connects transloading and consolidation facilities to the marine terminals allowing legal movement of "overweight" containers.

Rough and Ready Island is entirely Port of Stockton property and the highway load limits do not apply. It would thus be possible for a shipper to bring in legal highway truckloads to a Rough and Ready facility, transload the cargo to a small number of ISO boxes, and position the "overweight" containers for rail loading on Rough and Ready Island. The study team found no legal overweight routes to and from the BNSF and UP intermodal facilities in Stockton and Lathrop.

Options for the future include developing such routes or developing suitable transloading facilities adjacent to the intermodal terminals. As the role of international trade in the Central Valley grows, it will become increasingly advantageous to handle overweight containers in a safe and controlled manner within the region. Creating overweight corridors linking other areas to Rough and Ready Island would extend this capability to more of the region.

Transloading Benefits

As an initial step in implementing CIRIS transloading at Port of Stockton offers the following benefits.

- **Reduction in truck traffic between San Joaquin Valley and Oakland.** Typically, five trucks must make round trips to Oakland-area transloading facilities to fill four export marine containers. Four round trip truck movements would be replaced by three containers via rail.

- **Land use.** Transloading facilities are facing pressure from higher valued land development and the potential sites for these necessary ancillary port facilities are shrinking. Relocation to Rough and Ready Island would conform to the Port of Stockton's long-term development plans while freeing up land around the Port of Oakland.

- **Job creation.** Transloading facilities create job opportunities in skilled and unskilled labor, including clerical and equipment operator jobs.

- **Safety.** Transloading at Stockton would provide a means to handle overweight export and import marine containers without violating highway weight limits.

Empty Container Supply

Rail costing for this study was conducted assuming that each export load required an empty container from Oakland and each import load generated an empty to be returned to Oakland. The rail costs used in the comparisons are therefore all round-trip. If the need for empty movements can be reduced or rationalized, the rail cost can be reduced.

There are at least three possibilities for rationalizing empty container flows.

- **Using low-priority manifest rail service to position empties at Stockton-area depots.** Ocean carriers may be able to use their negotiating position with the railroads to obtain favorable rates for moving empties to Stockton supply points.

- **Reusing import empties for export loads.** As the import traffic to Stockton/Lathrop distribution centers grows, an increasing number of international empties are generated in the Stockton area. At present, some truckers hold on to a handful of containers for potential reuse, but the effort is piecemeal and impact is small. If these empties could be turned in to a Stockton depot and accumulated in significant numbers, truckers would reduce the need for empty returns to Oakland and gain a local source of supply.

- **Reusing westbound "backhaul" boxes.** Since the advent of double-stack rail service in the late 1980s, ocean carriers have offered empty containers to eastern and Midwestern shippers for "backhaul" westbound movements of domestic freight. The ocean carriers do so to reduce the cost of repositioning these boxes to west coast ports for eventual return to Asia. There is no data on the number of such containers that unload domestic freight and become empty in the Stockton area, but anecdotal evidence suggest the number could be substantial. To the extent that these containers could be organized at depots and tapped for export loads the need to dray empties from Oakland would be reduced.

Each of these possibilities is an opportunity to reduce the total costs of moving containers by rail between Stockton and Oakland, and an opportunity to improve Stockton-area container supply.

The latter consideration is particularly important for many potential Rough and Ready tenants. Empty container supply is a key factor in encouraging "urban ore" export businesses such as waste paper, recycled plastic, and scrap metal. In the course of interviews with Northern California businesses of these kinds, it became apparent to the Tioga team that the ready availability of suitable ISO boxes is a major consideration in locating these businesses and in turning a local supply of waste products into containerized exports. Moreover, several of these firms expressed an interest in Central Valley locations as alternatives to high-cost Bay Area sites or as business expansion opportunities. To the extent that depots or other arrangements on Rough and Ready Island can insure a supply of empty containers, such businesses would be more inclined to locate there.

Implementation Steps

The key steps in implementing transloading operations at Rough and Ready Island include the following.

- Agreement between CCT and either BNSF or UP to handle loaded container cars between a Rough and Ready loading track and an Oakland intermodal terminal at a commercially competitive rate.

- Location of a CCT-served loading/unloading track and sufficient improvement for start-up operations (e.g. graded gravel, fencing, and lighting as required).

- Identification of a loading track operator. Candidates could include Stevedoring Services of America (SSA), transloaders, experienced intermodal terminal contractors, such as Parsec and Pacific Rail Services, and CCT itself.

- Acquisition or lease of lift equipment. SSA has access to usable equipment as do the other potential operators.
- Identification of participating transloaders, either with existing Port of Stockton operations or with interest in establishing Stockton operations.
- Development of necessary contractual agreements and other institutional arrangements.
- Identification of demonstration funding sources to close any gap between revenue and cost.
- Solicitation of customers.

If detailed investigation and rail negotiations indicate that a Rough and Ready transloading operation could succeed without subsidy it could be started without waiting for broader CIRIS funding. If successful, a Rough and Ready transloading effort could later be folded into CIRIS or, if advantageous, continue as a parallel program serving the same goals.

Rough and Ready Terminal Requirements

Intermodal terminals can and have been developed with minimal investment. Some of the key considerations are as follows:

- **Volume:** This discussion applies to locations handling 12,000 lifts or less per year. A lift is a transfer of a loaded or empty container to/from a railcar. Other transfers to/from ground or chassis do not count for this purpose.
- **Track Space:** Track space should be provided at the rate of 100 ft of track for 1500 annual lifts of planned capacity. If switch engines are readily available, higher utilization is possible but it will not be very efficient use of an engine and crew. It is convenient to have more track than the minimum; it saves switching cost and provides some room to grow.
- **Lift Machine:** This kind of terminal is typically served by one used, rehabilitated lift machine, which are ordinarily available for about $250,000. It is important that the machine be reliable and regularly maintained; if it fails then the terminal is out of business.
- **Ground:** Ground conditions in front of the loading track are critical. The most common failure of this kind of facility has been that the ground was not strong enough to hold the lift machine. If there is any question at all about the ground conditions, a soils engineer should be consulted. (The ground bearing pressure of a lift machine is the same as a 747 hitting a runway.) The ground should be relatively flat for about 100' (60' minimum) away from the centerline of the track and at approximately the same level as the ties. Ordinarily, if the lane parallel to the track is already a roadway capable of handling semis then the ground will be strong enough to hold up the lift machine.

- **Surface:** Gravel is an acceptable surface for a lift machine, and large-scale intermodal terminals have operated on gravel for decades. If soil conditions are marginal a road grader may also be required to regularly smooth the surface where the lift machines are working. Gravel will produce a lot of dust, which can get to be an environmental problem. In the past it was legal to put down clean oil as a dust treatment, but this is no longer the case in most places. As a gravel surface is renewed it is best to use a very hard rock which sometimes cuts tires but produces less dust.

- **Parking Spaces:** Customers bring their containers to the terminal for outbound shipment as convenient for them, so the terminal needs to be able to hold them until such time as they are loaded on the rail cars. Obviously, the lower the train frequency, the greater is the parking requirement. Sometimes, the customers can be disciplined to accept gate hours during normal business hours. As terminals grow, however, hours are typically expanded. Parking will also be required for empty chassis. Ordinarily customers are allowed to leave their containers at the terminal for a few days before they are required to come and pick them up, and sometimes terminals receive and unload trains on weekend days when customers are not open to receive cargo. Sometimes regardless of what the terminal does, customers are slow in picking up their containers. Parking typically needs to be provided at the rate of about one slot per 100 annual lifts. This translates to about an acre of parking for every 5000 annual lifts. There may be some exceptional cases in which there is an unusually high degree of operational collaboration between the operator and the users of the facility. In this case the storage requirement can be moved from the terminal to the yards of the customers.

- **Fence:** Fencing is required if there is any threat of cargo theft. Loaded containers will typically be on this property overnight.

- **Lights:** If there is any work activity after dark, these need to meet OSHA standards for parking lots. Lift machines have their own lights. Lights should be in the middle of the terminal and pointed out and down rather than on the perimeter. Perimeter lights often interfere with proper visibility for the lift machine operator. Lights for security may be an additional requirement.

- **Yard Tractor:** If this small facility is going to handle boxes on chassis or trailers then there will be use for a yard tractor. One is sufficient for the volume in view here, but if two machines are provided, one can be a backup.

- **Maintenance Facilities:** It is impossible to properly maintain a lift machine and yard tractor if they cannot be washed. Minimum facilities must be provided to handle waste oil. A minimum cost facility can be made from a concrete pad. Used containers can be used for storage as well as provide a platform to perform repairs on the lift machine.

- **Office Facilities:** Mobile office trailers are typically used for this purpose as well as to provide a locker room for the workers at the facility. The office is necessary to house the computers required at these facilities. Utilities, specifically water

and electricity, should be available at the terminal. (Water for chemical spills, fire, drinking, and sewer; electricity for lights and computers.)

- **Fuel Facilities:** These are not necessary if the terminal operator makes an arrangement to have fuel delivered and pumped regularly.

- **Labor:** It takes two people to safely load and unload an intermodal train, a ground person and a lift machine operator. An ordinarily skillful lift machine operator can perform lifts at the sustained rate of three minutes per lift. This means that lifting is not a full time job in a small terminal. An intelligent terminal operator will make certain the terminal's labor is efficiently used. This is done in a number of ways. If the gate is open, then at least one person has to be at the terminal to check trailers in and out. Terminals will often use part time laborers. When they are not busy lifting the labor force may be employed maintaining power and trailing equipment. When they are not busy lifting the labor force may be employed as truck drivers moving containers to and from customer's docks.

A common strategy used to keep the capital and operating costs of the terminal manageable is to co-locate the terminal with a container yard operator or a motor carrier. Both of these strategies were used by Norfolk Southern in the Midwest. From very humble beginnings Norfolk Southern has developed a very sizable business in Cleveland, Detroit, and Columbus using co-location strategies. Co-locating permits the same parking area to be used for both the intermodal terminal and the container yard, for example. The gate for the container yard is the same gate as is used by the terminal. The same is true of the maintenance facilities, the labor, the utilities etc. When the collaborator is a trucking company, delivery services, distribution center, and warehousing is added to the mix. As the size of the operation grows there is gain from labor specialization; the best clerks do not make the best lift machine operators. Finally, co-locating permits a smaller operation to be viable as a sub-set of a larger operation. The downside of this strategy is that it requires the terminal operator to pick a business partner, which may be difficult if there is no one major customer at hand.

X. CIRIS Organization and Management

Organizational Requirements and Roles

If CIRIS is to provide ongoing services with any sort of funding it will require a permanent organizational structure. Exhibit 78 below, taken from the 2003 Feasibility Study, lists the major roles that must be performed in a door-to-door CIRIS operation.

Exhibit 78: Rail Shuttle System Roles and Potential Participants

Role	Description	Potential Participants
"Rail Shuttle Sponsor"	Public, private, or public-private organization that develops, oversees, and subsidizes the shuttle system.	Caltrans, joint powers authority, council of governments
"Rail Shuttle Customer"	Tenders container to railroad for line-haul movement, pays rail invoice	Shipper, consignee, ocean carrier, drayman, IMC
"Manager"	Supervises door-to-door service, handles problems, resolves disputes	Shuttle sponsor, shipper, consignee, ocean carrier, drayman, IMC, terminal operator
"Terminal Operator"	Receives containers, loads and unloads rail cars, and chassis, interchanges equipment	Container depot operator, rail terminal contractor
"Railroad"	Operates trains, receives containers in interchange	Railroad (BNSF or UP)
"Intermodal Marketing Company"	"IMC" – provides marketing, sales, and customer service	Existing IMC, railroad, drayman
"Drayman"	Provides over-the-road trucking to/from intermodal terminals, interchanges containers	Drayman, rail terminal contractor
"Ocean Carrier"	Provides ocean container transport, interchanges containers	Steamship line, NVOCC

Most of the roles will be filled by commercial firms. The customers, terminal operator, railroad, IMC, drayman, and ocean carrier functions can all be performed by existing private sector companies.

The key roles of sponsor and manager, however, do not have obvious private sector candidates.

- A sponsoring organization will require legal standing to negotiate and fulfill contractual agreements, receive and disburse public funding, and represent the interests of multiple stakeholder agencies and constituencies. It would be unlikely to have a private firm perform these functions.

- The "manager" role may be critical to the success of this complex endeavor. The decentralized "management" of intermodal services is often a serious weakness, resulting in inconsistent service and inconsistent customer support. To maximize

the container volume, control costs, and obtain the potential public benefits of CIRIS an effective centralized manager may be required.

Managing and Marketing CIRIS

The administrative requirements for CIRIS could vary significantly, depending on how CIRIS and its finances are organized.

- At a minimum someone will need to market and sell the service, book the door-to-door container movement, arrange drayage on both ends, and tender the container to the rail operator for terminal and line haul services.
- If operating subsidies are paid on a per-shipment basis someone must monitor the shipments and disburse the subsidy payments.

If subsidies are paid on some other basis, such as an annual grant or monthly payments, there will still be a need to monitor CIRIS operations for volume carried and service performance against standards.

If CIRIS is started by subsidizing UP or BNSF to provide service between their own terminals with their own equipment and crews, SJRRC or a JPA would have a minimum of operating responsibilities. As Exhibit 78 indicates, however, there would still be need to market and monitor the service, and administer the subsidy.

The trip-by-trip marketing and management arrangement will vary depending on which party has control of the movement.

Intermodal Marketing Companies

Intermodal Marketing Companies (IMCs) exist to market, arrange, and monitor intermodal rail services. IMCs evolved from traditional surface freight forwarders and shippers' agents to become multi-purpose intermediaries and now control most domestic intermodal business not handled by trucking companies. These firms will:

- Locate and solicit customers.
- Arrange equipment supply.
- Arrange drayage for both pickup and delivery.
- Arrange the rail movement.
- Invoice the customer for the cost of the door-to-door movement plus a markup or flat fee to cover expenses and produce a profit.

For movements that they generate, IMCs would ordinarily perform the necessary marketing, monitoring, and administrative functions.

Ocean Carrier Control

Depending on the type of business arrangement, an international container movement might be controlled by the ocean carriers, the customer, or the customer's agent.

Inbound (import) containers are billed as either "Local" or "Store-Door".

- For "local" containers, the carrier or stevedore simply notifies the customer (the "notify party" on the bill of lading) of the container's arrival and availability, and the customer makes all delivery arrangements. A "local" bill of lading covers only the movement from port to port.

- For "store-door" containers, the ocean carrier theoretically makes arrangements for inland delivery (via truck or rail) and pays the inland carriers. A "store-door" bill of lading covers the movement all the way to the consignee's door.

Major customers and ocean carriers both typically have a preferred "house drayman" that handles most or all of their drayage business. For local moves, the customer usually calls their own house drayman. For store-door shipments, most ocean carriers notify the customer's house drayman of the container's arrival. The drayman then makes the arrangements, with the customer choosing actual pickup and delivery times.

Rail intermodal movements are usually treated as store-door shipments, with the ocean carrier arranging and paying for inland rail movement and truck delivery. For port-rail drayage, the ocean carrier chooses the drayman (the ocean carrier's house drayman) and effectively controls the movement.

Outbound (export) containers from major shippers are picked up by the house drayman according to the customer's preferences. Intermodal export and empty containers are picked up at the rail ramp by the ocean carrier's house drayman, with the ocean carrier in control.

Major ocean carriers prefer local over store-door billing, and will shift accounts to local billing where possible. The drayage costs incurred under store-door billing are, at best, passed through to the customer. At worst (from the ocean carrier's perspective), ocean carriers pay the shipper's house drayman a higher rate than their own house drayman, and do not recover the difference from the customer. Some ocean carriers offer a "drayage allowance" to customers that make their own trucking arrangements.

All ocean carriers have service contracts in place with the railroads, and CIRIS movements under their control may be covered by these contracts. Under those circumstances the sponsoring agency would have little if any role in managing or marketing the service.

Customer Control

The third major option is a direct working relationship between the customer (export shipper or import consignee) and the CIRIS operator. A very few customers work directly with the Class I railroads, and those that do would have the means to make their own arrangements. More often,

or if the service operator is a shortline or contractor, the CIRIS sponsor would either arrange the movement using its own staff or bring in an IMC to handle the transaction.

While there are many possible ways in which these roles might be filled in the transition between demonstration project and ongoing service, the study team has focused on a CIRIS Joint Powers Authority (JPA) or operation under the San Joaquin Regional Rail Commission (SJRRC) as the leading and most logical options.

JPA Formation

Formation of a Joint Powers Authority (JPA) is one logical way to establish an organization to manage an inter-regional rail operation.

The formation of a JPA may be a key procedural step in implementing CIRIS. A JPA or equivalent organization may be required as a conduit for funding capital expenditures (locomotives, cars, lift equipment, terminal improvements) and operating subsidies, especially in the transition between demonstration project and on-going service. A legally constituted contracting entity such as a JPA, will be required where contractual agreements or other enduring relationships must be established with railroads or other private sector participants.

The formation of a JPA is likely to take anywhere from a few months to a year or more, so it may be desirable to identify an interim sponsor for the short-term demonstration phase. The choice of whether to start by forming a JPA or to start with another organization and transition to a JPA will depend on:

- **Funding.** If pilot or start-up funding can be arranged, or if the funding process must start before a JPA can be formed, the funding arrangements should be given priority. If the formation of a JPA is necessary or very advantageous for funding, the JPA formation should begin immediately.

- **Organizational alternatives.** Proceeding without a JPA requires that some other organization be willing and able to act as an effective CIRIS sponsor. The following report section discusses SJRRC as a candidate, but there is no guarantee that SJRRC would be willing to take on responsibility for CIRIS. Short-term sponsorship of a pilot program may be easier to arrange through an alternative organization than long-term responsibility.

Formation of an organization dedicated to CIRIS will also signal the serious intentions of the sponsors and the commitment to a long-term service. Given the natural skepticism of potential customers regarding pilot or demonstration projects the appearance of permanence is of great value in establishing credibility.

JPA Powers and Operation

A JPA is essentially a joint venture of public agencies. Legally, it is a separate agency with its own governance. Its charter is typically enabling rather than limiting, and a JPA usually enjoys the flexibility of its most flexible member, e.g. anything one member can do the JPA can do as

well. The jurisdiction of a JPA is usually defined by geography. The agreement of the members is necessary to expand its geographic coverage.

A JPA has a business-like budget reflecting its intended function. Its staff is often a mixture of direct JPA employees and "dual-hatted" member agency employees who also serve in JPA functions. Contractor employees may also have JPA job titles and carry JPA business cards.

The Port of Oakland has noted the following advantages of forming a JPA:

- Forming a JPA is a first step to create a focus for channeling resources to CIRIS, notably funds and attention. It would constitute a single entity to move the project forward and create a charter; a framework for getting the work done.

- A JPA can act as a bonding authority or as a special assessment district. It carries more weight in the planning process, can acquire land and is able to contract with local jurisdictions. It can raise revenue by imposing fees such as a per-container fee.

- A JPA by its multi-entity nature can more readily be backed by state funding than can a smaller, single entity. A JPA is a stand-alone entity that is capable of accepting financial liability, releasing its individual members from substantial exposure.

Contracting authority is a critical factor in the suitability of JPA organization to CIRIS. JPA's can enter into ordinary contractual arrangements. For example:

- The Capital Corridor Joint Powers Agency contracts with BARTD to run the Capital trains.

- The Peninsular Corridor Joint Powers Board contracts with Amtrak to run Caltrain service.

- SJRRC contracts with Herzog to run ACE.

The financing capability of a JPA depends on the capabilities of its members and the terms of its charter. JPAs commonly engage in bond financing supported by either revenue or member assessments, and charge fees for services. A JPA can pursue multiple sources of funding. For instance, ACTA has pursued a number of government grants including Freight Intermodal Distribution, CMAQ, and earmark funding from federal TEA-21 legislation. ACTA is also setting up public-private partnership funding. When the initial segment of the Alameda Corridor was moving forward, ACTA was able to obtain a $400 million federal loan to be repaid from operating revenues.

JPA Membership

JPAs generally function best when their members are of comparable scale and at roughly the same level of government. Joint Powers Authorities are most often formed by counties, which

are the basic multi-purpose unit of government in California. Some agencies can be ex-officio, non-voting members for specific purposes.

- Initial membership in a CIRIS JPA might thus include the Ports of Oakland and Stockton, Alameda County, San Joaquin County, Stanislaus County, and Fresno County.

- Alternatively, a JPA could have as its members the Metropolitan Planning Organizations (MPOs): the San Joaquin Council of Governments, the Stanislaus Council of Governments, the Fresno Council of Governments, and the SF Metropolitan Transportation Commission.

As other points of service are added, their jurisdictions could be offered membership on the JPA.

A key principle in forming a JPA is to avoid dual or overlapping membership. Were both the Alameda Congestion Management Agency and Alameda County itself members, for example, it would effectively double the county's influence on CIRIS. A more tractable solution would be to have an Alameda County CMA executive represent the County on the JPA or to have the CMA itself as the member.

County representatives could be the county governments, Congestion Management Agencies/Transportation Authorities, or their Air Quality Management Districts. Given that CIRIS is primarily a response to congestion, it might make sense to seek CMA/Transportation Authority representation for the counties. Caltrans could serve as an advisory member of the JPA and as a facilitator to bring in and hold together the widely-diverse members of the JPA. Caltrans would probably not be a member of the JPA, since under some circumstances that would make the JPA a *de facto* state organization.

Examples of comparable JPAs and their composition include:

- **SJRRC** – The SJRRC Board of Directors consists of six members nominated by local agencies and appointed by SJCOG. SJRRC commissioners include representatives of the Cities of Tracy, Stockton, Manteca, Ripon, and Lathrop, and San Joaquin County. Representatives of the San Joaquin Regional Transit District, SJCOG and Caltrans District 10 are ex-officio members. Representatives of Alameda County and BART are Special Voting Commissioners.

- **Caltrain** – The Peninsula Corridor Joint Powers Board was formed by the counties of San Francisco, San Mateo, and Santa Clara.

- **Capital Corridor** – The Capital Corridor Joint Powers Authority is made up of six local transit agencies: Placer County Transportation Planning Agency, Sacramento Regional Transit District, Bay Area Rapid Transit District, Santa Clara Valley Transportation Authority, Solano Transportation Authority, and the Yolo County Transportation District.

