

U.S. DEPARTMENT OF ENERGY
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT

**NUCLEAR WASTE TECHNICAL REVIEW BOARD
TRANSPORTATION & SYSTEMS PANEL**

**SUBJECT: NEVADA POTENTIAL REPOSITORY
PRELIMINARY TRANSPORTATION
STRATEGY STUDY 1**

PRESENTER: RICHARD D. MEMORY

**PRESENTER'S TITLE
AND ORGANIZATION: MANAGER, SYSTEMS ANALYSIS AND MODELING
MANAGEMENT AND OPERATING CONTRACTOR
LAS VEGAS, NEVADA**

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**ARLINGTON, VA
JUNE 14, 1995**

Study Purpose

- **Support the NEPA information needs relative to transportation mode/corridor**
 - **Determine/document the process/ timelines/ costs associated with acquisition of SNF/DHLW transportation capability to the potential repository site at Yucca Mountain**

Scope

- **Emphasize Nevada transportation of waste leaving waste producer sites via rail transport (i.e. arriving in Nevada by rail)**

Objectives

- **Identify reasonable alternatives for transportation**
- **Categorize rail transportation options**
 - **Recommended for detailed evaluation**
 - **Eliminated from detailed evaluation but monitor for changes**
 - **Eliminated from further study**
- **Develop or update cost estimates**
- **Document EIS options with linkages to design and construction**

Background

- **1990 Preliminary Rail Access Study**
 - Evaluated 10 rail routes out of 13 identified
 - Provided rough-cost estimates
 - Recommended three routes (Carlin, Caliente & Jean) for greater detail evaluation
- **1992 Caliente Route Conceptual Design Report**
 - Provided detailed analysis including land use, environmental and institutional aspects
 - Provided refined costs
- **Other studies conducted by Eureka County, Lander County and University of Nevada, Reno**

Route Selection Reminder

- **Criteria to be used for Nevada transportation mode and route selection cannot be finalized until EIS scoping is complete**
- **EIS process will provide input to final mode/route selection**