- **ACTA** – The Alameda County Transportation Authority was formed by the cities and Ports of Long Beach and Los Angeles. The seven-member governing board

includes two representatives from each port, a member of each city council, and a representative of the Los Angeles County Metropolitan Transportation Authority.

JPA Formation Process

A JPA is ordinarily created in two basic steps.

- Potential member agency representatives draft a charter.
- The charter is adopted by a resolution of each member.

Technically the JPA comes into existence when the second member agency accepts the charter. Membership expands as the other candidate agencies join.

The Port of Oakland suggested the following major steps in forming a JPA.

- *First step:* Develop a concise, focused justification for forming a JPA. Write a clear mission statement and a statement of value to members. Fill in the details so that agencies approached would have a fairly accurate idea of their rights and responsibilities as JPA members.
- *Second step:* Develop the desired membership. Approach, educate and lobby prospective members. To this end, Central Valley COGs have already expressed interest in exploring the formation of a JPA and the Port has committed to create interest on the part of appropriate Bay Area agencies.
- *Third step:* Working with experienced legal assistance and using lessons learned and best practices from other JPAs in the transportation field, draft a JPA members' covenant, outlining rights and responsibilities as well as organizational details.

The function of a JPA may begin with a temporary organization for a study, planning, or demonstration phase. For example:

- The Alameda Corridor Transportation Authority (ACTA) began as the Ports Advisory Committee (PAC), created by SCAG to study the need for intermodal facilities. The PAC was succeeded by the Alameda Corridor Task Force (ACTF) which had additional members. The ACTF recommended the formation of a JPA, which resulted in ACTA.
- For Caltrain, Caltrans contracted with Southern Pacific to operate SF Peninsula commuter trains from 1980 to 1992. The Peninsula Corridor Joint Powers Board was formed in 1987 and contracted with Amtrak to operate the trains starting in 1992.

San Joaquin Regional Rail Commission Option

The alternative to creating a new organization is to extend the scope of an existing operation. The San Joaquin Regional Rail Commission (SJRRC) oversees the Altamont Commuter Express (ACE) whose day-to-day operation is conducted under contract by Herzog. SJRRC is structured to allow for expansion and could become the CIRIS sponsor.

Using SJRRC as the initial sponsor could greatly facilitate the development of a pilot or demonstration project to get CIRIS started. SJRRC has the legal and governmental standing to apply for and receive funding, negotiate and contract for services from railroads or contractors, and administer the subsidy or grant.

Using an existing organization as a sponsor could also reduce the complexity and time requirements of organizing for long-term operation. Using an organization such as SJRRC would enable sponsors to establish CIRIS administrative functions as incremental additions to an existing staff rather than establishing a new stand-alone organization. The costing analysis allows $25 per shipment for overhead expense. Any reduction in that figure would yield dollar-for-dollar reduction in the unit operating subsidy.

As a successful commuter service operator SJRRC has credibility with both public and private sectors. The ACE service currently obtains 55-60% of its operating cost from the fare box, a lower ratio than is expected from CIRIS but a higher ratio than other commuter rail operators. SJRRC has funding sources in place to cover the operating gap and provide for capital expenditures. On the basis that it is usually quicker and easier to augment existing arrangements than to establish new areas, working with SJRRC would be an advantage in the funding sphere as well.

Involvement of SJRRC in CIRIS has several potential long-term benefits.

- Administrative cost efficiency through incremental staff additions to an existing organization.
- "Short line" rail line haul economics through use of an SJRRC operations contractor such as Herzog.
- Use of the Altamont Pass route, which may be the least congested option with the most current unused capacity, and avoids the East Bay bottleneck between Oakland and Port Chicago.
- Possible long-term public purchase of the Altamont Pass route, adding flexibility to CIRIS finances and economics.

Initial contacts with SJRRC can be described as cautiously supportive. The SJRRC board is reportedly interested in using the organizations capabilities to maximize public benefits of rail economics, and may be willing to expand from passenger operations to freight.

XI. Class I Railroad Implementation Options

Class I BNSF or UP Operations

CIRIS operations by either of the two line haul railroads would be the simplest choice, if it can be arranged. The obvious advantages are the trackage, operations, and terminal access in place. Both carriers also have motive power and access to cars supplied from the TTX fleet. There are, however, several barriers to CIRIS operation by the major railroads.

Capacity is the primary issue in railroad participation, not cost. It is clear to the project team that long-term railroad participation in CIRIS – either as an operator or as a host for operation by someone else – will be contingent on public funding for increased capacity. The situation is parallel to that of passenger rail services in California, whose expansion has been facilitated by strategic state investments in additional track capacity, signaling, and other measures to expand total rail capacity.

Studies consistently indicate that unsubsidized short-haul rail shuttles in the 75-150 mile range will not be commercially viable or attractive business propositions for the railroads. It is equally clear that developing and operating intermodal facilities is unlikely to be a profitable stand-alone venture. Both will require subsidies or other forms of financial support to succeed in a competitive environment. The means of providing those subsidies is at the crux of the implementation effort.

Both Class 1 railroads are experiencing traffic growth, driven by transcontinental intermodal movements that generate far more revenue than short-haul intermodal movements such as CIRIS trips. An operating subsidy to make up the difference between commercial rail intermodal rates and the trucking competition will not be nearly enough to interest the railroads if they have to turn away higher-yield business due to capacity constraints.

Recent national discussions of public-private partnerships for freight have included the possibility of public investment in rail capacity in return for rail service and rate commitments on target movements. The scope for direct public investment in CIRIS-related facilities has expanded since the inception of the CIRIS concept as traffic growth has brought both BNSF and UP closer to their trackage and terminal capacity limits in Northern California.

Public investment elsewhere in California could also be part of a public-private agreement for lower CIRIS rates and service guarantees. The scope of such discussions could include CIRIS-like services being considered in Southern California and potential public investment in Alameda Corridor East. A multi-jurisdictional or comprehensive public-private agreement for rail freight projects in California could have great advantages to both parties and facilitate progress on many pending issues.

Terminal Capacity. The study team understands there to be marginally adequate capacity at the UP and BNSF Stockton (Mariposa) ramps for the near future. The Oakland Intermodal Gateway (the JIT) has adequate capacity, as does the UP Oakland terminal. Both carriers have indicated a

preference for concentrating all international business in Oakland and leaving the Valley terminals for domestic business.

Serving the Fresno market is more problematical. UP does not have an active intermodal terminal in Fresno; BNSF does. The options would be:

- Develop a UP-served intermodal terminal in or near Fresno.
- Use BNSF to serve the Fresno market.

Track Capacity. Track capacity may be the toughest operational issue. Problems with the UP's East Bay Bottleneck were noted earlier. BNSF's route between Oakland and the Central Valley is nearing capacity due to the growth in both BNSF freight business and Amtrak passenger operations. The CIRIS service would be expected to run in night and early morning hours, which is more likely to coincide with freight operations than with the passenger operations during the day. The Amtrak San Joaquins run from about 5:00 AM (first morning departure from Bakersfield) to about midnight (last arrival in Bakersfield). This would leave a five-hour window with no Amtrak operations at all and a wider window when much of the route is clear of passenger trains.

Train Capacity. Depending on how BNSF and UP are serving Central Valley points at present, there may be opportunities to add demonstration or start-up businesses to existing trains. For example, if BNSF is using an eastbound train from Oakland or Richmond to pick up eastbound intermodal at Stockton and/or Fresno, that train may have capacity for CIRIS traffic on the Oakland-Valley leg. The Stockton and Fresno cars do not necessarily need to be on the same train, or even necessarily on an intermodal train. If BNSF is using westbound trains bound to Richmond or Oakland to drop westbound intermodal cars at Fresno and/or Stockton, those trains may have capacity for westbound traffic on the remaining leg to Richmond or Oakland. Both carriers should be seeing a buildup of empty westbound marine containers in Fresno and Stockton due to backhaul loading from points east. BNSF has often run a weekend train from San Bernardino to Hobart to reposition empty marine containers in Southern California. UP does the same thing from Lathrop to Oakland.

Motive Power and Railcars. There is general agreement that public agencies would be relatively comfortable funding motive power and cars for a shuttle service. The public sector commonly funds rail equipment for passenger service, and has funded capital projects for rail freight operations. Some of this comfort, however, is limited to the notion of a stand-alone shuttle operation.

- If CIRIS intermodal traffic rides railroad trains, the ability to identify and fund equipment and motive power may require some ingenuity but should not be impossible. Motive power pooling on a horsepower-hour basis might be one possibility.
- If CIRIS traffic is handled on separate trains or on railroad trains that require additional power other possibilities can be investigated, such as having a sponsoring agency buy or lease power for use by the line haul carrier.

Profitability. The study team recognizes that CIRIS service will not be a profitable venture, especially on the shorter Oakland-Stockton leg. Although the upward pressure on trucking costs is raising the CIRIS rate ceiling, the length of haul is basically too short for profitable rail line haul economics. From a railroad perspective there are two levels of economic and profitability issues.

- **Reaching/LRVC.** The URCS costing work by RII identifies short-run variable cost (SRVC) and overhead allocation, and the long-run variable cost total (LRVC, the sum of SRVC and overhead). The study team cannot envision an acceptable arrangement that returns less than SRVC to the railroads (e.g. has the railroad losing money on an incremental cost basis). There could be some flexibility in the contribution to overhead, the difference between SRVC and LRVC. Aggressive rate setting below LRVC is usually done only with some larger goal in mind.

- **Profit Margin.** If the railroad had substantial excess capacity on the lines and in the terminals any profit margin above LRVC might be attractive. Since capacity is tight, however, it is reasonable to ask if the railroads would have to forego high-margin business to handle CIRIS traffic. At one extreme, it might be argued that the railroads would have to turn down highly profitable long-haul business to accommodate CIRIS. A more realistic view, however, is that the railroads might have to redirect and/or re-price the least profitable existing business to accommodate CIRIS.

The range between SRVC and an attractive profit margin is a wide one and may provide the scope for broader strategic considerations.

Pilot/Demonstration Service

Both UP and BNSF could implement a CIRIS operation between Oakland and Stockton. BNSF could also serve Fresno. (UP has a "paper ramp" at Fresno that would require drayage to Lathrop). The essential steps in implementing an ongoing service are as follows.

- Identify a sponsoring agency. The sponsoring agency would develop the detailed proposal, seek and obtain funding, and either manage the service or contract for management.

- Obtain funding for the ongoing subsidy. Funding will be required to manage and market the service and to cover the expected operating deficit.

- Arrange for service administration, management, and marketing. CIRIS will need someone to perform the business solicitation, booking management, invoicing, and tracking functions of an Intermodal Marketing Company (IMC).

- Reach rate and service agreements with the railroad. Most intermodal customers, including IMCs and ocean carriers, sign contracts with the railroads specifying service standards, rates, and terms. An agreement between a sponsoring agency and one of the two railroads would likely consist of a railroad commitment to

make CIRIS service available to existing and new intermodal customers at specific rates in return for a sponsor's commitment to the negotiated subsidy.

Intermodal contracts typically include volume commitments from the customer. In a ongoing service it would be more appropriate to give the railroad a commitment to the negotiated subsidy in return for a railroad commitment to offer the service.

XII. Short-Line and Contractor Implementation Options

SJRRC/Contractor Option

The San Joaquin Regional Rail Commission (SJRRC) operates the Altamont Commuter Express (ACE) and has both an internal organization experienced in rail operations and working relationships with the railroads (chiefly UP).

The SJRRC option permits rethinking the central California rail network. In principle SJRRC could sponsor CIRIS operations over Altamont Pass or over another route. Actual ACE operations are currently managed and conducted by Herzog under contract to SJRRC. Herzog employees are both unionized and non-unionized. The unionized employees are represented by the Carpenters Union or other labor organizations rather than the railroad unions. Labor costs aside, this arrangement may give Herzog or another contractor additional flexibility in CIRIS operations.

The locomotives used in the ACE service might be usable for a CIRIS pilot, depending on the CIRIS schedule and the available operating window between ACE trains. Westbound ACE operations begin at 4:00 AM and end at 9:00 AM Eastbound trains begin at 3:00 PM and end at 8:00 PM The times between 9:00 AM and 3:00 PM and between 8:00 PM and 4:00 AM would initially appear to be open for CIRIS trains, but some of that time must be devoted to locomotive inspection, fueling, and maintenance.

SJRRC currently maintains two locomotives beyond the six needed for daily train operations. One is rotated into the schedule as others are released for scheduled maintenance, and the other is a spare in case of unscheduled repairs or other contingency. The SJRRC is in the process of acquiring additional locomotives to expand the ACE operation and is investigating the use of hybrid diesel/electric/battery locomotive technology.

SJRRC, however, does not have intermodal terminals or access to BNSF or UP terminals on the west end. SJRRC would need to obtain trackage rights from Niles to the Port of Oakland over one of UP's three routes (two ex-SP and one ex-WP) or purchase one of the routes. SJRRC has considered long-term trackage rights or purchase of one of UP's three routes south of Oakland. On the east end SJRRC would need to obtain trackage rights between its existing routes and either UP or BNSF terminal facilities. Since the ACE trains already use the UP line between Lathrop and Stockton, negotiating connections to the UP Lathrop terminal would probably be easier than those to BNSF's Mariposa terminal.

SJRRC has considered extending ACE service farther down the valley from Stockton and there have been expressions of interest from Stanislaus County in joining SJRRC. The extension of ACE service to points in Stanislaus County and, eventually Fresno County, would pave the way for CIRIS intermodal service.

While there are precedents for line-haul intermodal trains of one railroad originating or terminating at the intermodal terminals of another, it is an uncommon practice. Such an arrangement would leave the terminal owner – BNSF or UP – performing few if any functions at

all, since intermodal terminal operations are contracted out at both railroads (e.g. to Omnitrax at BNSF's Oakland International Gateway).

The concept of SJRRC operating CIRIS trains over trackage rights opens up additional possibilities.

- Direct service to Sacramento, after establishment of a small-scale intermodal terminal in that area.
- Connecting service to the Port of Stockton for overweight containers.
- Reopening the M&ET intermodal facility in Empire to serve the Modesto market.

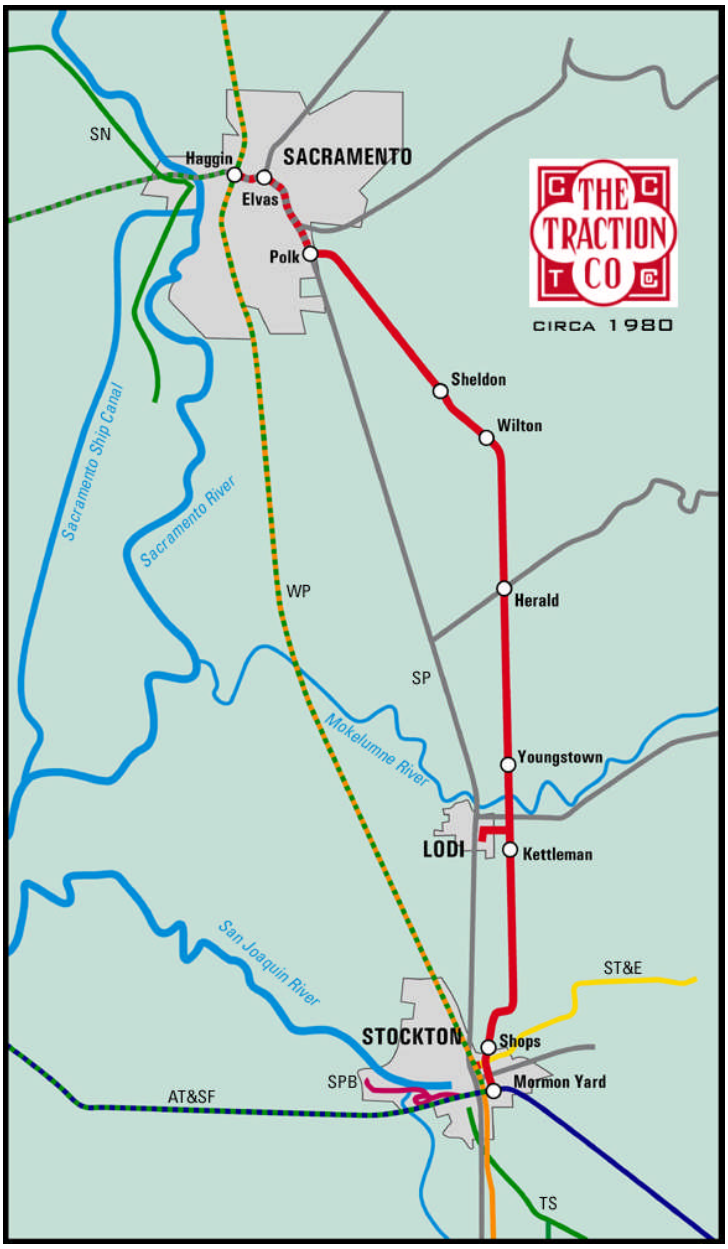
Central California Traction

The Central California Traction Company (CCT) is a short-line and switching railroad jointly owned by UP and BNSF. CCT operates rail services at the Port of Stockton, including on Rough and Ready Island. CCT also operates between Stockton and Lodi to serve carload customers on its own trackage. (Exhibit 79) The CCT line extends to Sacramento but the 27 mile portion between Lodi and Sacramento is presently dormant, and there has been interest expressed by local groups in converting it to a recreational trail.

By virtue of its joint ownership and short line/switching status, CCT enjoys greater flexibility in its operations than BNSF or UP. Major railroads such as BNSF or UP typically avoid complex switching tasks or stopping trains to set out or pick up cars at intermediate points due to the expense and potential for schedule disruption. CCT, in contrast, is set up to perform such tasks.

One major challenge facing CIRIS is assembling an operating scheme that combines advantages of BNSF and UP systems. As CCT is under joint ownership, it has working agreements, access agreements, and interchange agreements with both.

Exhibit 79: CCT Routes



CCT could conceivably obtain trackage rights as required over BNSF and UP to:

- Connect a Rough and Ready Island transloading or intermodal operation with either BNSF Stockton or UP Lathrop intermodal terminals.
- Operate on BNSF between Stockton and the Fresno intermodal terminal.
- Operate over Altamont Pass and into either the UP or BNSF intermodal terminal at the Port of Oakland.

- Eventually expand service on its own line to Sacramento.
- Negotiate trackage rights to serve Modesto and/or Bakersfield.

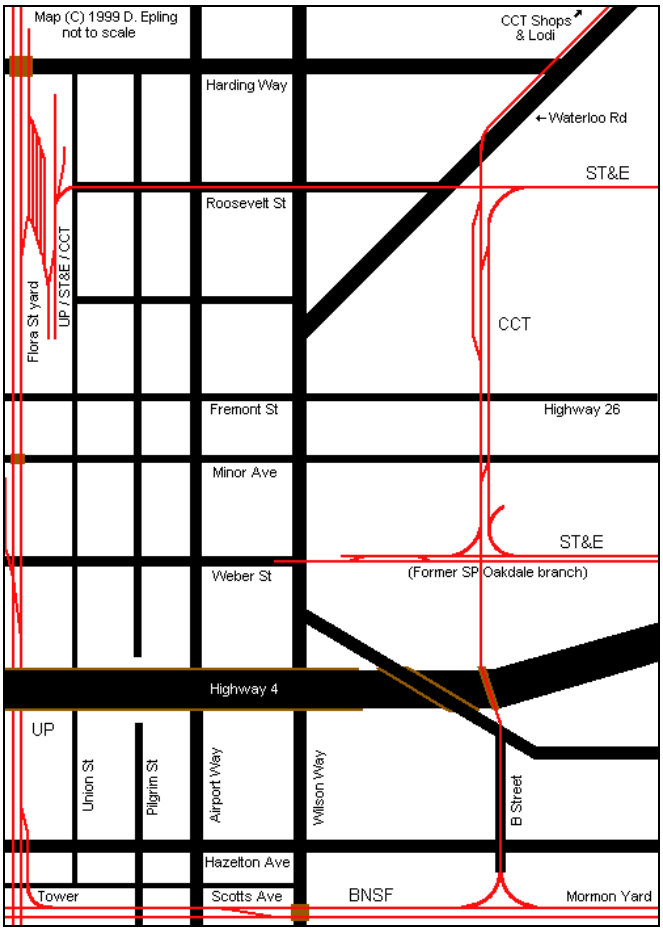
If appropriate working relationships can be established with BNSF and UP, it would therefore be conceivable for CCT to operate CIRIS as a quasi-independent system overlaid on the existing rail system, much as Amtrak operates.

At present, CCT assembles groups of cars on Port of Stockton trackage for pickup by BNSF and UP. The Class I carriers take the cars to their own Stockton yards for classification and sorting into outbound trains. Depending on the timing, it takes one to two days after the cars leave the Port before they are added to an appropriate outbound train from Stockton. Deliveries to the Port of Stockton reverse the process. If CCT were able to take CIRIS cars directly to the Class I yards rather than waiting for pickup, there may be an opportunity to cut a day off the time.

If CCT were able to move intermodal cars directly between Port property and either the UP Lathrop intermodal terminal or the BNSF Stockton intermodal terminal, those cars would likely save 1-2 days in transit to and from Oakland. This action would also relieve the Class I railroads of having to move intermodal cars in mixed trains.

Exhibit 80 shows CCT's connections in Stockton. CCT operates north from BNSF's Mormon Yard and has the ability to operate into UP's Flora St. Yard.

Exhibit 80: CCT Stockton Connections



The distances are small. The major issues are institutional and operational, but might be overcome if UP or BNSF has sufficient incentive.

A more ambitious role for CCT would involve assembling CIRIS trains from multiple Central Valley terminals. CCT would be a logical candidate to move intermodal cars to and from a new Sacramento terminal (either on its own rehabilitated line or on one of UP's lines). It would be conceivable for CCT to bring cars handled at the Port of Stockton (particularly overweights) and Sacramento to either UP Lathrop or BNSF Stockton to be combined with cars handled at the Class I terminal.

Conceptually, the CCT role could evolve into an "overlay" system of CCT movements over Class I lines to Modesto, Fresno, and Bakersfield. Under this admittedly speculative scenario CCT would be operating over the Class I lines much as Amtrak does.

Potential Long-Term Line Purchases

Looking at the very long term, it is conceivable that a public agency (e.g. SJRRC or the Capital Corridor Authority) would eventually purchase the Altamont line. Under those circumstances, a CIRIS operation could become a tenant, and its revenue could be used to offset the total

operating and maintenance of a line that was predominantly used for passengers. Very long-term options for regional rail development also include reactivation of the dormant former SP line over Altamont.

Implementation Steps

The essential steps in implementing a SJRRC/contrcator or CCT service are necessarily more complex than the Class I options but have many steps in common.

- Identify a sponsoring agency. The sponsoring agency would develop the detailed proposal, seek and obtain funding, and either manage the service or contract for management.

- Obtain operating funding. Funding will be required to manage and market the pilot project and to cover the expected operating deficit.

- Arrange for management, and marketing. CIRIS will need someone to perform the business solicitation, booking, invoicing, and tracking functions of an Intermodal Marketing Company (IMC).

- Reach trackage rights and access agreements with the Class I railroads. These would likely build on existing agreements and precedents and would cover locations, usage limits and terms, fees, and many other details.

- Establish combination rates for SJRRC/contractor line haul and Class I terminal loading and unloading. These would be complex but not without precedent, as there are instances of one railroad delivering intermodal business to another trainload's terminal. Intermodal terminals are operated by contractors rather than railroad personnel, so those contracts may require amendment.

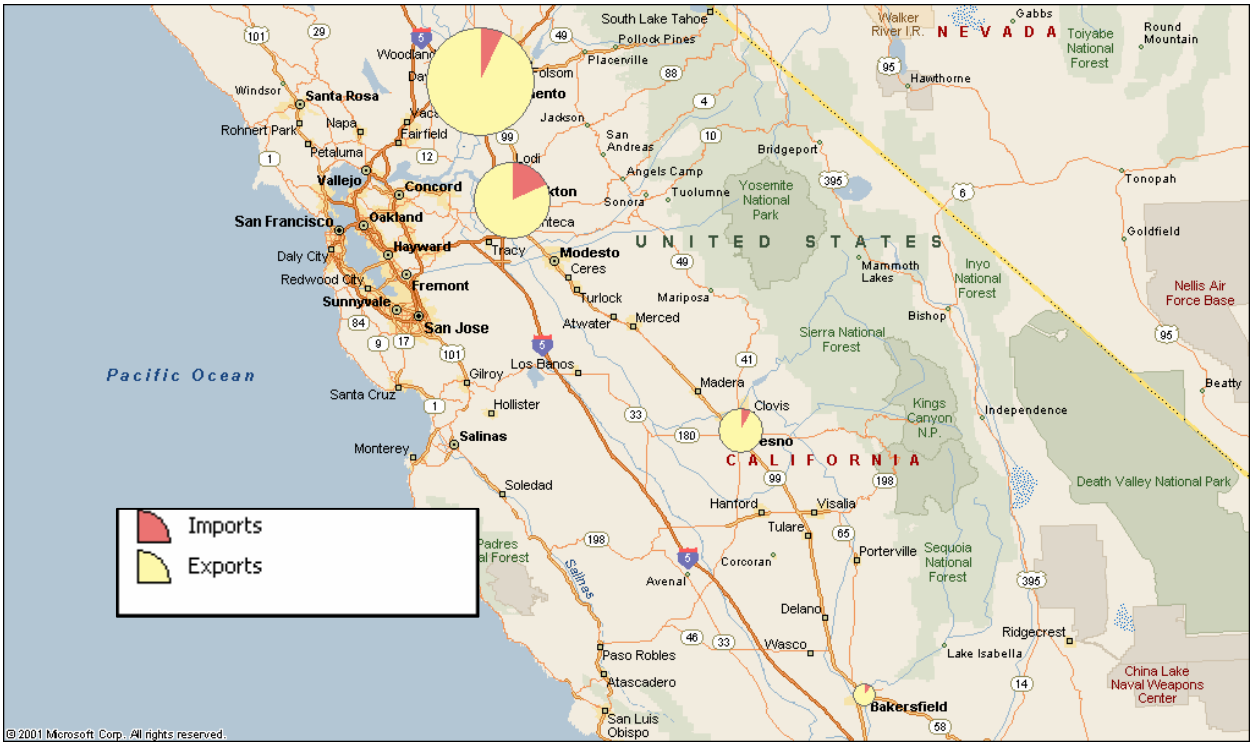
XIII. Long-Term Market Extension

Long-Term Market Potential

Stockton/Lathrop and Fresno have the only operating rail intermodal terminals in the Central Valley and therefore determine the limits of near-term CIRIS operations. In the long term however, the regional benefits of CIRIS would increase if service could be expanded to other markets.

Exhibit 81 (using the same data as Exhibit 22) shows a sizable cargo flow to and from the Sacramento market and a smaller flow to and from the Bakersfield market. It also separates the northern San Joaquin Valley market between San Joaquin and Stanislaus Counties, showing the larger of the two segments in the Modesto market.

Exhibit 81: Geographic CIRIS Market Spread



The challenge in market extension is to balance the costs of additional rail and terminal operations against the potential volume increases and reduction in drayage. As discussed in the previous chapter, the key to success is likely to be flexibility in rail operations.

Sacramento Market

There are several ways in which service might be extended to the Sacramento market and tied in to CIRIS.

UP has two lines to Sacramento, one of which supports BNSF trackage rights. CCT has a third line. The conceptual possibilities include:

- UP service
- BNSF service via trackage rights
- CCT service, over CCT or UP lines
- Service by Herzog or another contract operator over UP or CCT lines.

UP's Fresno line (former SP) extends from Stockton to the southeast Sacramento area near the Sacramento Army Depot (Exhibit 82). CCT's line extends from Mormon Yard in East Stockton north through Lodi to the Sacramento Army Depot (approximately 10 miles from the Port of Sacramento).

Exhibit 82: Sacramento Army Depot Site

There would be three key factors in a successful expansion to the Sacramento market.

- Development of a low-cost low-volume intermodal facility similar to proposals for Rough and Ready Island or Shafter.
- Negotiation of the required rail access via one of the four options above.

- Integration of competitive Sacramento service into CIRIS.

The major commercial challenge would be competing with truckers using I-80, which is a more direct route (although congested) between the Sacramento area and Oakland. The prospect of barge service between Oakland and the Port of Sacramento has been raised, and is discussed in Appendix D.

Modesto Market

The Valley Lift facility (Exhibit 84) was operated by the Modesto and Empire Traction Co. (M&ET) and served by BNSF. BNSF provided service to and from points east, there was no service to or from the Bay Area. Eastbound trains from Richmond picked up eastbound business while westbound trains from Chicago or other points dropped off westbound business. This service was discontinued when BNSF opened its own Stockton Terminal.

Exhibit 83: M&ET Valley Lift Site

The Valley Lift facility is being used for other purposes at present but the BNSF track connection and much of the infrastructure remain. The cost of putting Valley Lift back into service is likely to be minimal.

Extension of direct CIRIS operations to Modesto would be justified if sufficient potential Modesto-area business can be identified. An economic and operational tradeoff is involved. Providing service to Valley Lift would shorten drayage times and distances for Modesto-area customers, reducing costs, truck VMT, and emissions at the expense of additional rail miles and switching. Absent favorable labor conditions the terminal may be inefficient, offsetting some of the gain.

Direct service to the Modesto market would be particularly desirable if the CIRIS terminal in Stockton is at Rough and Ready Island. The driving time from the UP Lathrop terminal to the Beard Industrial District in Modesto is about 45 minutes each way. The driving time from Rough and Ready Island, however, is about half an hour longer, increasing the round trip drayage time by an hour and the cost by about $50. Having a terminal in Modesto would therefore help CIRIS remain competitive.

Bakersfield Market

As noted in Chapter XV, the City of Shafter has aggressively sought to develop an intermodal facility there with rail shuttle service to and from Oakland. An interim facility was opened along the UP line or the east side of the Shafter area but there has been no significant business. A track connection is being built to an industrial park adjacent to the BNSF line. (Exhibit 84) The project lacks service commitments from either railroad.

Exhibit 84: Shafter Project Site

Extending an established CIRIS operation to the Bakersfield market should be substantially easier than starting a new standalone service. It would likely be advantageous to build on the work done to date at Shafter, but there may be other terminal options.

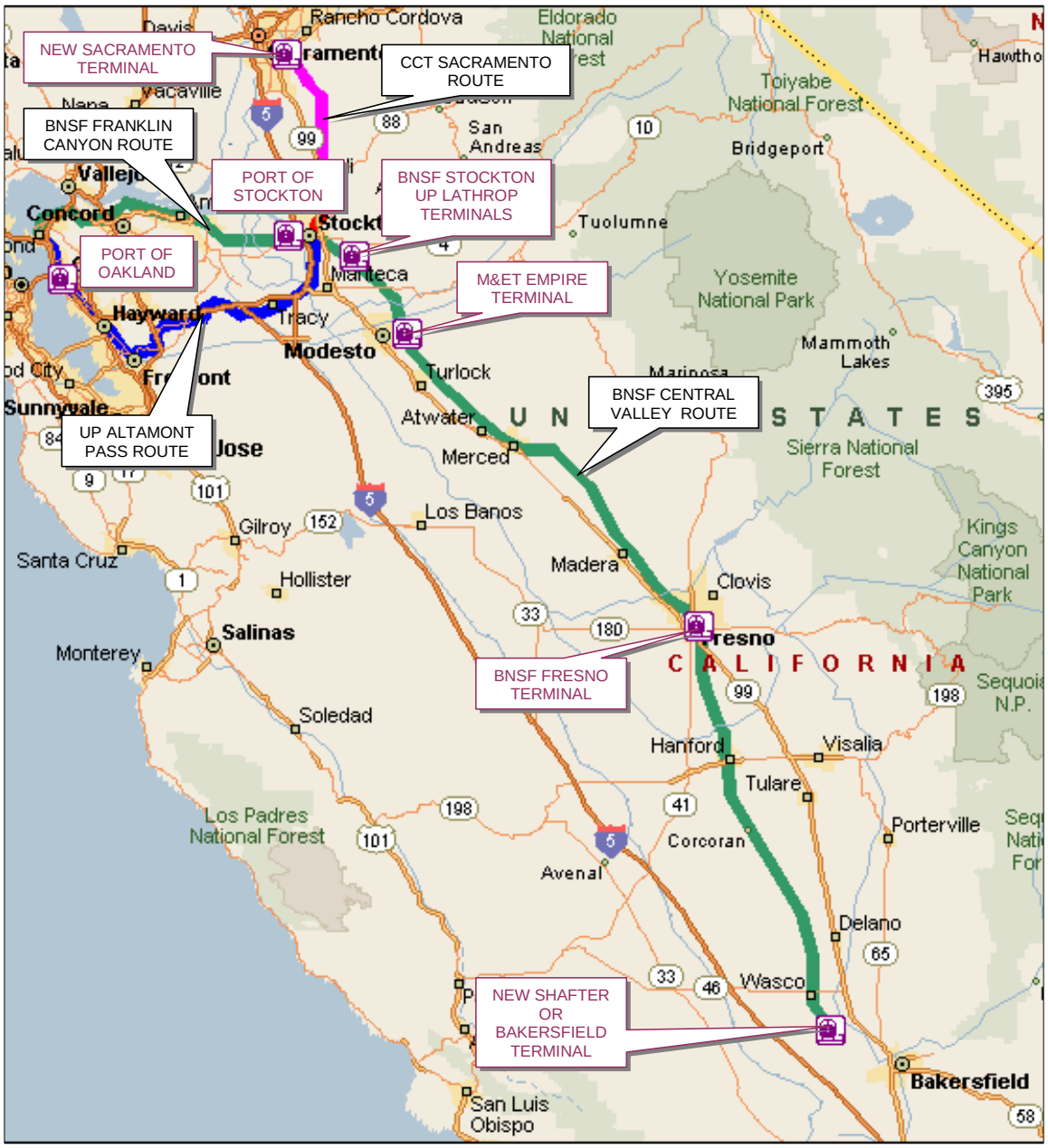
As indicated in Exhibit 81, the identifiable cargo flow between the Bakersfield market and the Port of Oakland has been relatively small. A CIRIS extension would facilitate the use of Oakland by Bakersfield importers and exporters but would not alter the fundamental geographical relationships. A market cargo shift from Los Angeles/Long Beach to Oakland is unlikely.

Full CIRIS Build-Out

At its most expansive CIRIS could link the Sacramento, Stockton, Modesto, Fresno, and Bakersfield markets and the Port of Stockton to the Port of Oakland via either the BNSF Franklin Canyon route or the UP Altamont Pass route. Exhibit 85 shows the potential CIRIS system in this configuration.

- The UP Altamont Pass route would have less congestion but is somewhat longer and more costly to operate.
- The BNSF Franklin Canyon route is shorter and flatter, but uses trackage rights over UP through the East Bay Bottleneck between Richmond and Oakland.
- In Oakland CIRIS could use either the UP terminal or the BNSF-operated OIG.
- Transloading and other operations at the Port of Stockton (Rough and Ready Island) would be linked to CIRIS.
- In Stockton, CIRIS would use the Port of Stockton, BNSF Stockton, or UP Lathrop terminals.
- The CCT line (or one of the UP routes) would provide a link to a new Sacramento terminal.
- CIRIS would use the BNSF line to reach a reopened M&ET terminal at Empire (Modesto), the BNSF terminal in Fresno, and a new terminal at Shafter or elsewhere in the Bakersfield market.

Exhibit 85: CIRIS at Full Build-Out



XIV. Long-Term Equipment Investment

There may be a long-term need to acquire equipment locomotives or railcars for CIRIS.

- Increased volume at existing facilities now near capacity may create a demand for additional lift equipment.
- Lift equipment investment may be required to open new Sacramento or Bakersfield terminals or to reopen the Modesto terminal.
- A stand-alone CIRIS rail shuttle may require its own equipment to replace pooled or leased equipment used at start up.
- Publicly funded equipment may be used by rail operators to reduce the need for operating subsidies.

One of objectives of the CIRIS project is to determine ways that the total rail cost can be reduced to make the intermodal shuttle more attractive and cost competitive for shippers. One means to meet this objective may be to purchase certain assets used to move the containers in intermodal service: specifically locomotives or intermodal rail cars. This would allow the railroad providing the rail service (UP or BNSF) to reallocate their assets to other traffic and routes.

Locomotive Options

There are a few basic options for locomotives, depending on who is operating the CIRIS trains and how.

- If the CIRIS cars are still moving in BNSF or UP trains for the long-term, it would be awkward but not impossible to maintain separate CIRIS locomotives. There are precedents for motive power pooling agreements between railroads in which the participants contribute horsepower hours in proportion to their revenue or some other basis. At one time BN, one of BNSF's predecessors, contracted for motive power on the basis of horsepower hours or equivalent basis, with the locomotives roaming the BN system. Both UP and BNSF have leased motive power to relieve shortages.
- It would be possible for CIRIS to supply the railroad with locomotives for use in CIRIS service and provide in the agreement for reimbursement or adjustment for the time the locomotives spend in other uses. For example, if it was agreed that the CIRIS service itself would require 10.8 million horsepower hours annually (two 3,000 horsepower locomotives for 10 hours per day, 360 days per year), the CIRIS agency could provide the railroad with two 3,000 horsepower locomotives and receive reimbursement for railroad use in any service, over 10.8 million horsepower hours.
- If CIRIS business is handled primarily or exclusively in separate trains the sponsoring agency could purchase or lease locomotives for use on those trains.

There exist precedents for the regular use of "foreign" locomotives on unit coal trains and in the interchange of complete trains between railroads. Both ACE and Amtrak trains use their own locomotives on BNSF and UP lines. The choice between lease and purchase is a financial issue involving the balance between capital and operating costs and between current costs and future risk.

Class I carriers currently prefer to operate intermodal trains with six-axle locomotives, but intermodal trains can utilize four-axle high-horsepower locomotives. RII developed the costs to acquire locomotives needed for the planned intermodal service assuming that the Class I carrier would require a six-axle locomotive operating on their lines. The equipment can either be purchased or leased, new or used. The number of locomotives required per train is dependent upon the trailing tons on each train. For example, a 50 car train (100 containers) will have approximately 4,000 trailing tons, requiring one locomotive for service. A 100 car train (200 containers) will have approximately 8,000 trailing ton, which will require two locomotives.

The locomotive costs included in the URCS costing system assumes the locomotive costs are based on the replacement cost of a locomotive amortized over its useful life. The capital costs associated with the locomotive are applied to each train movement within the system.

RII has developed illustrative costs of acquiring a locomotive assuming the equipment was either leased or acquired by a public agency and then provided to the operating railroad for use in the intermodal service. The chart below (Exhibit 86) summarizes some of the major expenses associated with the acquisition of a representative locomotive, based on their relative pulling power and the number of containers each unit can move per trip (recognizing that they can be used in multiples as required). Of the examples given below, the GE-C44-9 and the SD-70-MAC are both new locomotives and the SD-40-2 is a used locomotive.

Exhibit 86: Locomotive Analysis - Purchase Option Examples

	GE-C44-9 New	**SD-70-MAC** New	**SD-40-2** Used
Capacity Trailing Tons	5,000	5,000	3,000
Purchase Price	$ 1,650,000	$ 1,929,000	$ 300,000
Capital Cost/Year	$ 135,720	$ 159,393	$ 36,739
Maintenance/Year	$ 109,500	$ 56,575	$ 69,715
Annual Locomotive Cost	**$ 245,220**	**$ 215,968**	**$ 106,454**
Round Trips/Year	260	260	260
Containers/Trip	125	125	75
Round Trip Cost per Container	**$ 7.55**	**$ 6.65**	**$ 5.46**

The total pretax annual capital costs, assuming the locomotive is acquired, range from a high of $245,220 for the GE-C44-9 to a low of $106,454 for the SD-40-2. The cost differences include maintenance usage projected for each type of representative locomotive.

If the locomotives are leased the annual pretax capital costs are actually higher, as shown in Exhibit 87.

Exhibit 87: Locomotive Analysis - Lease Option Examples

	GE-C44-9	SD-70-MAC	SD-40-2
Capacity Trailing Tons	5,000	5,000	3,000
Purchase Price	$ 1,650,000	$ 1,929,000	$ 300,000
Lease Cost/Year	$ 158,400	$ 185,184	$ 100,375
Maintenance/Year	$ 109,500	$ 56,575	$ 69,715
Annual Locomotive Cost	**$ 267,900**	**$ 241,759**	**$ 170,090**
Round Trips/Year	260	260	260
Containers/Trip	125	125	75
Round Trip Cost per Container	**$ 8.24**	**$ 7.44**	**$ 8.72**

The SD-40-2 locomotive is the least expensive example on a per locomotive basis, but the locomotive's pulling power is less than the SD-70-MAC and the GE-C44-9.

A third option is to expand the pool of Amtrak California or ACE locomotives with dual-service units for CIRIS use. Neither fleet has sufficient excess motive power at present to operate CIRIS trains or plans to acquire motive power in excess of expected needs. Expanding either pool to cover CIRIS needs could have some concrete advantages.

- **Sharing spares.** Any motive power fleet needs spares to "protect" scheduled operations while locomotives are out of service for planned maintenance or unplanned repairs, or while inbound locomotives are delayed beyond the departure time for outbound trains. If the CIRIS and Amtrak California operations (or the CIRIS and ACE operations) can share spares the number of spares might be reduced at a savings of $1—2 million.

- **Future flexibility.** The use of dual service locomotives for CIRIS trains offers flexibility in the face of uncertainty for both freight and passenger services.

    - If CIRIS trains are ultimately unsuccessful the dual-service locomotives can be used in passenger service either in Northern California or elsewhere.

    - If CIRIS remains successful, the dual-service locomotives can either remain with CIRIS or move to passenger service and be replaced with freight-only units.

The dual-service strategy has been used successfully in at least two cases.

- As Southern Pacific anticipated its exit from passenger service it bought dual-service units as required to maintain the remaining service, and shifted them to exclusive freight use when passenger service ended.

- Amtrak's initial purchase of road locomotives were dual-service units in case Amtrak itself was disbanded. Some of these locomotives were later resold to Santa Fe for freight service.

Railcar Supply Options

There are a number of short-term, medium-term, and long-term options for CIRIS railcar supply.

- In the short-term CIRIS could 1) operate with whatever cars the railroad assigns each day, 2) have the railroad assign cars to a CIRIS pool, or 3) lease cars from an existing fleet.
- In the medium-term, CIRIS could 1) continue with the initial choice indefinitely, or 2) arrange a long-term lease of cars from an existing fleet.
- In the long-term CIRIS could 1) continue to obtain car supply from the railroads, 2) arrange a long-term lease, 3) purchase cars from existing fleets, or 4) acquire newly built cars.
- CIRIS may also want to examine or monitor the development of alternative rail technologies for eventual application to new CIRIS routes and services.

Intermodal railcar options and sourcing choices for CIRIS are extensive. Depending on the type of operation anticipated different cars types have advantages. Existing cars will provide the most effective option for starting and growing the business. All the car types suggested below are potentially available to varying degrees. Some are surplus at present and thus would be a cost effective alternative to purchasing new cars. It is anticipated that the number of cars required for start-up of the shuttle service will be relatively small, and will stay small well into the maturing of the service. Finding a new car builder who would build fewer than 100 cars to meet the specifications for this service is very unlikely, and the price would reflect the low order volume. If new builds are required, they would need to be an add-on to a current order to be economically attractive.

General specifications, advantages, and disadvantages of car types to be considered are discussed below. The NTTX and 48' TTAX cars are only available from TTX. Bulkhead Double Stack cars and 89' All Purpose flatcars are available in the TTX fleet, as well as from other owners, such as Greenbrier, CP, CSX and FEC. The willingness of these parties to sell or lease these cars has not been explored, as it will require among other things a determination of how many and how soon the cars are needed.

NTTX Cars

The NTTX type is an articulated, five platform container-only car. (Exhibit 88). The NTTX has a decided advantage over the other car types for CIRIS service, but because the car is container-only chassis pools will be necessary in all terminals served by the shuttle. A major advantage of this car type is the ability to load a high percentage of heavy twenty-foot containers without sacrificing space. Many of the candidate export commodities for CIRIS can be moved in heavy twenty-foot containers. The NTTX cars are relatively new with more than 20 years of remaining interchange life and thus can be available for this service for a long time. NTTX cars are surplus to the national fleet and could likely be purchased or leased from TTX at an attractive price.