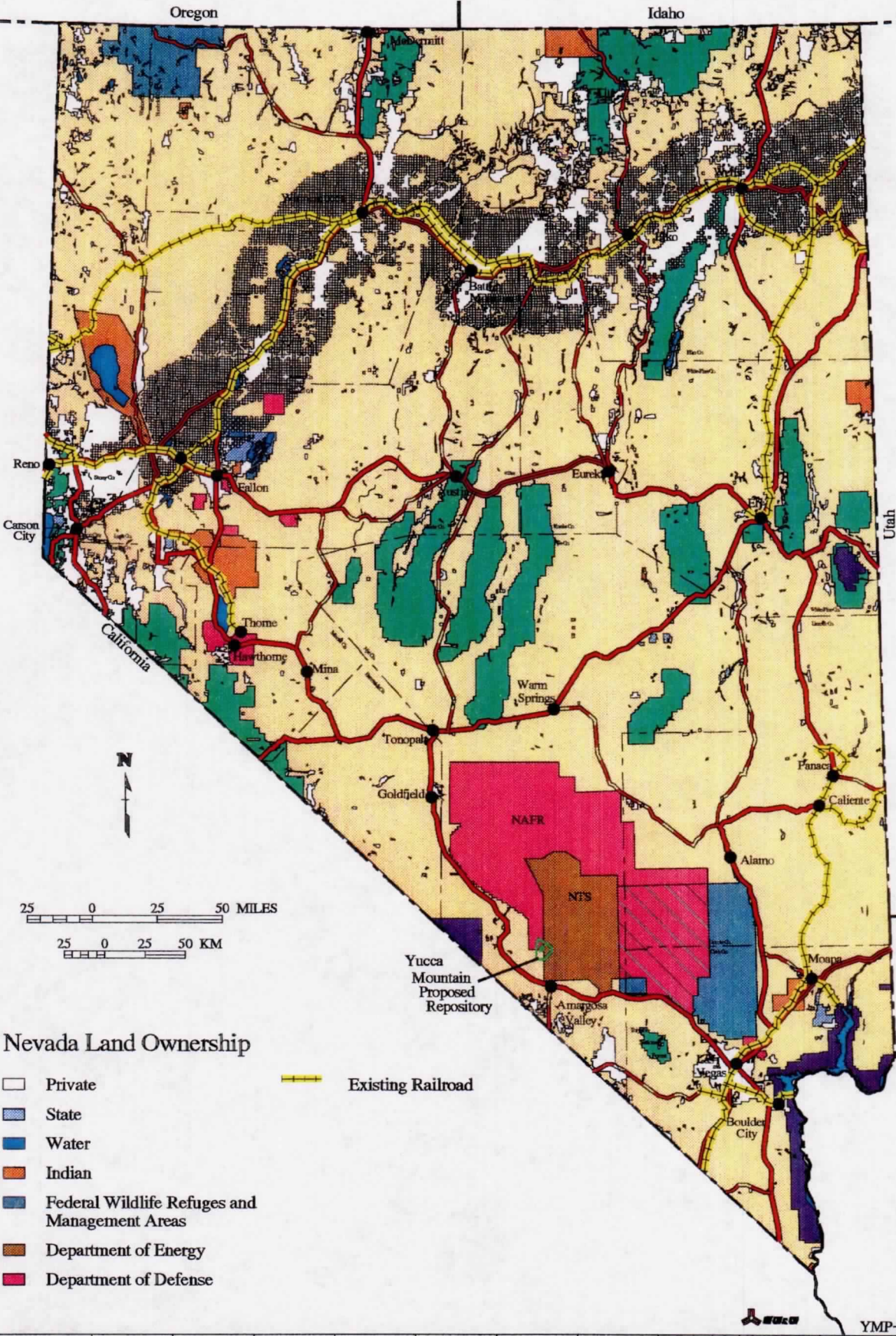
Transportation Modes Considered

- **Rail**
- **Heavy haul truck (i.e. truck shipments in excess of 129,000 lbs. gross vehicle weight)**
- **Legal weight truck**

Existing Railroads

E270000m E370000m E470000m E570000m E670000m E770000m

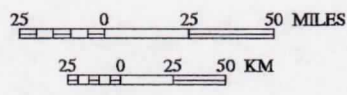
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Nevada Land Ownership