Exhibit 88: Articulated Single Stack Container Only Car (NTTX)

48-foot TTAX Cars

TTAX cars (Exhibit 89) are also five-platform articulated sets, but have the capability of handling both trailers and containers, either on chassis or on the deck. The 48' TTAX car is also somewhat surplus in the market. A major drawback to this car is it can not be loaded with 20' containers on short chassis. The car can accommodate 28' trailers, but the wheel landing pad is too short for the 20' chassis wheel set.

Exhibit 89: Articulated Five Platform All-Purpose Spine Car (TTAX)

Bulkhead Double Stack Cars

The bulkhead double-stack car (Exhibit 90) was one of the first designs for double-stack cars and addressed the need to load 20' and 40' international containers efficiently. With the addition of 48' and 53' domestic containers this car design proved to be less efficient. While the car can load both 20's and 40's it has a limited load capacity and two heavy 20' containers use the full

weight capacity of the well. If this happens nothing can be loaded on top, reducing productivity. Understanding the mix of anticipated container loadings will aid in defining the car type best suited for this service.

Exhibit 90: 40' Bulkhead Double Stack Car

89' All-Purpose Flatcars

These older conventional cars (Exhibit 91) are less efficient but could offer flexibility. If the share of heavy 20' containers is high, it may be desirable to consider an 89' intermodal flatcar that has both trailer and container capacity. These cars may be available through a number of sources, but some are not currently equipped for trailer loading. However, many of the cars of this design can carry four fully loaded 20' containers and all of them can accommodate at least three 20' containers. If these cars prove to be the best alternative because of the need to load a high percentage of heavy 20's those not equipped with hitches could be modified to allow container on chassis loading.

Exhibit 91: 89' All Purpose Intermodal Flatcars

Rail Car Supply Strategies

Exhibit 92 summarizes the characteristics, advantages, and disadvantages of the car types discussed above.

Exhibit 92: Rail Car Alternatives Within Existing Equipment Fleets

Car type & Specifications	Advantages	Disadvantages
Articulated Single Stack Container Only Five Platform per Car (NTTX)		
▪ 40 foot containers on all platforms or 2 – 20 foot containers on the end and middle platforms with a 40 foot container the remaining platforms ▪ Platform carrying capacity End & middle units-106,000 lbs. 2nd & 4th units-67,200 lbs. ▪ Car length – 239'	▪ Designed specifically for low volume, or low clearance container operation ▪ Designed for 20 & 40 foot international containers ▪ 300 plus cars in the TTX fleet most of which are surplus ▪ As a result of railroad clearance efforts and increased concentration of container volumes, railroads do not desire these cars in general service ▪ TTX may be willing to consider long term disposition for these cars through direct sale or long term lease	▪ Container only – will require distributed chassis pool ▪ Limited to six 20 foot containers per car
40' Bulkhead Double Stack Car		
▪ Five wells per car capable of two 40 foot containers per well with two 20 foot containers and one 40 foot container possible in the end wells depending on container weights ▪ Platform carrying capacity 95,000 – 100,000 lbs. ▪ Car length – 265'	▪ Double stacking reduces train length for given number of containers ▪ Some designs can load 20' containers in all wells	▪ Weight carrying limitation particularly with heavy 20's ▪ Potentially more costly terminal operations

Car type & Specifications	Advantages	Disadvantages
Articulated Five Platform All-Purpose Spine Car (TTAX)		
▪ 40/45/48 foot trailers, containers on chassis or container on the deck one unit per platform or 2 – 20 foot containers on the deck on the end units ▪ Platform carrying capacity 100,000 lbs. ▪ Car length – 298 feet	▪ Accommodates trailers, containers or containers on chassis eliminating the need for a distributed chassis pool ▪ Large supply of cars to draw from ▪ Currently free running on railroads in the TTX pool ▪ Cars rapidly becoming surplus as 53' trailers replace 48's ▪ TTX may be willing to consider long-term disposition for these cars through direct sale or long term lease	▪ Wasting 8' per platform in line haul and terminal operations ▪ Can not carry 20' containers on chassis ▪ Alternative use of surplus cars in a program to increase the capability of the car to accommodate 53' trailers may temper TTX's desire to dispose of the cars ▪ Limited to four 20' containers per car ▪ Requires a one to one relationship between containers and chassis
89' All Purpose Intermodal Flatcars		
▪ Single deck car capable of up to four 20 foot containers or two 40 foot containers ▪ Car carrying capacity 105,000 – 130,000 lbs. ▪ Car length – 89'	▪ Haul 20 to 40 foot containers on deck or on chassis ▪ High 20' container capabilities	▪ Limited number available and there are alternative services for these cars when modified ▪ Poor net to tare ratio ▪ Not articulated – subject to train slack action ▪ May be prohibited as a block on articulated trains

TTX Car Pool

The quickest and least risky way to supply cars for CIRIS is through a carrier that has access to and can supply intermodal cars from the TTX fleet. TTX Corp. is owned by the major railroads and supplies most of the intermodal cars in service. The cars operate in pools and railroads pay per diem and mileage charges for their use. If a railroad wants to support a service it can direct cars to that specific service. The railroad could pass the TTX car hire through to the underlying customer. The likely pass-through rates for cars furnished by the serving carrier from the TTX fleet are shown in Exhibit 93. These ranges assume that the serving carrier is willing to pass the rate through at its cost based on the rates charged by TTX.

Exhibit 93: Likely Pass-Through TTX Rates

Car Type	Pass Through Rate Range per Slot per Day (incl. Mileage)
Single Stack Spine Car - NTTX	$8.45 - $8.85
48' All Purpose Spine Car - TTAX	$9.10 - $9.55
89' All Purpose Flat Car - TTWX	$7.15 - $7.50
100 Ton Bulkhead Double Stack Car – DTTX	$5.30 - $5.50

The normal practice is for the serving carrier to use a blended cost based on likely car types to be used for a specific market and include that rate into the transportation rate billed to the customer.

Under this pricing scenario the serving carrier would provide an agreed level of intermodal car capacity for the service. During start-up and on a seasonal basis there would have to be some flexibility on how much capacity would be utilized and billed. This is in contrast to a lease or ownership where the cost for equipment would be fixed regardless of usage.

Purchase/Lease Existing Cars

For purchasing or leasing existing railcars for CIRIS, the two most likely car types are the NTTX Single Stack Spine Car or the 100 Ton Bulkhead Double Stack Car (Exhibit 94) . Both of these car types are somewhat surplus in the national fleet and if captured in a specific service have a higher than average chance of staying in the service. The 48' All Purpose Spine car is also somewhat surplus, but given the inability to load 20' containers on chassis on this car it is less desirable than the other alternatives as a long term choice. The 89" All Purpose Flat Car while no longer needed in intermodal service is a good candidate for alternative services in the national fleet and thus is not a likely candidate for lease. The actual price to purchase or long term lease existing cars for this service will of course be subject to negotiations, but a likely ranges are as follows:

Exhibit 94: Purchase Existing Cars

Car Type	Price Range – Per Car	Annual Maintenance Expense
Single Stack Spine Car - NTTX	$90,000 - $119,000	$4,500 - $5,500
100 Ton Bulkhead Double Stack Car – DTTX	$135,000 - $170,000	$6,200 - $7,000

An issue that must be recognized and addressed in the operating agreement associated with this service is that of keeping car capacity available. This is particularly true when the operating railroad is relied upon for car supply. In peak season, mid-July through Thanksgiving, when capacity demands are at their greatest, railroads tend to manage car capacity to meet the most pressing needs, which is long haul from the West Coast Ports inland. To the extent capacity use in the shuttle service is divertible to long haul needs there is a potential for loss of cars.

It may seem that direct ownership of the cars would insure car availability. If the terminals used for this service are not exclusive to the service, however, car ownership might help but is no guarantee that the cars will be kept captive in the service when overall capacity is tight. Cars once lost to general service are very difficult to capture and return to the designated service. Even more problematic, private CIRIS cars, have no car hire associated with them and as such the owner not only losses use of the cars but is not compensated for there use in other services.

Ongoing operational monitoring of car movement activities will be necessary to facilitate retention of carrying capacity. Using car types that are the least desirable in general intermodal operation such as the NTTX and 100 Ton Bulkhead Double Stack Car will also help keep the cars safe from bleeding out of the shuttle service.

New Builds

One additional source of car supply is purchase of new builds. The number of cars needed in this service even three to five years out, however, is small relative to the economic break-even point for new car production unless it is added-on to an existing production run. In the current market that means 125 Ton 40' Double Stack well Cars, which are more than is needed for the startup of shuttle service and is also a very desirable car in the general intermodal service. This car type is in very tight supply all year and as discussed above would be subject to some potential for diversion to other services regardless of ownership.

Summary

In summary the likely best alternative for car supply for the shuttle service in the near term is from existing equipment and specifically the NTTX cars currently surplus in the TTX fleet. This will require establishment of both 20 and 40 foot chassis pools at all of the terminals served by the shuttle. If the desire is to minimize the investment required to establish the service an arrangement in which the TTX rate is passed through by the serving carrier is the best alternative with the realization that it will be necessary to forecast capacity requirements and work with the carrier to insure that the car capacity is available.

Alternative Technologies

The Tioga team briefly examined three alternative technologies for intermodal rail cars. The nature of these technologies is summarized below and presented in greater detail in Appendix C.

Rail Runner

The Rail Runner system employs modified container chassis supported by specialized rail wheel assemblies ("bogies") to move containers by rail without rail intermodal cars. Rail Runner is designed to facilitate low-volume intermodal movements without the capital and operating costs of a conventional intermodal terminal with lift equipment. Experience and the observations of Tioga staff indicate that the incremental terminal labor requirements for Rail Runners are similar to or slightly greater than the labor requirements for a lift-on/lift-off operation. Container chassis used with Rail Runners must be modified at a cost of $500 – $1,000 each. Besides the cost of modification, the use of a modified chassis would require the creation and management of a CIRIS-only chassis pool. Railroad acceptance of Rail Runners is also a barrier to their use for CIRIS. Rail Runners are typically envisioned as operating in separate trains to avoid mixing them with consists of conventional cars.

Expressway®

Expressway® is a refinement of a rail technology originally named the "Iron Highway". In essence it is a series of connected platforms providing a continuous surface over the length of a short train. Highway trailers or containers on chassis are driven on and off or spotted by yard tractors. The system has proven advantageous for motor carrier traffic in short-haul markets due to it flexibility in accepting a wide variety of equipment and its simple terminal needs. At present

Expressway® equipment operates only on Canadian Pacific Railway (CPR), and the railway has exclusive rights to the system.

IMTRX RampCar

Intermodal Trailer Express Inc. (IMTRX) is a intermodal operating company created to introduce and operate a new seven-platform intermodal railcar. The 439-ft. RampCar is "circus loaded" over a 14-foot long pneumatic ramp located at one end. The RampCar is designed to transport a wide spectrum of wheeled vehicles including containers on chassis and many types of highway trailers. As its name indicates, the Intermodal Trailer Express is best suited to accommodate multiple highway trailer types moving to and from new, non-mechanized, low-cost terminals.

Comparisons

Exhibit 95 provides a capsule comparison of the key rail car technology features.

The NTTX container cars are recommended for use in the initial CIRIS operation for their ready availability, their ability to accommodate heavy 20' containers, and their low initial cost should purchase be desirable.

Other conventional types can be used as well, and starting operations with TTX pool cars would allow CIRIS to mix and match car types as needed. This would be particularly advantageous to cope with seasonal fluctuations in demand and the need to carry some container on chassis and some without.

Exhibit 95: Equipment Technology Comparisons

Technology	Equipment Carried	Loading Method	Terminal Labor/Capital Balance	Compatibility with Existing Terminals	Slots/Platforms per Car	Est. Capital Car Cost per Slot/Platform
NTTX Container Cars (used)	Containers	Mechanical Lift	High Capital/Low Labor	High	5	Pool/$24,000
TTAX All-Purpose Spine Cars	Containers Containers on Chassis	Mechanical Lift	High Capital/Low Labor	High	5	N/A - Pool
Bulkhead Double-Stack (used)	Containers	Mechanical Lift	High Capital/Low Labor	High	10	Pool/$17,000
89' Intermodal Flat	Containers Containers on Chassis	Mechanical Lift	High Capital/Low Labor	High	2	N/A - Pool
Rail Runner	Containers on Modified Chassis	Ramp	High Labor/Low Capital	Low	1	Proprietary
Expressway®	Containers on Chassis	Ramp	High Labor/Low Capital	Low	10	Proprietary
IMTRX RampCar	Containers on Chassis	Ramp	High Labor/Low Capital	Low	7	$71,400

Over the relatively short hauls anticipated as part of CIRIS there would be little difference in line haul rail operating cost between the various technologies. Full-platform systems such as the 89' Intermodal Flat, IMTRX RampCar, and Expressway have higher tare weights per unit than spine cars or double-stack cars, but the added cost is likely to be small. The Rail Runner system does not require a "car" at all, but does require one rail bogie assembly per unit.

CIRIS is intended to transport containers without chassis wherever possible. Container chassis are more costly than the containers themselves, have higher maintenance costs, are in shorter supply, and add weight and aerodynamic drag to the trains. It is therefore efficient and desirable to leave them behind. To the extent that chassis are used in the initial stages of CIRIS they can be accommodated on all-purpose spine cars or other conventional intermodal cars in the TTX pool (Exhibit 92). The expected advent of more flexible and efficient chassis pools in the immediate future will facilitate this strategy, and there should be a declining need for containers to travel on chassis. Technologies that accommodate trailers, therefore, may not have enduring advantages for CIRIS.

CIRIS service is planned to connect existing rail intermodal terminals at Stockton and Fresno with the existing terminals at Oakland. Terminal infrastructure and lift equipment are already in place, and terminals have reached an efficient scale. Alternative technologies do not usually integrate well with conventional terminal facilities, and attempting to do so may raise additional implementation barriers for CIRIS. A successful CIRIS program could require additional long-term terminal capacity. Public funding for terminal equipment or infrastructure, however, is expected to be more accessible than funding for operating subsidies. In essence, the current public funding environment favors the substitution of capital for operating costs while these alternative systems offers a means of minimizing capital cost in favor of higher ongoing terminal labor expense.

Alternative technologies may offer considerable promise for their intended purpose, but that purpose does not coincide with near-term CIRIS objectives. Accordingly, the scope of this implementation planning effort did not include a detailed investigation of their cost characteristics. Over the long run, these and other technologies should be monitored for their possible application as CIRIS scope expands.

Lift Equipment Options

Intermodal terminals typically require two types of specialized equipment: lift machines and yard tractors. Lift machines of various types are used to load and unload the railcars, and yard tractors are used to move and position trailers and containers on chassis.

- Lift machines typically cost anywhere from $500,000 to $1.5 million, and can be purchased new, leased, or used. A small facility may have just one, but at least two is more typical to avoid downtime during maintenance and repair.

- Yard tractors typically cost $20,000 (used) to $75,000 (new). It is common to have at least two yard tractors for each lift machine.
- Minimal equipment investment for a new terminal is thus $540,000 to $1.6 million.

The ability of the terminal operator to "amortize" this equipment investment over growing lift volumes is a major source of scale economics in terminal operation. At start-up, equipment cost can account for over 25% of the total lift cost (e.g. $12 in an overall cost of $45 per lift) while as volume grows this share may decline to about 20% (e.g. $7 in an overall cost of $35 per lift). Public provision of terminal equipment would reduce the lift cost accordingly. Since the total round trip cost includes four lifts, a reduction of $7 per lift in a mature service scenario would reduce the need for subsidy by $28 per round trip.

XV. Statewide Coordination Potential

Background

In the course of previous studies and parallel work in Southern California, it became apparent that the potential exists for authentic synergies if potential CIRIS implementation can be considered in a statewide context. This effort included contacts with agencies involved in rail and transportation planning statewide and in Southern California and reviews of state and regional planning documents to investigate parallel planning initiatives and the potential for statewide synergies.

Public/Private Partnership Potential

It is clear from studies to date that short-haul rail shuttles in the 75-150 mile range will not be commercially viable or attractive business propositions for the railroads. It is equally clear that developing and operating intermodal facilities is unlikely to be a profitable stand-alone venture. Both will require subsidies or other forms of financial support to succeed in a competitive environment. The means of providing those subsidies is at the crux of the implementation effort.

Recent national discussions of public-private partnerships for freight have included the possibility of public investment in necessary rail capacity in return for private rail service and rate commitments on target movements. The scope for direct public investment in CIRIS-only facilities, however, is limited because neither railroad is in clear need of additional intermodal terminal capacity in Northern California. Line capacity may be another matter, however, as BNSF and UP are both in need of capacity improvements to their Northern California routes.

Both railroads do have significant capital investment and capacity needs elsewhere in California, and expanding the scope of potential public/private partnership statewide creates additional opportunities. For example, BNSF is seeking a near-dock intermodal terminal to serve the Ports of Los Angeles and Long Beach, and BNSF's San Bernardino intermodal facility is near or at capacity. UP has periodically considered building an intermodal facility in the vicinity of Colton to serve the Inland Empire market. Public investment elsewhere in California could conceivably be part of a public-private agreement for lower CIRIS rates and service guarantees. The scope of such discussions could include CIRIS-like services being considered in Southern California and potential public investment in Alameda Corridor East. A multi-jurisdictional or comprehensive public-private agreement for rail freight projects in California could have great advantages to both parties and facilitate progress on many pending issues.

Bakersfield Market: Shafter Initiative

The SJCOG Feasibility Study determined that Bakersfield business would require significantly less subsidy that the other markets because of the higher truck rate ceiling. A minimum cost operation may actually yield net revenue. To serve the Bakersfield market, however, requires building an intermodal terminal.

There is a well-publicized effort to develop an "inland port" near the City of Shafter (north of Bakersfield) connected to the Port of Oakland by a rail shuttle. The City of Shafter is the sponsor, but the effort also involves local industrial park developers. The industrial park development is the "International Trade & Transportation Center" and the Shafer intermodal initiative is the "California Integrated Logistics Center".

According to the sponsors, the facility would serve both domestic and international needs, provide container depot and Container Freight Station (CFS) services, and offer a Foreign Trade Zone opportunity. The claimed advantages of the Shafter location include:

- Proximity to exports including hay, cotton, citrus, almonds, and pistachios
- Proximity to major import distribution centers, including Sears, IKEA, Target, and Wal-Mart (although only Target is adjacent).

The Bakersfield area is typically considered an extension of the Southern California market and most marine cargo originating or terminating in the Bakersfield area is assumed to move via the ports of Los Angeles and Long Beach. By highway Shafter is about 256 miles from Oakland but just 150 miles from Long Beach, which is why the Bakersfield market is ordinarily tied to the Southern California ports. Shafter is roughly equidistant by rail from Oakland and Long Beach, 270-290 miles to either port depending on the route.

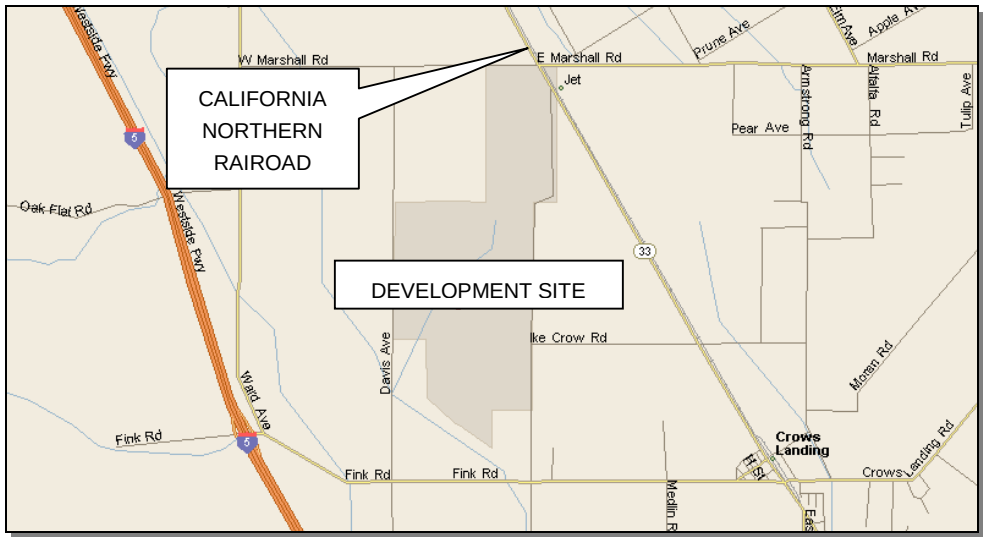
A review of the available reports and presentations on the Shafter initiative suggests that the proposal faces some significant near-term obstacles. There is no intermodal terminal at Shafter yet. The sponsors obtained $5 million in funds from the State of California, which are being used to install a track connection between the industrial park/terminal site and the BNSF mainline. Although the sponsors state that funding will be forthcoming for terminal construction, it is not clear that sufficient funding will be available. The sponsors note the difficulty of placing debt unless there is a service and volume commitment. The study team was unable to locate any market analyses beyond the conceptual level, or any financial or economic analyses of costs, rates, etc. Railroad interest in serving Shafter has been minimal.

Given the lead time required to develop a Shafter terminal, service to the Bakersfield market has not been included in startup CIRIS implementation plans. Viewed in the context of a more comprehensive statewide public-private rail intermodal strategy, however, development of service to a new intermodal terminal in the Bakersfield market may serve the interests of both Southern and Northern California constituencies, and has been described as a possible market extension.

Crows Landing Development.

The former Naval Auxiliary Landing Field adjacent to Crows Landing (Exhibit 96) was conveyed from the Federal Government to Stanislaus County in 2005 and is poised as a major industrial and commercial development site in the Central Valley. The site is about 1500 acres. The site is roughly 30 miles or one hour from the closest existing intermodal facility, which is the dormant M&ET terminal at Empire. Alternatively, it could be served by the California Northern Railroad, which operates the northern portion of the former SP West Valley Line along Highway 33.