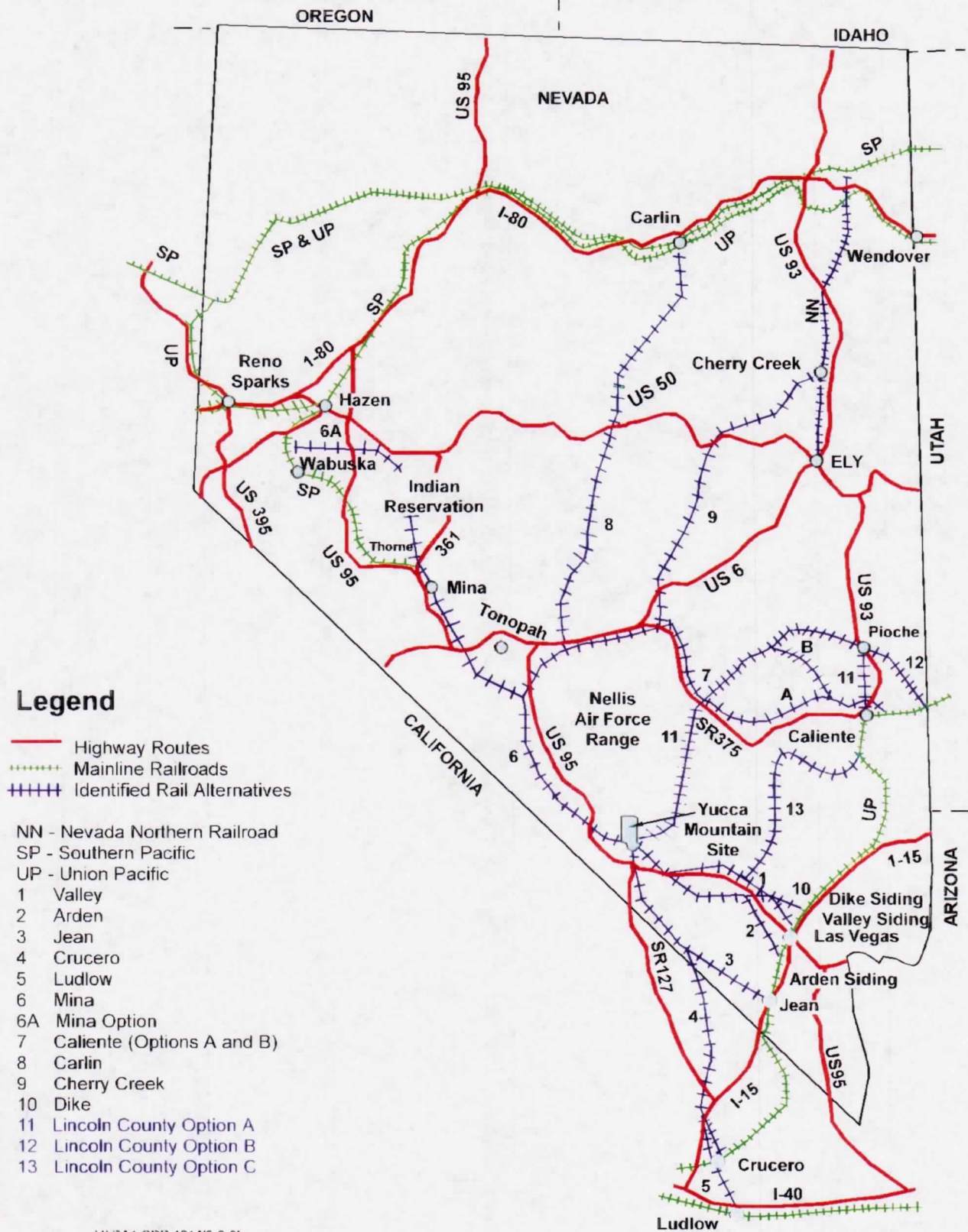
- Private
- State
- Water
- Indian
- Federal Wildlife Refuges and Management Areas
- Department of Energy
- Department of Defense

Existing Railroad



YMP-95-392.0

Preliminary Rail Access Study Proposed Routes



Legend

- Highway Routes
- - - - Mainline Railroads
- + + + + Identified Rail Alternatives

- NN - Nevada Northern Railroad
- SP - Southern Pacific
- UP - Union Pacific
- 1 Valley
- 2 Arden
- 3 Jean
- 4 Crucero
- 5 Ludlow
- 6 Mina
- 6A Mina Option
- 7 Caliente (Options A and B)
- 8 Carlin
- 9 Cherry Creek
- 10 Dike
- 11 Lincoln County Option A
- 12 Lincoln County Option B
- 13 Lincoln County Option C