Exhibit 96: Crows Landing Development Site



Crows Landing would not be candidate for near-term service or a demonstration service due to the lack of intermodal facilities and the difficulty of arranging near-term shortline service. In the long run, however, Crows Landing could be considered either a traffic source for service via a revitalized Empire terminal, or an element in an expanded CIRIS system.

Southern California Developments

Interest in inland ports and rail shuttles in Southern California has centered on two ideas.

Development of an "Inland Port" in the Inland Empire (San Bernardino and Riverside Counties). Inland Port possibilities have included a new intermodal terminal for UP at Colton or nearby, a facility at Devore, and other possible sites. BNSF already has an intermodal terminal at San Bernardino, but it is near capacity with domestic business. Planning agencies such as SANBAG have mentioned an inland port in their freight plans but no concrete projects have emerged. UP was a major advocate. Predecessor SP had considered an Inland Empire intermodal terminal at least 10 years ago but did not have the means to build one. The $60 million inland port/rail shuttle project considered in State plans is understood to have been a new terminal and pilot service project for UP.

Development of a rail shuttle over the Alameda Corridor and Alameda Corridor East. With the capacity to handle additional port rail traffic over its line, the Alameda Corridor Transportation Authority (ACTA) adopted an Expanded Mission to address cargo growth at the ports and to optimize use of the existing rail and highway network while larger scale projects are planned and funded. As part of its Expanded Mission, ACTA identified initiation of a Shuttle Train Pilot Program as a priority goods movement project.

"The Shuttle Train Pilot Program

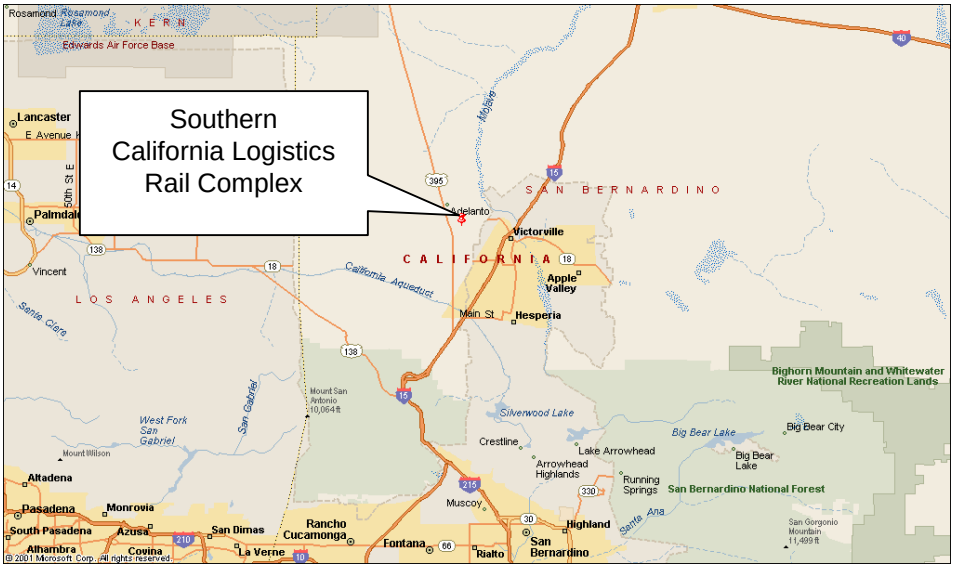
The shuttle train pilot program addresses the need to develop a short-haul rail alternative to trucking cargo from the ports to inland distribution centers and storage facilities.

If successful, this innovative pilot program will lead to a large scale shuttle train service that will alleviate truck traffic along the I-710, I-110 and major east-west freeways, by transporting containerized cargo via rail from the port complex to a rail facility in the Inland Empire. From the rail facility, cargo will be trucked a short distance to warehouses and distribution centers. The pilot shuttle train, as well as the future permanent service, would use the existing Alameda Corridor and the existing railroad mainlines."

In August 2005 ACTA announced that it had received $5 million in funding for a rail shuttle demonstration project from SAFETEA-LU as a congestion relief measure. The ACTA press release noted that the shuttle train demonstration project is scheduled to begin in 2006 (as opposed to late 2005, which was indicated earlier). The project would involve developing an interim intermodal facility at UP's West Colton yard and operating a shuttle between there and the ports of Los Angeles and Long Beach. The funding, however, was actually earmarked for the Ports, and the project may not be progressing as planned.

Southern California Logistics Rail Complex. Adjacent to the Victorville-area Southern California Logistics Airport, the Southern California Logistics Rail Complex (Exhibit 97) is a 3,800-acre master-planned facility targeted at goods movement customers. The PASHA Group has committed to a 700-acre multimodal logistics and distribution complex. The complex will provide a consolidation center for automobiles, container storage, repair and maintenance facility, and various 3PL services. This site is of potential interest in the SCAG Inland Port Feasibility Study described below, and could be considered a possible element of a north-south CIRIS system.

Exhibit 97: Southern California Logistics Rail Complex Site



SCAG Inland Port Feasibility Study

The Southern California Association of Governments is now sponsoring a two-year Inland Port Feasibility Study described as follows in the RFP.

"The purpose of this study is to determine the potential benefits an Inland Port could bring to the region, the usefulness of such a facility to users of the goods movement system, and the effectiveness of an Inland Port in reducing goods movement-related congestion in the region. As described in the 2004 Regional Transportation Plan, Inland Ports could function as inland sorting and depository centers for ocean and domestic containers, as well as assembly points for cargo destined for points either within or outside the region. Inland Ports could also potentially introduce additional efficiencies in the goods movement system and supply chain."

"The goal of this study is to evaluate alternative Inland Port concepts, then evaluate the ability of those concepts to generate benefits to the public as well as the private sector, both regionally and locally, in the form of reduced congestion and community impacts, improved air quality, and increased supply chain efficiency and reliability."

The initiation of this broadly defined inland port feasibility study opens the way to more extensive and organized north-south coordination on the development of an inland port/rail shuttle strategy. The study began in January 2006, and is expected to take 18 months.

State Rail Plan

The CIRIS concept is not specifically reflected in the current State Rail Plan, issued in December 2004, which is focused primarily on passenger service. The Plan contains a freight rail element and cites as major issues congestion in Southern California, the sharing of capacity between freight and passenger services, and the future of short lines. The discussion of funding needs concerns the short lines.

The Rail Plan, however, is instructive in the way passenger issues and funding are organized by corridor rather than by locality or agency, thereby linking funding requirements to services provided and large constituencies served. The concept of freight corridors does emerge in the Goods Movement Action Plan.

State Goods Movement Action Plan

The Goods Movement Action Plan (GMAP) Phase I: Foundations report was issued in September 2005. The action plan establishes the importance of goods movement to California, lists a number of projects, and lays out future steps towards implementation of the plan.

In effect, the GMAP encourages statewide coordination. The GMAP explicitly recognizes the desirability of statewide consensus for federal freight funding applications. Given the need to tap all possible funding sources for ambitious inland port and rail shuttle projects, it may be more feasible to obtain federal funding for a north-south package than for separate CIRIS and Southern California projects. The CIRIS project has a lower price tag since no facility construction is involved in the initial stages.

The GMAP designates the Bay Area & Central Valley regions as "priority corridors", although it does not explicitly mention I-580. The priority designation and the organization of issues into corridors should both be beneficial to CIRIS.

GMAP Phase II. The next steps in the GMAP process include some with importance to both CIRIS and the potential for statewide coordination.

- A Phase II Action Plan is targeted for July 2006. It is to be supervised by a cabinet working group and address two themes relevant to CIRIS: capacity expansion, and goods movement-related environmental and community mitigation. (Safety and security are also key themes but have less application to CIRIS.) Phase II action plans are expected to include operational improvements, infrastructure prioritization, and facilitation of project delivery. CIRIS can easily fit into this framework.

- An Infrastructure Work Group is charged with the development of business plans for infrastructure projects, particularly for public-private initiatives such as CIRIS.

- The Emissions Reduction Plan embedded in the Goods Movement Action Plan will be aimed at reducing goods-movement related emissions back to 2001 levels by 2010. The emissions plan is to be developed by CalEPA and ARB with local agency input and participation. The emissions discussion places the heaviest emphasis on ports and port operations, particularly in Southern California. To the extent that CIRIS is viewed as a port emissions reduction measure it might be included in the emissions plan.

The Phase II report is expected to include a prioritized list of projects and a funding/implementation plan.

Statewide Coordination Potential

The prospect of true statewide coordination raises the possibility of linking Northern California, Central Valley, and Southern California initiatives into a single effort.

The CIRIS nomenclature – California Inter-Regional Intermodal System – was chosen in part to emphasize the inter-regional nature of the concept and to allow or even encourage expansion of the idea beyond an Oakland-Stockton rail shuttle. There is no reason why the CIRIS initiative could not ultimately encompass service to the Bakersfield market from either the north or south, or service between the San Pedro Bay ports and a future Inland Port facility.

The first step in achieving statewide coordination could be creating a "California Inland Port Coalition" or equivalent organization. Such an organization would provide a framework for discussions, information sharing, concept recognition, and emergence of a permanent JPA or other umbrella organization. The emergence of a coalition or other organization, even without the legal standing of a JPA, would also signal the railroads and other stakeholders that the initiative was serious and progressing. Coalition members could engage the railroads in more definitive discussions than a consultant team can hold.

The FAST Corridor project in Washington State provides the best-known prototype for such an organization. In the FAST Corridor project a number of Seattle-area communities, agencies, and jurisdictions developed an ambitious, multi-year program of rail grade crossing improvements.

The success of the effort has been attributed to the agreement among the organizations to 1) jointly pursue funding for all of the individual projects, 2) complete each project as funding became available, and 3) maintain the coalition and the mutual support until the entire program was complete. The FAST Corridor agreement gave the program a distinct consensus voice greater than the sum of its parts and greatly reduced the funding competition and infighting.

The joint powers authority (JPA) has been a common and effective organization tool for multi-jurisdictional transportation initiatives in California. Prominent examples include the Capital Corridor, the SJRRC, and the ICTF. If, as it appears, an umbrella organization is needed for statewide coordination, a JPA may be a logical choice. A statewide JPA to implement a north-south intermodal rail system would be an ambitious step with few if any precedents, but also a logical successor to either a statewide coalition or a single-region JPA.

A statewide JPA could potentially pursue the following objectives, in rough chronological order.

- Development of transloading at the Port of Stockton
- Funding of a CIRIS demonstration service
- An ACTA-sponsored rail shuttle demonstration in 2006 (funded)
- Funding of a Shafter intermodal terminal
- Funding of a Southern California Inland Port
- Start up of ongoing service to existing facilities
- Addition of service to new facilities as they come on-line
- Expansion of terminal and line capacity as required
- Acquisition of dedicated cars and locomotives

Exhibit 98 displays all of the major routes and terminal sites discussed to date from both Northern and Southern California perspectives.

- CIRIS Phase 1 would link the Port of Oakland with the Stockton and Fresno terminals, including a transloading operation at the Port of Stockton.
- CIRIS Phase 2 would seek expansion to cover the Sacramento and Bakersfield markets, and a separate terminal in the Modesto market. A Crows Landing site would have potential if shortline service can be established.

The Southern California system shown in Exhibit 98 is conceptual, linking the Ports of Los Angeles and Long Beach and the Los Angels intermodal terminals with the Inland Empire, the Victorville area, and the Bakersfield market. A more detailed system concept should emerge from the SCAG Inland Port Feasibility Study just begun.

Exhibit 98: Statewide System Potential

There are some clear potential benefits to a statewide north-south system.

- **Funding.** A statewide consensus program would have a better chance of securing both state and federal funding.

- **Economics.** A broader multi-market system allows additional economic leverage. As noted in the 2003 Feasibility Study the longer, more truck-competitive movements to Oakland from Fresno and Bakersfield can balance the less-remunerative movements from Stockton. Movements from the San Pedro Bay ports to the Inland Empire are likely to require significant subsidies as well.

- **Operations.** A linked north-south system might allow operational flexibility as well, including the repositioning of empty intermodal cars and empty containers between Oakland and the San Pedro Bay ports.

- **Seasonal congestion relief.** Over the last 6 – 7 years the California container ports have seen major episodes of massive port congestion and the need to reroute large volumes of marine containers. The major tool for rerouting has always been trucking. The existence of a functioning rail alternative for north-south repositioning would create a much-needed safety valve.

- **Statewide system capacity.** The development of a regular rail intermodal service linking existing, expanded, and new terminals would add to the state's overall goods movement capacity as well as increasing the effective throughput capacity of the Ports of Oakland, Long Beach, and Los Angeles.

Exhibit 99 suggests the possible scope of a coordinated north-south service. Southbound trains from Oakland could carry empty and loaded containers for Central Valley and the Inland Empire, imports for the Los Angeles market, and empty intermodal cars being repositioned to Southern California. At Central Valley terminals a southbound train could add cars with export loads or empties headed for Southern California ports. At an Inland Empire Inland Port, the train could pick up export loads and import empties for San Pedro Bay, performing the function of a Southern California rail shuttle. A northbound train would reverse the flows. Some of these flows could be quite small or intensely seasonal. The existence of a backbone CIRIS operation, however, could facilitate seasonal expansion and contraction as required.

Exhibit 99: Potential Statewide North-South Marine Container Flows

SOUTHBOUND	OAKLAND	STOCKTON - MODESTO	FRESNO	BAKERSFIELD	INLAND EMPIRE	LA RAMPS	S. CALIF. PORTS
Central Valley Import Loads							
Empties for Exports							
Inland Empire Import Loads							
LA Import Loads							
Repositoned Empties							
Empty Intermodal Cars							
Central Valley Export Loads							
Central Valley Import Empties							
Inland Empire Import Empties							
Inland Empire Export Loads							

NORTHBOUND	OAKLAND	STOCKTON - MODESTO	FRESNO	BAKERSFIELD	INLAND EMPIRE	LA RAMPS	S. CALIF. PORTS
Central Valley Import Loads							
Empties for Exports							
Inland Empire Import Loads							
Bay Area Import Loads							
Repositoned Empties							
Empty Intermodal Cars							
Central Valley Export Loads							
Central Valley Import Empties							
Inland Empire Import Empties							
Inland Empire Export Loads							

Appendices

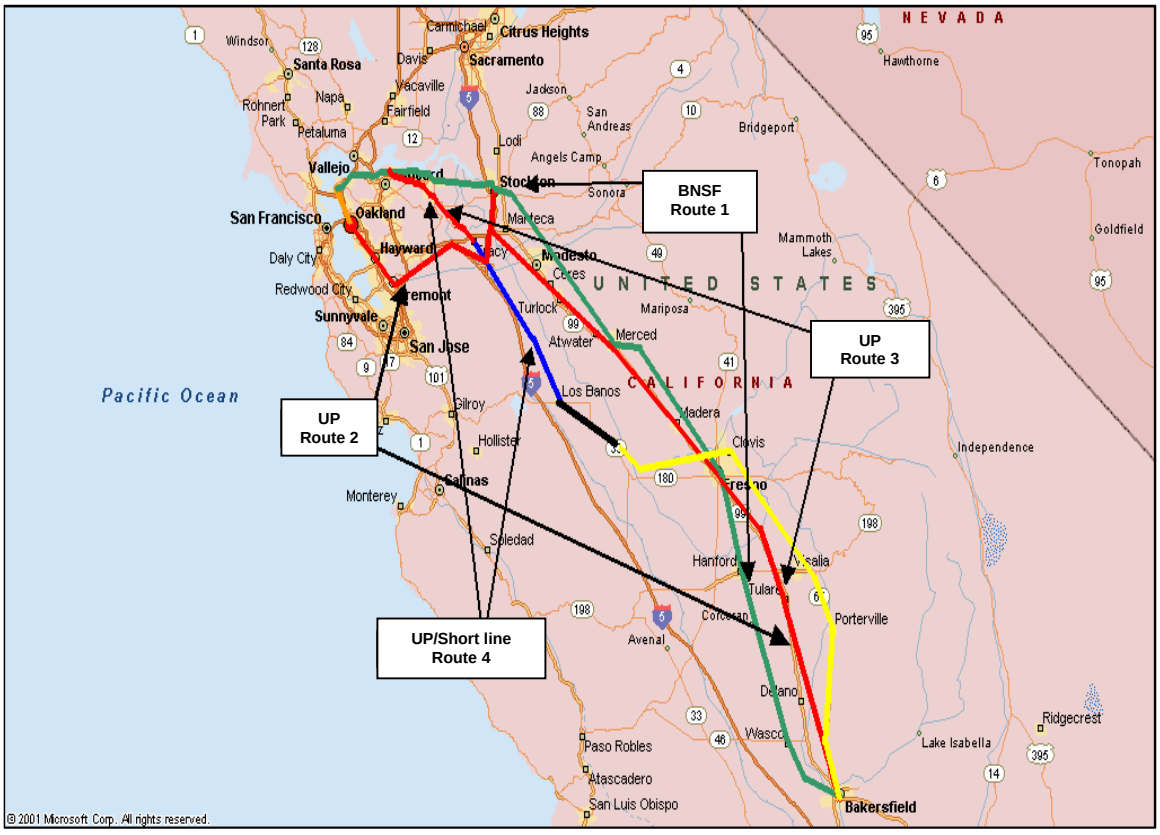
A. Rail Route Options

Potential Rail Routes

Railroad Industries, Inc. analyzed the potential rail routes for initial CIRIS service to Stockton and Fresno, and expansion to Bakersfield. There are four possible rail routes between the Port of Oakland and Bakersfield, CA. (Exhibit 100) Two of the four routes are currently in use. The other two have portions of the route that are currently not serviceable.

- Route Option 1: BNSF Railway Richmond to Stockton to Bakersfield (in use)
- Route Option 2: Union Pacific Altamont Pass to Fresno Line (in use)
- Route Option 3: Union Pacific Mococo Line to Fresno Line (not serviceable)
- Route Option 4: UP/Short Line Mococo Line to West Valley Line to Fresno Line (not serviceable)

Exhibit 100: Possible CIRIS Rail Routes



Route Option 1: Burlington Northern Santa Fe Oakland to Bakersfield

The BNSF route from the Port of Oakland to Bakersfield is the shortest route (314 miles) of all of the alternatives. The BNSF operates over the UP lines to Richmond and then its own lines all the way to Bakersfield (Exhibit 101).

Exhibit 101: BNSF San Joaquin Valley Route

Passenger trains operate over the entire line (Exhibit 102). The BNSF has intermodal yard terminals at Oakland, Richmond, Stockton, and Fresno.

Exhibit 102: BNSF San Joaquin Valley Route Segments

Route	Line Description	Track Owner	Trackage Rights	Yards/ Terminals	Track Miles
Port of Oakland to Richmond	n/a	UP	BNSF/Amtrak	Oakland	11.9
Richmond to Port Chicago	n/a	BNSF	UP/Amtrak	Richmond	25.0
Port Chicago to Oakley	n/a	BNSF	UP/Amtrak	n/a	18.1
Oakley to Stockton	n/a	BNSF	UP/Amtrak	Stockton	25.2
Stockton to Escalon	n/a	BNSF	Amtrak	Stockton	19.3
Escalon to Merced	n/a	BNSF	Amtrak	n/a	46.0
Merced to Fresno	n/a	BNSF	Amtrak	n/a	58.7
Fresno to Bakersfield	n/a	BNSF	Amtrak	Bakersfield	110.3
Total Route Miles					314.5

The BNSF line is FRA Class 5 Status operating at speeds up to 70 mph (Exhibit 103). The majority of the line CTC controlled and single track. At this time the maximum capacity level is 50%.

Exhibit 103: BNSF San Joaquin Valley Route Capacity

Route	Siganling System	FRA Track Status	Annual GTM (mil)	Maximum Train Speed	Est. Freight Moves/Day	Train Cap per Day	% of Capacity	Passenger Trains (daily)
Port of Oakland to Richmond	CTC/Double	Class 4-5	1-5+	40-60 mph	5	70	7%	Yes (24)
Richmond to Port Chicago	TWC/Single	Class 4-5	20-30	45-70 mph	15	35	43%	Yes (24)
Port Chicago to Oakley	CTC/Double	Class 4-5	20-30	45-70 mph	15	35	43%	Yes (4)
Oakley to Stockton	CTC/Single	Class 4-5	30-40	45-70 mph	15	35	43%	Yes (4)
Stockton to Escalon	CTC/Single	Class 5	40+	70 mph	20	40	50%	Yes (8)
Escalon to Merced	CTC/Single	Class 5	40+	70 mph	20	40	50%	Yes (8)
Merced to Fresno	CTC/Single	Class 5	40+	70 mph	20	40	50%	Yes (8)
Fresno to Bakersfield	CTC/Single	Class 5	40+	70 mph	20	40	50%	Yes (8)
Total Route Miles								

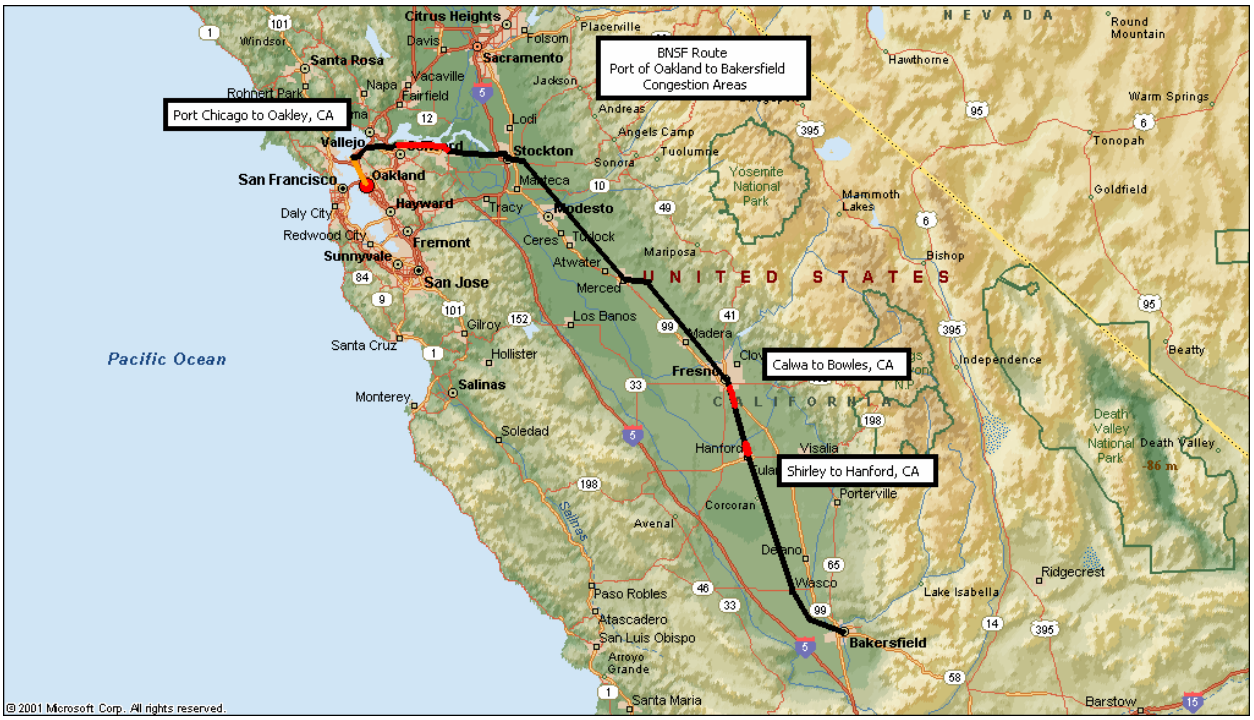
Though the line appears to be at 50% of capacity, this is misleading. The BNSF passes through numerous cities, which requires slowing the train. In addition, the freight traffic must wait for passing Amtrak trains. This leads to congestion on parts of the system. The State of California has three capital projects on this route designed to reduce congestion (Exhibit 104).

- Double track 17.6 miles of track between Port Chicago and Oakley. The engineering, design and environmental work is planned for completion in the summer 2006 and the installation of CTC and siding construction is scheduled to be completed at the end of 2005.

- Complete construction on double tracking two major track segments totaling 14.3 miles between Calwa to Bowles, and Shirley to Hanford by the Fall 2005

- Complete environmental work, design, and engineering for a second main track between Shafter and Jastro (12.5 miles) by the end of 2005. Double tracking the line will immediately double the capacity on this section of the line.

Exhibit 104: State of California Capital Projects



The primary issue associated with the BNSF route is the desire for the BNSF to participate in a program as envisioned by CRIS. Independent of the BNSF desire to participate in this program, the BNSF route is by far the best route for a new intermodal service between the Port of Oakland and Bakersfield.

Route Option 2: Union Pacific: Altamont Pass to Fresno Line

The Union Pacific has a route (Exhibit 105) from the Port of Oakland that moves to the south over the Altamont Pass to the San Joaquin Valley and then on to Bakersfield (326 miles). The entire route is owned by the UP, but the BNSF has trackage rights over the line between the Port of Oakland and Niles, CA.

Exhibit 105: UP Altamont Pass Route

There are several Amtrak and ACE trains that operate on portions of the track between Oakland and Lathrop (Exhibit 106).

Exhibit 106: UP Altamont Pass Route Segments

Route	Line Description	Track Owner	Trackage Rights	Yards/ Terminals	Track Miles
Port of Oakland to Elmhurst	Coast Line	UP	BNSF	Oakland	8.7
Elmhurst to Newark	Coast Line	UP	BNSF	n/a	33.4
Newark to Niles	Centerville Line	UP	BN/Amtrak/ACE	n/a	5.8
Niles to Lathrop	Altamont Pass	UP	BNSF/ACE	Lathrop	56.3
Lathrop to Modesto	Fresno Line	UP	none	Lathrop	20.5
Modesto to Merced	Fresno Line	UP	none	n/a	36.7
Merced to Fresno	Fresno Line	UP	none	Fresno	56.9
Fresno to Bakersfield	Fresno Line	UP	none	Bakersfield	107.7
Total Route Miles					326.0

The UP has terminals at Oakland and Lathrop. With the exception of the track between the Port of Oakland and Newark, the line is CTC controlled and single track. The majority of the track is FRA Class 4 Status (Exhibit 107). The speeds on the route range from 30 to 60 mph on the northern portion of the track to Modesto, and range from 60 to 65 mph on the southern portion into Bakersfield.

Exhibit 107: UP Altamont Pass Route Capacity

Route	Siganling System	FRA Track Status	Annual GTM (mil)	Maximum Train Speed	Est. Freight Moves/Day	Train Cap per Day	% of Capacity	Passenger Trains (daily)
Port of Oakland to Elmhurst	ABS/Double	Class 4	20	30-60 mph	15	35	43%	Yes (8)
Elmhurst to Newark	TWC/Single	Class 4	10	30-60 mph	15	35	43%	Yes (8)
Newark to Niles	CTC/Single	Class 4	10	30-60 mph	15	35	43%	Yes (6)
Niles to Lathrop	CTC/Single	Class 3-4	10	35-60 mph	16	30	53%	Yes (6)
Lathrop to Modesto	CTC/Single	Class 4	40	60-65 mph	20	35	57%	No
Modesto to Merced	CTC/Single	Class 4	40	60-65 mph	20	35	57%	No
Merced to Fresno	CTC/Single	Class 4	20	60-65 mph	15	35	43%	No
Fresno to Bakersfield	CTC/Single	Class 4	20	60-65 mph	15	35	43%	No
Total Route Miles								

The average capacity on this route is between 43% and 57%. As with the other routes through the San Joaquin Valley, the line has become tied up and slowed due to the numerous road crossings within the cities and the number of train meets. There are no specific areas of congestion on this route. The addition of a new intermodal train will need to be coordinated with the ACE trains on the Altamont Pass. This route is a good candidate for a new intermodal train assuming the new trains operated at night.

Route Option 3: Union Pacific Mococo Line to Fresno Line

The entire UP Mococo/Fresno Line (Exhibit 108) is owned by the Union Pacific. The 337-mile route originates at the Port of Oakland then arches north to Richmond and Martinez and then moves south to Bakersfield.

Exhibit 108: UP Mococo/Fresno Line

The rail line between the Port of Oakland and North Richmond is heavily traveled by both UP, BNSF and Amtrak trains (Exhibit 109). While the UP owns this portion of the track, the BNSF and Amtrak have trackage rights to operate on the line.

The line between Port Chicago and Pittsburg is currently out of service, but the track is still in place. Southern Pacific Railroad stopped using and maintaining the line in the late 1980s and early 1990s apparently due to the company's financial trouble. The speeds at the time prior to abandonment were between 30 and 50 mph. At the present time the Union Pacific is storing cars on the line. RII projects that the speed on this line, once the stored cars are removed, is probably no more than 10 mph.

On average the speeds on the portions of the UP Mococo/Fresno Lines that are actually operating range from 40 to 60 mph. The Union Pacific has an intermodal terminal located at Lathrop and a paper ramp at Fresno.

Exhibit 109: Mococo/Fresno Line Segments

Route	Line Description	Track Owner	Trackage Rights	Yards/ Terminals	Track Miles
Port of Oakland to N. Richmond	n/a	UP	BNSF/Amtrak	Oakland	12.4
North Richmond to Martinez	n/a	UP	BNSF/Amtrak	n/a	19.5
Martinez to Port Chicago	Moccoco Line	UP	BNSF/Amtrak	n/a	6.0
Port Chicago to Pittsburg	Moccoco Line	UP	none	n/a	8.9
Pittsburg to Tracy	Moccoco Line	UP	none	n/a	55.4
Tracy to Lathrop	UP Tracy Line	UP	none	Lathrop	13.0
Lathrop to Modesto	Fresno Line	UP	none	Lathrop	20.5
Modesto to Merced	Fresno Line	UP	none	n/a	36.7
Merced to Fresno	Fresno Line	UP	none	Fresno	56.9
Fresno to Bakersfield	Fresno Line	UP	none	Bakersfield	107.7
Total Route Miles					337.0

As Exhibit 109 indicates the portion of the UP route between Oakland and Port Chicago is shared with Amtrak and BNSF through trackage rights.

- Amtrak routes the Capitals, the San Joaquins, the Coast Starlight, and the California Zephyr over this route.

- BNSF uses this route to reach the Oakland International Gateway (OIG), carload interchange customers in the Oakland area, and, the NUMMI plant at Warm Springs.

As Exhibit 110 shows, this intensive use results in congested conditions even though the route is double track CTC. In previous studies the 38-mile segment from Oakland to Port Chicago was labeled the "East Bay Bottleneck." Capitals, Coast Starlights, and California Zephyrs leave the route at Martinez to head toward Sacramento. San Joaquins leave the UP line at Port Chicago and use the BNSF route through the Delta.

Exhibit 110: Mococo/Fresno Line Capacity

Route	Siganling System	FRA Track Status	Annual GTM (mil)	Maximum Train Speed	Est. Freight Moves/Day	Train Cap per Day	% of Capacity	Passenger Trains (daily)
Port of Oakland to N. Richmond	CTC/Double	Class 4-5	30	40-60 mph	40	70	57%	Yes (24)
North Richmond to Martinez	CTC/Double	Class 4-5	30	40-60 mph	16	70	23%	Yes (24)
Martinez to Port Chicago	ABS/DTC	Class 3-4	30	10	16	10-20	80%	No
Port Chicago to Pittsburg	out of service	Excepted	-	10	-	0	0%	No
Pittsburg to Tracy	out of service	Excepted	-	10	-	0	0%	No
Tracy to Lathrop	CTC/Single	Class 3-4	20	10	11	35	31%	No
Lathrop to Modesto	CTC/Single	Class 4	40	60-65 mph	20	35	57%	No
Modesto to Merced	CTC/Single	Class 4	40	60-65 mph	20	35	57%	No
Merced to Fresno	CTC/Single	Class 4	20	60-65 mph	11	35	31%	No
Fresno to Bakersfield	CTC/Single	Class 4	20	60-65 mph	11	35	31%	No
Total Route Miles								

The total train capacity on the route is dependent upon the number of tracks and the type of signaling. In the heavier capacity routes between Port of Oakland and the Martinez line is CTC controlled and double tracked. The southern portion of the track between Stockton and Bakersfield is CTC controlled and single track. Based on these factors, RII has estimated that the northern portion of this route is operating at between 57% and 80% of capacity with a significant portion of the capacity taken up with the Amtrak trains. The southern portion of the line ranges from 31% to 57%. No Amtrak trains operate on the southern portion of the UP Mococo/Fresno route.

From the charts above, the capacity on the operating portions of the route appears to have room for expansion. In fact, however, all of the routes through the Central Valley pass through towns and cities with many road crossings. So while the speed limit is posted at 60-70 mph, in reality the trains must slow to deal with the road crossings, train meets, and slow orders on the routes. Increasing the number of trains on this route should not strain the network if the new train is scheduled for off peak hours.

Because the Mococo Line is not currently serviceable this route is not a candidate for a start-up or demonstration service. The availability of this route for long-term CIRIS operation is complex and uncertain, and unlikely to be resolved in the near future. The involvement of the Mococo Line in the eBART project is the subject of a separate section at the end of this Appendix.

Route Option 4: Union Pacific/Short Line – Mococo Line to West Valley Line to Fresno Line

The third conceptual route option involves the Union Pacific lines and the lines of two short line railroad owned by RailAmerica: California Northern Railroad (CFNR) and the San Joaquin Valley Railroad (SJVR). This route (Exhibit 111) is 336 miles long.

Exhibit 111: UP Short Line Route

The line between the Port of Oakland and Tracy is owned by the UP (Exhibit 112). The portion of the track between Martinez and Tracy (Mococo Line) is currently out of service. At Tracy, the line connects with the CFNR (the old Southern Pacific line) through to Los Banos. The tracks between Los Banos and Firebaugh were removed by the SP. The track is in place beginning at Firebaugh and runs through to Bakersfield on the SJVR.

Exhibit 112: UP/Shortline Route Segments

Route	Line Description	Track Owner	Trackage Rights	Yards/ Terminals	Track Miles
Port of Oakland to N. Richmond	n/a	UP	BNSF/Amtrak	Oakland	12.4
North Richmond to Martinez	n/a	UP	BNSF/Amtrak	n/a	19.5
Martinez to Port Chicago	Moccoco Line	UP	BNSF/Amtrak	n/a	6.0
Port Chicago to Pittsburg	Moccoco Line	UP	none	n/a	8.9
Pittsburg to Tracy	Moccoco Line	UP	none	n/a	55.4
Tracy to Los Banos	CFNR	CFNR	none	n/a	56.8
Los Banos to Firebaugh	out of service	?	out of service	n/a	25.8
Firebaugh to Fresno	SJVR	SJVR	none	n/a	44.3
Fresno to Bakersfield	Fresno Line	UP	none	Bakersfield	107.7
Total Route Miles					336.8

The northern UP line is FRA Class 4-5 Status with speed ranging from 40 to 60 mph. The short line tracks are FRA Class 2 for the CFNR and FRA Class 4 for the SJVR. The speeds are limited to 25 mph and 20 mph respectively (Exhibit 113). The train capacity on these lines is not an issue except for the UP portion of track between Martinez and Port Chicago.

Exhibit 113: UP/Shortline Route Segments

Route	Siganling System	FRA Track Status	Annual GTM (mil)	Maximum Train Speed	Est. Freight Moves/Day	Train Cap per Day	% of Capacity	Passenger Trains (daily)
Port of Oakland to N. Richmond	CTC/Double	Class 4-5	30	40-60 mph	40	70	57%	Yes (24)
North Richmond to Martinez	CTC/Double	Class 4-5	30	40-60 mph	16	70	23%	Yes (24)
Martinez to Port Chicago	ABS/DTC	Class 3-4	30	10	16	10-20	80%	No
Port Chicago to Pittsburg	out of service	Excepted	-	10	-	0	n/a	No
Pittsburg to Tracy	out of service	Excepted	-	10	-	0	n/a	No
Tracy to Los Banos	None	Class 2	1	25	1	1-10	10%	No
Los Banos to Firebaugh	track removed	n/a	-	n/a	n/a	n/a	n/a	No
Firebaugh to Fresno	None	Class 2	1	20	1	1-10	10%	No
Fresno to Bakersfield	CTC/Single	Class 4	40	60-65 mph	20	35	57%	No
Total Route Miles								

If the entire line were to become operational there may be some congestion experienced in the Fresno area.

There are many issues that are unresolved with this route alternative.

- The Mococo Line must be available and upgraded to handle intermodal service
- The track must be replaced between Los Banos and Firebaugh
- Train schedules and trackage agreements will need to be coordinated with all three rail carriers.

The lead time to implement this alternative is long and the cost to prepare this route will very high.

This is the least likely alternative route for providing intermodal service between Bakersfield and the Port of Oakland. As Exhibit 111 indicates, between Tracy and Firebaugh the route would follow SP's former "West Valley" route, well away from the markets CIRIS is attempting to serve. Between Firebaugh and Clovis the line switches to the east edge of the valley. None of the short lines or routes have access to operating intermodal terminals. As noted earlier and explained below, the future availability of the Mococo Line is uncertain. If this route were to be used for intermodal traffic it would be necessary to either construct intermodal terminals or negotiate access to existing terminals (with attendant detours from the route).

The Mococo Line and eBART

BARTD is interested in acquiring or using the Mococo Line to extend BART service into Eastern Contra Costa County and eventually towards San Joaquin County. The eBART project team is a partnership among BART, the Contra Costa Transportation Authority (CCTA) and the communities in East Contra Costa County. BART and the Federal Transit Administration (FTA) are co-lead agencies in the environmental review process for the eBART project. In a 2002 feasibility study, BART and CCTA recommended diesel multiple unit trains ("DMUs") that would operate in the median of State Route 4 and then travel southeast to Byron. As part of the process, BART and the Federal Transit Administration (FTA) have started the environmental review in which alternatives,

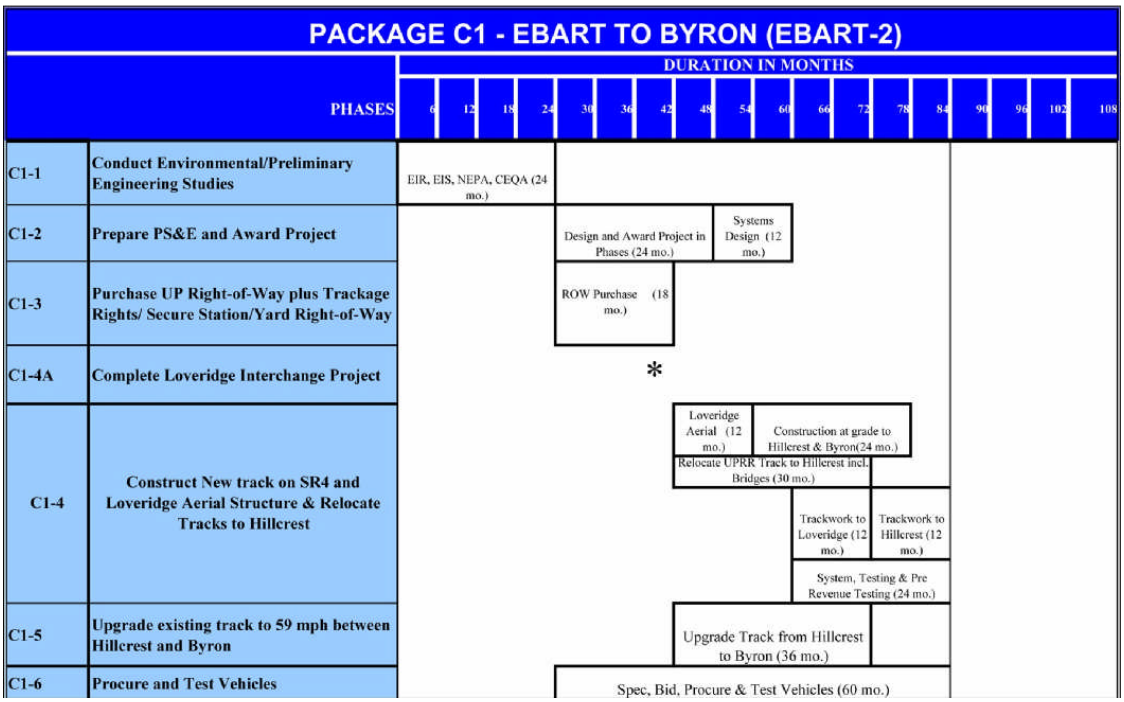
impacts and mitigation measures will be studied in detail. This review is expected to be complete in 2007. The scoping period for the Environmental Impact Statement / Environmental Impact Report (EIS/EIR) closed on August 20, 2005. BART is in the process of evaluating the project scoping comments that were submitted in the scoping process. The next opportunity to comment will be on the draft EIS/EIR, which is scheduled to be available in Fall 2006. Until the draft EIS/EIR document is completed, the amount of information available at this early stage is limited. The current project schedule envisions construction starting after 2007 and operations beginning in 2010, although the feasibility study indicates a minimum of 7 years for service out to Byron.

Two eBART DMU alternatives are under consideration.

- Package "C" calls for acquisition of half the 100-foot UP right-of-way and construction of new double track for eBART, leaving the existing UP line potentially available for freight service (e.g. CIRIS). UP has reportedly said that this scenario is acceptable to them. Capital costs for Package C are estimated at $802 million (in 2002 dollars), with an 8.5 year construction phase beginning in 2007. Package C would leave the existing Mococo line potentially available for CIRIS, but still requiring negotiations with UP and substantial upgrading. The feasibility study, however, concluded that this alternative could not be funded under existing conditions.

- Package "C1" calls for initial operation over upgraded UP trackage, with a subsequent "C2" Package for eventual construction of new double track. (Exhibit 114) Package C1 would upgrade the UP line and add passing sidings, benefiting potential CIRIS use. If Package C2 double-tracking were eventually completed, the line would have even more capacity. Package C1 has estimated capital costs of $377 million, of which a small portion is committed. The feasibility study concluded that funding Package C1 would be possible given favorable outcomes in renewing various funding measures, inclusion of eBART in those funds, and substantial bridge loan financing during construction. Funding of the Package C2 double-tracking was not addressed in detail.

Exhibit 114: eBART Package C1 Implementation Plan



The feasibility study, however, raises the following complexities regarding acquisition of right-of-way, UP retention of trackage rights for freight use, and implementation of Package C1.

> *"Ideally the UP could be convinced to waive the need for trackage rights. This may not be feasible or may add considerably to the acquisition cost. The answers to these questions cannot be determined until actual acquisition negotiations are undertaken."*

> *"If the UP would not waive trackage rights, the next best approach would be to get agreement on a temporal separation of freight and passenger traffic. This would involve relegating any freight activity to the very late evening and early morning hours. A temporal separation is required if non-FRA compliant DMUs are to be operated. (As the eBART concept is to meet every BART train, UP would be running its freight traffic from 2:00 a.m. to 3:30 a.m.)"*

> *"If the UP does not agree to either waive trackage rights or a temporal separation, then the eBART system must be planned and designed to operate as if freight trains would be sharing the tracks with the passenger trains. This definitely requires the use of FRA compliant DMUs. There is no manufacturer that currently produces such a vehicle, although one manufacturer has an operating prototype and a second has developed a conceptual design. The current freight train usage of these tracks is very infrequent. However, there is always the risk that future circumstances may change this situation. For example, weather or earthquake damage to the Altamont Pass route could force trains onto the Mococo Line."*

> *"Thus, there is a risk that Package C-1 may prove to be infeasible if the UP does not agree to waive or temporally reduce its trackage rights and an FRA compliant vehicle is not available for purchase. It seems, however, very likely that an FRA compliant vehicle*

would be available in the time-frame required for implementation which allows 6 to 8 years before the acquisition of the vehicles needs to occur."

Given the current tight capacity constraints that UP is facing and UP's reported increasing use of the Altamont Pass route for freight, it appear likely that UP will seek to retain trackage rights to maximize their own capacity and flexibility. If UP were to retain trackage rights for freight (similar to the arrangement on the Caltrain Peninsula line), CIRIS could conceivably use those trackage rights. A restriction to 2:00 am to 3:30 am would be very narrow for day-in-day-out schedule variability, but might work if no other freight trains were operating. The worst Package C1 outcome for eBART – that UP retains trackage rights for freight without narrow temporal restrictions – would be the best outcome for CIRIS. Under those circumstances the Mococo Line could be upgraded and CIRIS sponsors could negotiate with UP for UP operation of CIRIS trains or for trackage rights for another operator. The above quote also raises the possibility that Package C1 with freight rights might not be feasible at all if suitable vehicles cannot be designed and procured. Under those circumstances the Mococo Line would remain dormant unless funds could be found to upgrade it for freight use or UP eventually upgrades it for their own use.

The current version of the Governor's Strategic Growth Plan includes $400 million for rail transit in the proposed 2006 bond measure and $100 million in the proposed 2008 bond measure. Those amounts by themselves are unlikely to yield enough for eBART to build the Package C double-track option, but might put the objective within reach if other funds (e.g. Federal funds) can be tapped.

B. Rail Costing

Approach

There are four possible rail routes between the Port of Oakland and the San Joaquin Valley, but only two routes are operational at this time. Based on each route's characteristics, RII determined the railroad's cost to provide intermodal service. These costs are included in the following sections.

When a railroad is intent on entering into a new market, some times the railroad will set rates at a very minimum in order to attract the business. While this is an option for the San Joaquin intermodal shuttle, the costs developed by RII are the very minimum and it is not likely that either UP or the BNSF would consider setting rates on costs lower than those presented in this report.

None of the cost components used to determine the short run and long run variable costs include property acquisition or rail line rehabilitation costs. In general, railroads obtain a return on the underlying assets by charging a freight rate that will provide at an after-tax return on the value of the asset sufficient to cover the cost of capital (usually between 8% and 12%). Rates are based on "what the market will bear", but the cost must exceed the variable costs in the short run and the long run variable costs in the long run, or the railroad will not continue to operate. Each railroad develops rates differently, but most railroads are familiar with the concept of "cost plus" pricing. The railroads will still need to maintain the property, and these costs are included in the variable costs.

Cost Analysis Assumptions

RII developed the cost to move an intermodal container to and from the Port of Oakland to three locations in the San Joaquin Valley: Stockton area, Fresno, and Bakersfield. Two rail routes were the focus of the costing analysis: the BNSF San Joaquin Valley Route and the UP Altamont Pass Route.

The costs were developed using the 2003 Uniform Rail Costing System (URCS) created by the Surface Transportation Board. The costs reflect two containers per flatcar moving in intermodal service between intermodal ramps. The cost components do not include any drayage, lift costs, loading and unloading costs, but include a factor for empty repositioning. The key assumptions used to derive the costs are shown in Exhibit 115.

Exhibit 115: Costing Assumptions

Cost Category	Assumption
Fuel	Total cost of fuel.
Labor	Total labor costs including crew, dispatching, and clerical.
Loss & Damage	Average claims paid by the railroad for a specific commodity.
Locomotive	All locomotive expenses excluding fuel and labor.
Equipment Costs	All equipment is assumed to be privately owned. The daily rate represents a TTX car.
Overhead Costs	An average overhead percentage is applied to the short run variable costs to cover the general and administrative expenses. The overhead component does not include any return on underlying assets.
Short Run Variable Costs (SRVC)	The sum of all variable line haul costs.
Long Run Variable Costs (LRVC)	The sum of the SRVC and the overhead cost factor. The LRVC can range from 1.25 to 1.4 of the SRVC.
Data Year	2003

The costs estimated by RII in this report are based on an average size intermodal train moving a container of average weight over a specific distance. These are railroad costs that a railroad will use to set rates and determine the profitability of a business. Railroads always assume that any business is incremental and that there is always a train to handle a new load.

The freight rate cannot be the LRVC for an extended period of time, or the railroad will not earn an adequate return on the underlying assets. RII has not included any "markup" to the costs presented in this report. After discussions with the Class I carriers, a "markup" rate can be set and included in the economics of the rail routes.

All rail mileages were derived from the USRail Desktop model for consistency, but precise figures may vary from those in other sources.

Comparison with Previous CIRIS Reports

RII has prepared cost analyses for previous CIRIS reports for container moves between the San Joaquin Valley and the Port of Oakland. The costs in this report vary from the previous reports as follows:

- All intermodal traffic is assumed to be operating on an intermodal train. Therefore, there are no longer separate cost estimates for manifest trains. The current report uses 2003 data.
- The previous report reflected 2001 data. Changes in operations of either the UP or the BNSF will be reflected in the new data.

Fuel Prices

The recent fuel price increases will have a small affect on the overall cost to move a container between the inland cities to the Port of Oakland. RII prepared an analysis of potential fuel increases to determine the impact on the overall costs (Exhibit 116). Assuming fuel increases between 10% and 60% over the 2003 levels, the per container cost one way will increase from the current projection of $29 per container to as high as $46 per container or a $17 increase.

Exhibit 116: Port of Oakland to Fresno BNSF Rail Route Fuel Price Impacts

Expense Category	$/Cont. 1-way	% of Total	Variation in Fuel Prices					
			10%	20%	30%	40%	50%	60%
Fuel	$14	9%	$16	$17	$19	$20	$22	$23
Labor	$26	16%	$26	$26	$26	$26	$26	$26
Locomotive	$12	7%	$12	$12	$12	$12	$12	$12
Switching	$17	10%	$17	$17	$17	$17	$17	$17
M of W	$29	18%	$29	$29	$29	$29	$29	$29
Loss/Damage	$2	1%	$2	$2	$2	$2	$2	$2
Equipment	$12	7%	$12	$12	$12	$12	$12	$12
Short-run Variable Costs	$112	68%	$114	$115	$117	$118	$119	$121
Overhead	$53	32%	$53	$53	$53	$53	$53	$53
Long-run Variable Costs	$166	100%	$167	$169	$170	$171	$173	$174

All of the Class I carriers enter into long term fuel contracts and therefore, the actual fuel costs will not fluctuate at the level experienced by consumers.

Route Option 1: BNSF Oakland to Stockton to Bakersfield

BNSF San Joaquin Valley Route

The BNSF route from the Port of Oakland to Bakersfield is the shortest route (314 miles) of all of the alternatives. The BNSF operates over the UP lines to Richmond and utilizes the BNSF lines all the way to Bakersfield.

RII developed the costs to move a container between the San Joaquin Valley and the Port of Oakland. Three valley cities were analyzed: Bakersfield, Fresno and Stockton.

- Fuel: The fuel costs represent roughly 10% of the total cost to move a container. As fuel prices increase, this cost component will increase to 13% of the total costs.

- Switching Costs: The switching costs represent the cost to position a flatcar within a train set. The costs are constant regardless of the distance traveled.

- Labor: Labor is directly correlated to the distance traveled, but is a constant percentage of the total move independent of the distance.

Bakersfield. The total short run variable cost to move a container one way between Bakersfield and the Port of Oakland is $157 per container. The cost includes all labor, switching, fuel, and maintenance of way expenses. The following chart provides a summary of the total costs for the movement of an intermodal container on a flatcar to or from Bakersfield and the Port of Oakland.

Exhibit 117: BNSF Costs Port of Oakland to Bakersfield One Way

Expense Category	Cost per Container	% of Total
Fuel	$22	9%
Labor	$37	16%
Locomotive	$18	8%
Switching	$17	7%
M of W	$45	19%
Loss/Damage	$2	1%
Equipment	$15	6%
Short-run Variable Costs	$157	66%
Overhead	$80	34%
Long-run Variable Costs	$237	100%

The total long-run variable cost, including overhead, is $237 per container.

Fresno. The total short-run variable costs to move a container one way between Fresno and the Port of Oakland is $112 per container.

Exhibit 118: BNSF Costs Port of Oakland to Fresno One Way

Expense Category	$/Cont. 1-way	% of Total
Fuel	$14	9%
Labor	$26	16%
Locomotive	$12	7%
Switching	$17	10%
M of W	$29	18%
Loss/Damage	$2	1%
Equipment	$12	7%
Short-run Variable Costs	$112	68%
Overhead	$53	32%
Long-run Variable Costs	$166	100%

The total long run variable cost is $166 per container.

Stockton. The total short-run variable cost to move a container one way between the BNSF Stockton intermodal terminal and the Port of Oakland is $65 per container.

Exhibit 119: BNSF Costs Port of Oakland to Stockton One Way

Expense Category	Cost per Container	% of Total
Fuel	$6	5%
Labor	$13	12%
Locomotive	$5	4%
Switching	$16	14%
M of W	$12	10%
Loss/Damage	$2	2%
Equipment	$11	10%
Short-run Variable Costs	$65	57%
Overhead	$49	43%
Long-run Variable Costs	$114	100%

Due to the shorter distance between the Port of Oakland and Stockton the switching costs become one of the higher cost components. The total long run variable cost is $114 per container.

Route Option 2: Union Pacific Altamont Pass to Fresno Line

RII developed the line haul rail costs to move a container between the San Joaquin Valley and the Port of Oakland via the up Altamont Pass Route (Exhibit 120). Three valley cities were analyzed: Bakersfield, Fresno, and Lathrop. As detailed in the Methodology section the line haul costs do not include drayage or lift fees.

Exhibit 120: UP Altamont Pass Route

- Fuel: The fuel costs represent roughly 10% of the total cost to move a container. As fuel prices increase, this cost component will increase to 13% of the total costs.

- Switching Costs: The switching costs represent the cost to position a flatcar within a train set. The costs are constant regardless of the distance traveled.

- Labor: Labor is directly correlated to the distance traveled, but is a constant percentage of the total move independent of the distance.

Bakersfield. The short run variable cost for a one way trip between Bakersfield and the Port of Oakland is $175 per container. The cost includes all labor, switching, fuel, and maintenance of way expenses. The following chart provides a summary of both the short run and long run costs for the movement.

Exhibit 121: UP Cost per Container Port of Oakland to Bakersfield One Way

Expense Category	Cost per Container	% of Total
Fuel	$28	11%
Labor	$42	17%
Locomotive	$19	7%
Switching	$26	11%
M of W	$43	17%
Loss/Damage	$2	1%
Equipment	$15	6%
Short-run Variable Costs	$175	70%
Overhead	$76	30%
Long-run Variable Costs	$251	100%

The total long-run cost, which includes the company overhead factor, is $251 per container.

Fresno. The total short-run variable costs to move a container round trip from Fresno to and from the Port of Oakland is $131 per container.

Exhibit 122: UP Costs Port of Oakland to Fresno: One Way

Expense Category	Cost per Container	% of Total
Fuel	$18	9%
Labor	$32	16%
Locomotive	$12	6%
Switching	$26	14%
M of W	$28	14%
Loss/Damage	$2	1%
Equipment	$12	6%
Short-run Variable Costs	$131	68%
Overhead	$62	32%
Long-run Variable Costs	$193	100%

Total long run variable cost is $193 per container one way.

Lathrop. The total short-run variable costs to move a container one way between the UP Lathrop intermodal terminal and the Port of Oakland is $86.

Exhibit 123: UP Costs Port of Oakland to Lathrop One Way

Expense Category	Cost per Container	% of Total
Fuel	$8	6%
Labor	$21	16%
Locomotive	$5	4%
Switching	$26	19%
Trackage Rights Fees	$12	9%
Loss/Damage	$2	2%
Equipment	$11	8%
Short-run Variable Costs	$86	64%
Overhead	$48	36%
Long-run Variable Costs	$134	100%

Total long-run variable cost is $134 per container which includes the company overhead factor.

Short-line/Contractor Costing

Contractor Service Concept

All of the previous analyses prepared for the CIRIS project have been based on the same premise that a Class I carrier will provide the proposed intermodal service between the San Joaquin Valley cities and the Port of Oakland. RII has developed a preliminary, conceptual alternative to this approach that is based on service provided by a contractor (e.g. Herzog or equivalent) operating over the Union Pacific Altamont Pass route under the auspices of SJRRC. **Note that neither SJRRC nor the existing ACE contractor participated in these preliminary estimates and that a significant amount of negotiation and due diligence would be required to develop concrete service proposal on this basis.**

In this alternative SJRRC or equivalent would become the sponsor and a contractor would become the rail line-haul operator. The sponsor/contractor would conduct the entire intermodal rail operation between the designated San Joaquin Valley cities and the Port of Oakland, including trackage rights with a scheduled time slot for the trains from the UP, locomotive and equipment acquisition, crew scheduling and marketing of the rail intermodal service. The Class I carrier will not provide any services except access to the track and terminal load/unload by the railroad's terminal contractor,

This alternative has the benefit of economies of scale when combined with the current ACE operations out of the Stockton area:

- Access to existing ACE locomotives and crews that are currently not fully utilized
- An established relationship with the UP for the operation of trains over their Altamont Pass route into the Bay Area.

Contractor Operating Costs

RII developed a preliminary analysis of a contractor rail operation between Fresno and the Port of Oakland. The specifics of the operations are as follows:

- **Locomotives & Crews.** Intermodal operation would utilize existing Herzog/ACE crews and locomotives. The crews currently operate the three ACE trains into the Bay Area every weekday morning and return to the Stockton in the evening. During all other times of the day the crews and locomotives are idle. RII envisioned utilizing these crews and locomotives to operate the intermodal trains on either side of the morning or evening commute depending upon the availability of the corridor. The benefits are: 1) increase utilization of ACE crews and locomotives, 2) reduced incremental costs to the intermodal operations, 3) an established relationship and working agreement with the Class I carrier, the UP, and 4) no significant capital improvement requirements to initiate program.
- **Trackage Rights.** The sponsor/contractor would need to negotiate with the Union Pacific to acquire trackage rights to operate the intermodal trains. Ideally, these rights will include operation times that will be compatible with the existing ACE

operations, but some accommodations may have to be made in order to start up the operation. The benefit of acquiring specific time slots for the intermodal service are: 1) use of the track may or may not be on a pay as you go basis, 2) no capital improvements are required on the route, 3) the Altamont Pass has excess capacity at this time, and 4) the UP will increase their revenues on the route without any additional capital expenses.

The initial analysis indicates that a contractor operation, "piggy backing" on the existing ACE operations could cost less than $50 per container one way, as shown in Exhibit 124.

Exhibit 124: Contractor Costing: Fresno to Port of Oakland

	1-way	Round Trip
Expense Category	**Contractor $/container**	**Contractor $/container**
Fuel	$ 2.05	$ 4.10
Labor	$ 4.31	$ 8.62
Locomotive	$ 1.25	$ 2.50
Administrative	$ 1.69	$ 3.38
Trackage Rights Fees	$ 7.16	$ 14.32
Loss/Damage	$ 0.18	$ 0.36
Equipment	$ 9.36	$ 18.72
Short-run Variable Costs	$ 26.00	$ 52.00
Overhead	$ 15.60	$ 31.20
Long-run Variable Costs	$ 41.60	$ 83.20

These costs are very preliminary, based on a "ground up" analysis, and contain elements of speculation. The costs are intended to encompass all of the components associated with the operation of an intermodal shuttle by the sponsor/contractor. RII has estimated all of these fees based on our knowledge, but final cost estimates will be dependent upon negotiated trackage rights, locomotive and labor agreements and other administrative fees. At this time the salaries are based on union wages, the locomotive costs are based on the depreciation factor for two new locomotives , the trackage fees are based on a rate of $6.14 per mile per train (current fees paid by SJRRC) and the equipment is based on a dedicated leased fleet.

C. Alternative Rail Technologies

Overview of Alternative Rail Technologies

This appendix provides more detailed discussion of three alternative rail intermodal technologies: Rail Runner, the IMTRX RampCar, and Expressway®. All three technologies are intended to accommodate a wide variety of highway trailers in intermodal service. They are all intended to operate from low-cost terminals without lift equipment. These advantages, however, may not be significant for a CIRIS operation as currently envisioned.

Over the relatively short hauls anticipated as part of CIRIS there would be little difference in line haul rail operating cost between the various technologies. Full-platform systems such as the IMTRX RampCar and Expressway have higher tare weights per unit than spine cars or double-stack cars, but the added cost is likely to be small. The Rail Runner system does not require a "car" at all, but does require one rail bogie assembly per unit.

CIRIS is intended to transport containers without chassis wherever possible. Container chassis are more costly than the containers themselves, have higher maintenance costs, are in shorter supply, and add weight and aerodynamic drag to the trains. It is therefore efficient and desirable to leave them behind. To the extent that chassis are used in the initial stages of CIRIS they can be accommodated on all-purpose spine cars or other conventional intermodal cars in the TTX pool. (Exhibit 92) The expected advent of more flexible and efficient chassis pools in the immediate future will facilitate this strategy, and there should be a declining need for containers to travel on chassis. Technologies that accommodate trailers, therefore, may not have advantages for CIRIS.

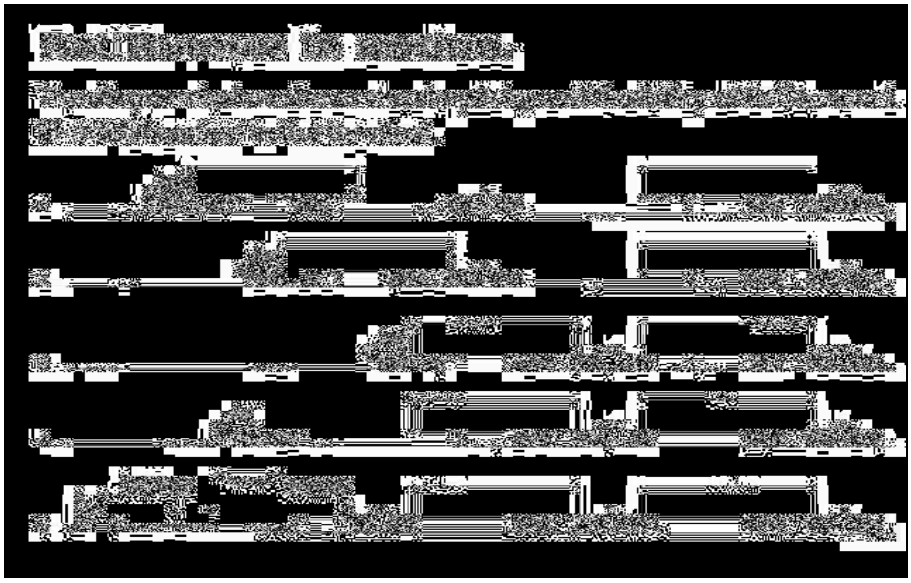
CIRIS service is planned to connect existing rail intermodal terminals at Stockton and Fresno with the existing terminals at Oakland. Terminal infrastructure and lift equipment are already in place, and terminals have reached an efficient scale. Alternative technologies do not usually integrate well with conventional terminal facilities, and attempting to do so may raise additional implementation barriers for CIRIS. A successful CIRIS program could require additional long-term terminal capacity. Public funding for terminal equipment or infrastructure, however, is expected to be more accessible than funding for operating subsidies. In essence, the current public funding environment favors the substitution of capital for operating costs while these alternative systems offer a means of minimizing capital cost in favor of higher ongoing terminal labor expense.

In summary, these technologies may offer considerable promise for their intended purpose, but that purpose does not coincide with near-term CIRIS objectives. Accordingly, the scope of this implementation planning effort did not include a detailed investigation of their cost characteristics. Over the long run, these and other technologies should be monitored for their possible application as CIRIS scope expands.

Rail Runner

The Rail Runner system employs modified container chassis supported by specialized rail wheel assemblies ("bogies") to move containers by rail without rail intermodal cars. Rail Runner is designed to facilitate low-volume intermodal movements without the capital and operating costs of a conventional intermodal terminal with lift equipment. A Rail Runner train is assembled by lining up the modified container chassis with the rail bogies on a terminal track. A rubber-tired yard tractor is used to assemble the train, as shown in Exhibit 125.

Exhibit 125: Rail Runner Terminal Operations



The terminal cost savings for Rail Runners are derived principally from:

- avoiding the capital, maintenance, and full costs of mechanical lift equipment; and
- avoiding the capital cost of the heavy-duty pavement preferred to support mechanical lift equipment.

Experience and the observations of Tioga staff indicate that the incremental terminal labor requirements for Rail Runners are similar to or slightly greater than the labor requirements for a lift-on/lift-off operation. Rail Runners will have higher unit labor costs, but at low volumes would have lower total costs than a mechanical lift operation, which would require roughly 20,000 annual lifts to obtain significant scale economies.

Operating experience in intermodal terminals, however, suggests that appropriate lift equipment can operate indefinitely on the same graded gravel surfaces required for Rail Runner terminals, if side loaders are used instead of rubber-tired gantries. Existing Port of Stockton Tenants have or can obtain the use of lift equipment adequate for start-up operations. The Port has also expressed interest in seeking funding for lift equipment.

Terminal operating experience also suggests that introducing Rail Runner equipment into conventional lift-on/lift-off terminals would yield no significant advantages. At worst, attempting to handle Rail Runner equipment in a conventional terminal operating near its capacity could be disruptive rather than advantageous.

The lighter tare weight of Rail Runner bogies and chassis versus conventional rail cars could result in small line haul cost savings, but these savings are unlikely to be significant on the very short CIRIS routes.

Container chassis used with Rail Runners must be modified at a cost of $500 – $1,000 each. Besides the cost of modification, the use of a modified chassis would require the creation and management of a CIRIS-only chassis pool. Any shortage of modified chassis would hamper the acceptability of CIRIS. A modified chassis pool would function best in a closed system such as the movement of municipal waste on which Rail Runners were tested.

Railroad acceptance of Rail Runners is also a barrier to their use for CIRIS. Rail Runners are typically envisioned as operating in separate trains to avoid mixing them with consists of conventional cars. Rail Runners have performed adequately in tests and demonstration projects, but a Rail Runner train has different handling and braking characteristics.

Given that many of Rail Runner's advantages could not be exploited in CIRIS and that Rail Runner does have other implementation barriers to overcome, the near-term implementation plans for CIRIS do not include the Rail Runner system. Rail Runner technology would have potential advantages for a low-volume start up operation that lacked existing terminals. If at some later date CIRIS were expanded to additional markets without terminals, such as Sacramento, Rail Runner technology might be a serious candidate. It would be appropriate to monitor the progress of Rail Runner technology while CIRIS is being implemented.

IMTRX RampCar

Intermodal Trailer Express Inc. (IMTRX) is a intermodal operating company created by Wabtec Corporation in Wilmerding (Pittsburgh), PA, for the purpose of introducing their seven-platform intermodal railcar. The 439-ft. RampCar is "circus loaded" over a 14-foot long pneumatic ramp located at one end. (Exhibit 126) Canadian National Railway operated prototype RampCars between Montreal and Toronto for 18-months. The RampCar is designed to transport a wide spectrum of wheeled vehicles including containers on chassis and many types of highway trailers. IMTRX intends to develop operations with railroads in the eastern part of the U.S. beginning in early 2007.

Exhibit 126: IMTRX RampCar

The RampCar is a full-wide, continuous-platform design loaded from one end. As volume grows, either the terminal drivers must back down a longer and longer string of cars or multiple loading tracks must be used. This is an inherent limitation of "circus loading" rather than of the equipment type.

IMTRX estimates that RampCars may cost $500,000 each, or roughly $71,400 per platform. By comparison, Tioga estimates that existing single-level spine cars could be purchased for under $120,000 each, or $24,000 per platform (Exhibit 94), if purchase became desirable. Existing double-stack cars could probably be purchased for a maximum of about $170,000 each, or $17,000 per platform/container slot.

As its name indicates, the Intermodal Trailer Express is best suited to accommodate multiple highway trailer types moving to and from new, non-mechanized, low-cost terminals. As a partnership venture, IMTRX has proposed to provide the RampCars and invest in the terminals with selected developers that can provide a load volume and revenue guarantee from a governmental agency within 5% over a five-year period. This is unlikely to be feasible for CIRIS unless the sponsoring agency is will to accept significant risk. Moreover, the start-up scenarios envisioned for CIRIS do not entail significant terminal investment beyond that necessary to establish transloading at the Port of Stockton.

CP Expressway®

Expressway® is a refinement of a rail technology originally named the "Iron Highway". In essence it is a series of connected platforms providing a continuous surface over the length of a

short train. Highway trailers or containers on chassis are driven on and off or spotted by yard tractors. The system has proven advantageous for motor carrier traffic in short-haul markets due to it flexibility in accepting a wide variety of equipment and its simple terminal needs.

This system is basically similar to the IMTRX concept: an articulated, full-width platform car with an integral loading ramp intended to carry highway trailers. (Exhibit 127)

Exhibit 127: Expressway® Intermodal Cars

At present Expressway® equipment operates only on Canadian Pacific Railway (CPR), and the railway has exclusive rights to the system. CPR began Expressway® service in 1999 on the Montreal-Toronto corridor, providing service to retail customers such as the Hudson Bay Company.

While CPR is cooperative in general terms, the cost structure and operating characteristics of the Expressway® technology is considered proprietary. According, Tioga was unable to describe the system economics in detail.

As with the Rail Runner and ITEX technologies, Expressway® has been devised as a means to accommodate a wide range of highway trailers in intermodal service, and to do so from low-cost, low-tech terminals with minimal investment. To achieve these ends, Expressway® accepts a higher tare weight and a slower and less labor-efficient loading and unloading process. Since a key objective of the CIRIS implementation analysis is to minimize operating cost and take maximum advantage of the mechanized terminal infrastructure already in place, Expressway® does not appear to be a good fit for CIRIS. As with the other alternative technologies, Expressway® and its success in real world markets should be monitored for its applicability to future stages of CIRIS.

D. Barge/Short-Sea Concepts

Barge Service Overview

The availability of navigable water between the Port of Oakland and the Ports of Stockton and Sacramento has led to recurrent speculation on the possibility of container barge service. Barge service is intuitively attractive, as it would substitute economical water transport for congested and costly highway trips. Maritime and port industry participants, however, have been skeptical of the potential for barge service. Objections include high startup cost, lack of terminal space in Oakland, slow transit times, and high volume requirements.

A previous feasibility study, now dated, addressed many of the issues but concluded that a barge service would require substantial subsidies and would not therefore be feasible.

Changed circumstances have led to more serious consideration of barge options:

- The urgency of congestion mitigation and the preliminary work on rail shuttles have led to an acceptance of operating subsidies as a concept.

- Increasing container barge traffic on the Columbia River and the recent feeder barge initiatives by the Port Authority of New York and New Jersey have given barge transport greater credibility and highlighted barge operating innovations. The Port Authority's Albany barge service, however, has been unsuccessful and was discontinued.

- Short-sea shipping and its many variations has caught the attention of transportation policy makers searching for solutions to port and gateway congestion.

In general, maritime shipping has lower line-haul costs than rail. The longer the line haul, the greater the advantage. The distance by water between Oakland and Stockton, however, is only 70 – 80 miles, about the same as the rail distance. At such short distances barge or short-sea economics are dominated by the terminal handling and drayage costs—the same problem facing the railroads.

Although there are a variety of different short-sea and barge systems in use or proposed in concept, they all tend to have comparable terminal costs to each other and to rail intermodal. The drayage cost function is, of course, identical, although the locations may differ. Barge and short-sea options, therefore, do not typically offer significant terminal or drayage savings over rail.

The near-term barriers to starting an efficient barge system, particularly the volume requirements, are higher than the hurdles facing a rail service. Analytic work on potential barge services to date has not been encouraging. Given the focus of this study on near-term and long-term implementation of intermodal service between the Port of Oakland and the Stockton, Modesto, and Fresno markets, barge and short-sea alternatives were not included in the detailed study scope.

Barge & Short-Sea Concepts

There have been no detailed operational or market-based studies of container barge or short-sea operations inland from Oakland. One conceptual feasibility study and one related short-sea proposal are described below.

JWD Feasibility Study

In October 2002, JWD Group completed a self-sponsored *Feasibility Study for Container Barges in Northern California*. The initial JWD feasibility study takes the barge concept much farther than earlier, more generic studies. In particular, the JWD work lays out the options for loading and unloading barges.

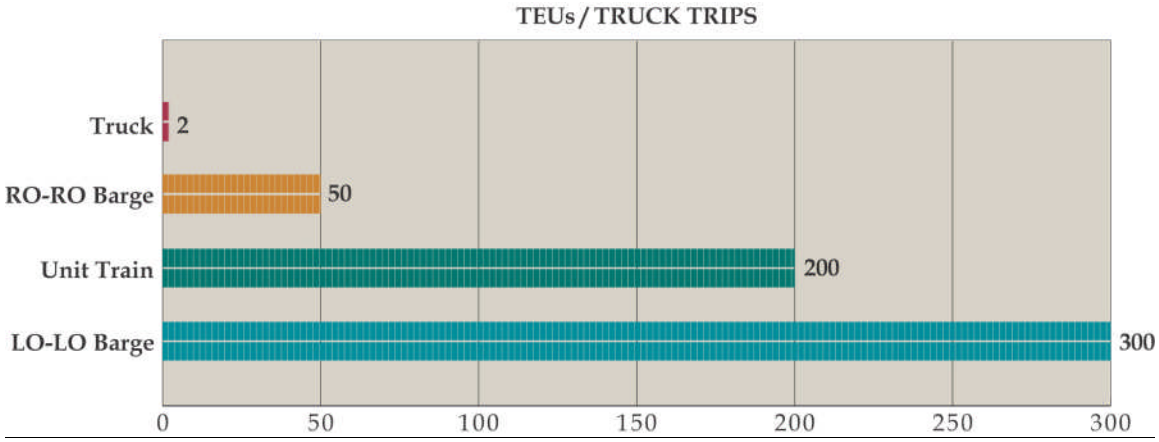
- Roll-on/roll-off (Ro-Ro) barges carry containers on chassis, and are normally loaded and unloaded by driving the chassis on and off. The "terminal" in this case is merely a shipside apron or ramp, similar to a ferry loading slip.

- Larger barges gain capacity by carrying stacked containers, but these must be loaded and unloaded with lift equipment.

- Still larger load-on/load-off barges are typically handled with gantry cranes or other equipment in specialized facilities. A Stockton-Oakland system would have difficulty justifying the capital cost of such facilities.

A significant point is the scale economics of container barges. As Exhibit 128 illustrates, Ro-Ro barges such as those contemplated in the JWD study carry around 50 TEU on chassis. More efficient load-on/load-off barges typically carry around 300 TEU. The minimum volume used in the JWD costing study is 100 containers per trip, which would require a very large share of the identifiable Stockton-area market.

Exhibit 128: Barge Scale Economics



Source: JWD

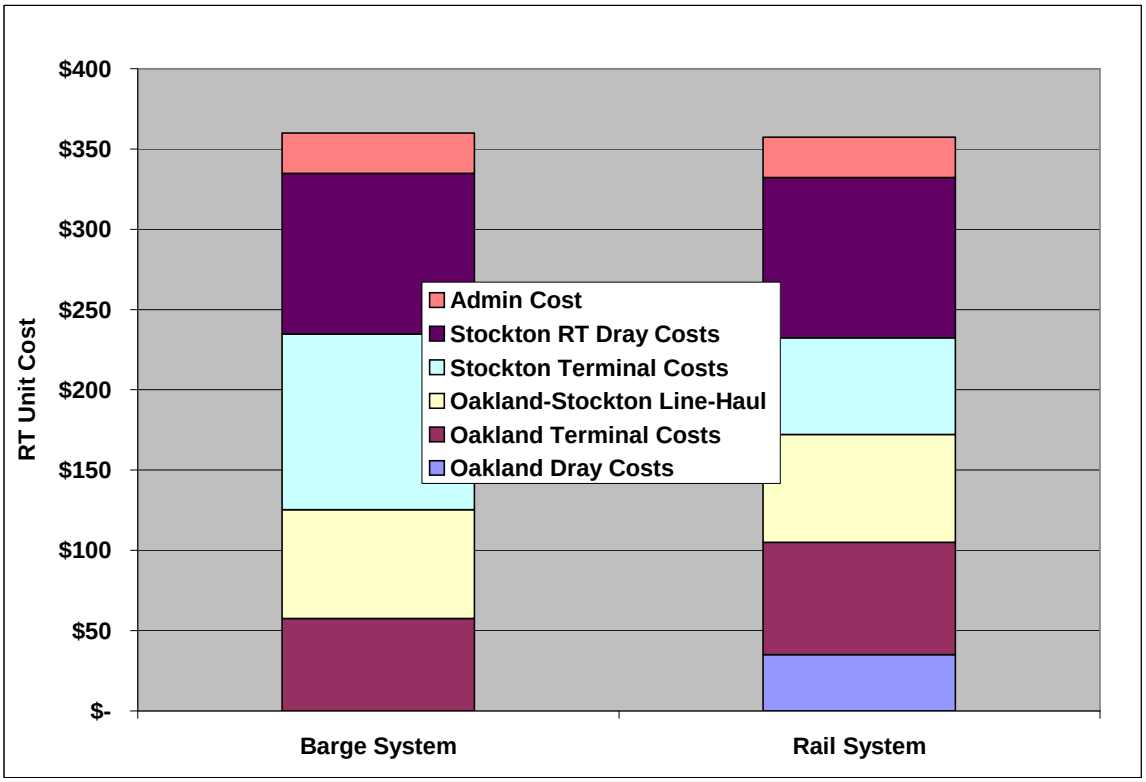
Depending on the system, barge or short-sea options typically require 100 – 150 containers per voyage to yield favorable utilization and productivity. If the voyages are to be daily, in order to meet service requirements, it does not appear that the Stockton-Modesto market has enough near-term volume to justify the service (Exhibit 25). In contrast, the size of rail movements is adjustable. The CIRIS operating scenarios anticipate that pilot programs would begin by adding CIRIS containers to existing trains, with separate CIRIS shuttles established when justified by traffic growth.

The table below (Exhibit 129) gives a preliminary comparison of barge and rail intermodal costs for a 100-unit trip. While barge costing could be refined in a more extensive feasibility analysis, the differing costs structures yield a very similar overall total. Moreover, the estimated line haul costs are almost identical, with the differences coming in terminal and drayage costs. The chart (Exhibit 130) shows the comparison graphically.

Exhibit 129: Barge vs. Rail Comparison, 100 Units per Trip

Barge vs. Rail Comparison: 100 Units per Trip				
	Barge System		Rail System	
Oakland Dray Costs	$	-	$	35
Oakland Terminal Costs	$	58	$	70
Oakland-Stockton Line-Haul	$	68	$	67
Stockton Terminal Costs	$	110	$	60
Stockton RT Dray Costs	$	100	$	100
Admin Cost	$	25	$	25
Total RT Cost	**$**	**360**	**$**	**357**

Exhibit 130: Barge vs. Rail Intermodal Comparison, 100-Unit Trip



Westar Short-Sea Concept

A recent conceptual proposal for a short-sea roll-on roll-off (Ro-Ro) vessel and barge system was advanced by Westar Transport. Although the Westar concept encompasses far more than the CIRIS service between Oakland and the Central Valley, the scale of investment and operations anticipated by Westar is instructive. The Westar concept[2] entails:

- A fleet of six Ro-Ro vessel to move trailers between Northern and Southern California at an estimated capital cost of $1.5 billion.
- A fleet of feeder tugs and barges with an estimated capital cost of $854 million.
- The development of two or more private ports, for which no capital cost estimates are provided.
- The development of Ro-Ro terminals at the Port of Oakland, for which the Port currently has no land or available waterfront.

The Northern California feeder barges contemplated in the Westar proposal would have a capacity of over 340 containers on chassis or 53' highway trailers. To use such capacity efficiently would require a much higher startup volume than appears available. Westar estimates that such a system could be created in five to six years after funding was obtained. In contrast, as rail service can start almost immediately with little or no capital costs and at a smaller scale

Terminal and Labor Efficiency

In general, roll-on roll-off systems can be advantageous for handling highway trailers, motor vehicles, and heavy equipment. Ro-Ro systems are widely used in the Puerto Rico and Alaskan trades to move domestic highway trailers, automobiles, etc. Large Ro-Ro vessels are used worldwide to move imported automobiles and trucks. Ro-Ro service, however, is not the most efficient way to handle marine containers, as it requires more land and more labor than lift-on systems (e.g. container cranes). Handling marine containers in Ro-Ro service also requires that the chassis travel with the container, an additional inefficiency. Were the objective of CIRIS to take ordinary highway trailers off the freeway, Ro-Ro options might be more applicable.

Ro-Ro operations are, by definition, chassis systems requiring all containers to be parked on chassis at all times. A port management textbook[3] published by the Port of Oakland rates the land utilization characteristics of chassis systems as "very poor" compared to systems that can stack at least some of the containers without chassis. This poor land utilization may not be a short-term barrier for the Port of Stockton, which has land available. The Port of Oakland, however, is approaching full build-out, with virtually all waterfront space developed as conventional container terminals and minimal room for expansion. Under these circumstances, Oakland may not have the luxury of being able to expand chassis systems for Ro-Ro service at the expense of more efficient lift-on crane systems.

[2] Source: Westar Transport Short Sea Shipping Vision: Highways of the Seas for California and the West Coast, 2/23/05

[3] Modern Marine Terminal Operations and Management, Port of Oakland, 1983.

As discussed in the section on alternative rail technologies, Ro-Ro systems require more terminal labor to load and unload containers than lift systems. This tradeoff reduces the terminal construction and equipment costs, but increases the long-run terminal operating cost. Given the greater perceived difficulty of subsidizing long-run operations versus capital costs, this is not a favorable tradeoff for CIRIS.

Central Valley Market Access

Barge or short-sea service might reach the delta ports, but cannot serve the greater Central Valley market or points south without long highway drayage trips.

Should a barge service prove feasible, either as a commercial venture or as a public-sponsored, subsidized service, the Port of Stockton appears likely to be the only existing inland port of call. Although the JWD proposal for a detailed feasibility study would also consider a Sacramento call, Tioga considers the feasibility of a Sacramento service to be unlikely under current conditions.

- The Port of Sacramento has very limited facilities suitable for barged or Ro-Ro containers – primarily the 6-acre Wharf 6, which is the only current open-apron terminal. Given pressure from surrounding land uses, significant near-term expansion at the port of Sacramento seems unlikely.

- It appears that barge travel times to and from Sacramento could be significantly longer than to Stockton.

- Barge service has very strong scale economics, as noted above, and the Port of Sacramento would not access as large a market as Stockton.

The Westar concept anticipates a new private port in the Pittsburg area, but that terminal would serve flows between Northern and Southern California rather than inland flows to and from Oakland.

Perhaps most significantly, barge or short-sea services cannot efficiently serve the large Fresno market or points farther south. The highway distance from Fresno to Oakland is approximately 175 miles. The distance from the Port of Stockton to Fresno is about 130 miles. A barge service attempting to serve Fresno through Stockton would therefore travel 70 to 80 miles by water and incur two terminal handlings to save just 45 highway miles, an unfavorable prospect.

Need for a Definitive Study

Given these geographic, economic, and market realities of the Central California service territory, barge or short-sea options are unlikely to be viable and were not considered in this implementation plan. The value of a detailed feasibility study, however, should not be dismissed. Barge alternatives have been mentioned repeatedly by public agency representatives, and a thorough study would either define the circumstances in which a barge service could succeed or put the matter to rest.

E. Report Comments and Clarifications

As the CIRIS concept has progressed through more detailed analysis towards implementation steps the study sponsors, including SJCOG, the Port of Stockton, the Port of Oakland, and Caltrans, have raised some specific issues of concern in addition to editorial comments and clarifications. Comments and clarifications regarding the current status of rail operations, terminals, and other factual updates have been addressed in the report text itself. A small number of larger issues is discussed below.

Issue: Accuracy of rail mileages and impact on cost estimates

Response: Different information sources yield slightly different mileage figures for the routes discussed in this report. The railroads themselves are the ultimate source of all mileage information. Variations in start and end point definitions, line changes over time, rounding conventions, and other factors contribute to the differences found in various publications. RII's cost analysis used the USRail Desktop model, which is derived from mileage information provided by the railroads to the publishers of the Official Railway Guide. This approach established a single, consistent source for mileage data. In response to questions on mileages RII conducted a series of comparisons and a sensitivity analysis. RII found that USRail Desktop mileages tended to be slightly higher than other sources cited by Caltrans. The sensitivity analysis found that the resulting variation in cost estimates would be less than 3%, and would have a negligible impact on comparisons between options. The rail line-haul estimates in the report can therefore be regarded as slightly conservative. Should the details of the cost estimates ever become an issue in railroad negotiations, they will need to be updated with the most recent cost factors of all kinds.

Issue: Locomotive types and costs

Response: Caltrans commented on an apparent discrepancy between RII's locomotive maintenance cost estimates and Caltrans experience. A review of the estimates found that the apparent discrepancy resulted from confusion between daily maintenance costs and per-container averages. The report text has been corrected to avoid confusion.

Caltrans also raised a question regarding the locomotive types used as examples in the analysis of potential motive power supply options. The types shown in the report are illustrative and were used to establish the range of average costs. The choice of motive power will actually depend on availability, train size, and operating strategy. These factors will be specific to the final choice of operator and route, and may change with CIRIS container volume and the transition from demonstration project to on-going operation.

Issue: Use of alternative rail intermodal technologies

Response: Alternative rail technologies were considered in the 2003 CIRIS Feasibility Study and found to offer no concrete advantages for CIRIS. To address specific concerns raised by Caltrans, the study team added a brief investigation of alternative intermodal technologies to the scope of this study (RailRunner, Expressway, ITEX). The results of this investigation are presented in Appendix C.

The team's investigation confirmed the earlier Feasibility Study findings.

- The alternative technologies were developed to carry a variety of highway trailer and container-on-chassis configurations over short hauls between low-volume, low-investment terminals. CIRIS, in contrast, would initially carry containers without chassis between established high-volume lift terminals.

- The alternative technologies would generally result in higher operating costs and reduce capital investment in terminals. Political realities, however, suggest that CIRIS should use capital investment whenever possible to minimize operating costs and subsidies.

- The introduction of alternative technologies into existing rail linehaul and terminal operations would create additional institutional and operational barriers to CIRIS implementation.

Accordingly, the study team concluded that alternative intermodal technologies offered no advantages for a CIRIS demonstration service or near-term implementation. The report recommends that alternative intermodal technologies be considered if CIRIS expands to new intermodal terminals in Sacramento or other markets.

Issue: California State Goods movement planning and infrastructure bonds

Response: The State's Goods Movement Action Plan has evolved in parallel with this study and draft versions included CIRIS among the freight initiatives to be considered. The target date for release of the Phase II Goods Movement Action Plan is now July 2006. The study team believes that CIRIS should be part of a statewide intermodal planning effort, but did not have direct input in the Goods Movement Action Plan process.

The long road to new State infrastructure funding led to the approval of SB1266 on May 16, 2006. This measure, if approved by the voters in November 2006, would enact the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006. The Act would authorize $19.9 billion in State general obligation bonds for specified purposes, including emissions reductions, rail improvements, State-local partnership projects, congestion relief, and other categories that could benefit CIRIS. The California Transportation Commission would be responsible for developing project guidelines and approving Caltrans project nominations.

Issue: Drayage routes and overweight corridors

Response: The Port of Stockton commented on the critical importance of STAA and overweight routes in handling containers to and from CIRIS terminals. STAA routes apply to larger (48' and 53') domestic containers on chassis, but may not be required for the most common (20' and 40') international containers handled by CIRIS. The presence or absence of overweight corridors, however, is critical to the ability of CIRIS to exploit the economic leverage of consolidation. In particular, the Port of Oakland's container terminals are connected to transloading facilities by a network of established overweight corridors. There is no such network serving the rail intermodal terminals in Stockton, Lathrop, or Fresno. In the absence of such routes consolidation of export loads into overweight marine containers would have to take place either immediately adjacent to the rail terminals or on a site such as Rough and Ready

Island where rail intermodal capability would be combined with overweight movements off public streets.

Issue: New intermodal facilities

Response: Caltrans raised the question of whether new intermodal facilities would be required and how much such facilities would cost. The study team's approach was to plan the pilot and start-up CIRIS operations to use existing facilities. The exceptions would be:

- Where incremental capacity additions were required at existing facilities operating near capacity, notably BNSF Stockton and UP Lathrop. In these cases, the report notes that public financial support for terminal expansion might be one factor in a broader public-private partnership to implement CIRIS. The details or cost of terminal expansion however, are beyond the study scope.

- Where intermodal capability is required for transloading at Rough and Read Island. In this instance the study team provided illustrative cost information but not detailed estimates.

There are presently no intermodal terminals in the Sacramento or Bakersfield markets. In both cases potential sites are available and rail-truck transloading capability exists. These is no UP intermodal terminal in the Fresno market, just a paper ramp. In these cases, extension of CIRIS service would require new terminal capability. The nature and capacity of such facilities would be dictated by the success of initial core CIRIS service, and were not addressed in this study.