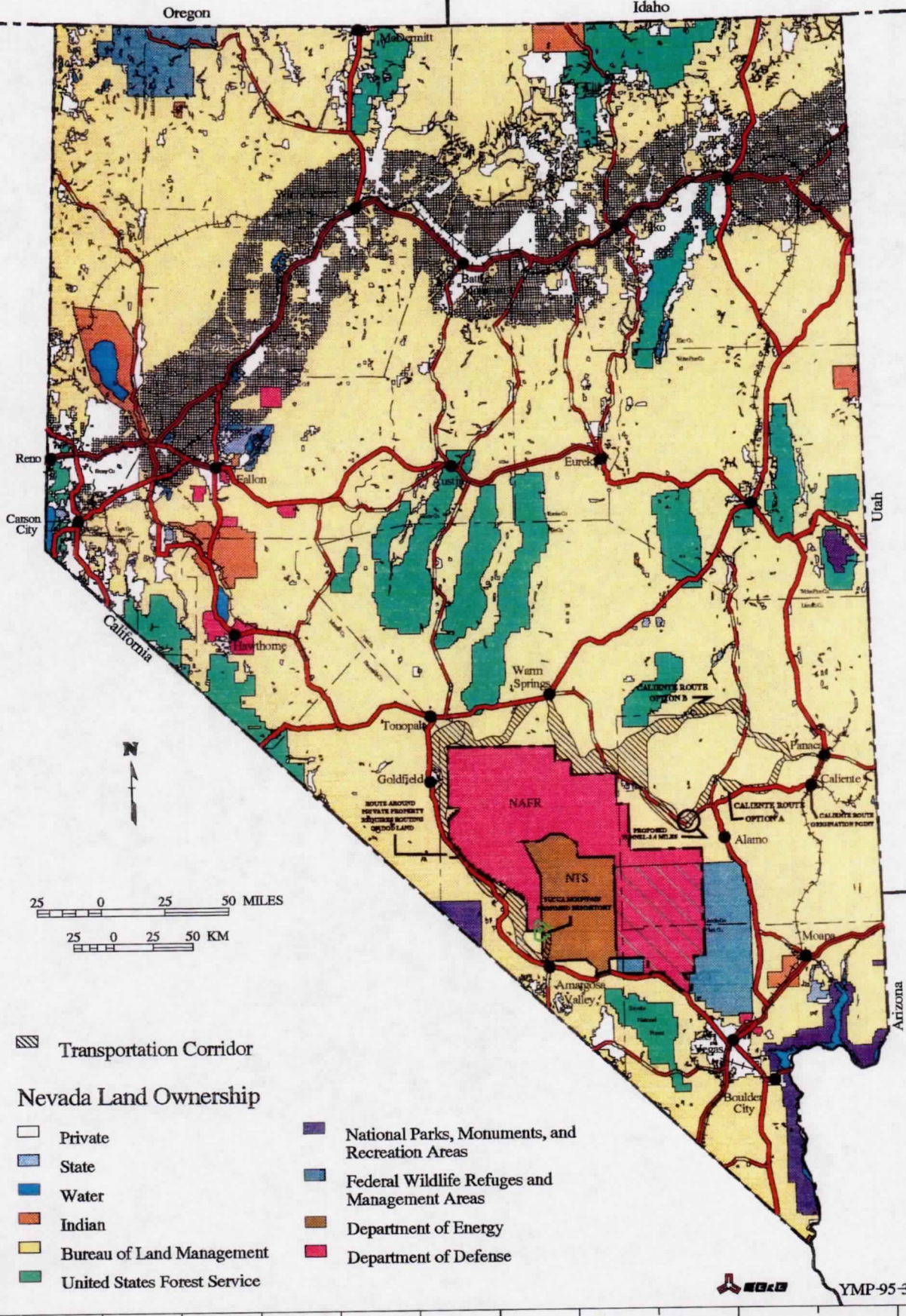
Rail Route Option Categorization

Route Status	Recommended for Detailed Evaluation	Eliminated From Detailed Evaluation Monitor	Eliminated From Further Study	Remarks/Reasons
Caliente	X			Minimal land use conflicts
Carlin	X			High probability of resolving land use conflicts
Jean	X			Minimal land use conflicts, favorable topography, length and costs
Valley Modified	X			Favorable topography, lowest cost, flexibility of personnel and freight transportation
Cherry Creek		X		Privately owned branch line connection. Track would require upgrading.
Dike		X		Potential Nellis Air Force Range conflicts, combined with Valley Modified
Mina		X		Infringes on Walker River Paiute tribe right-of-way, possible Fallon Air Force Base expansion
Arden			X	Significant potential land use conflicts with private and Nature area lands (Probable population growth in foothills of Spring Mountain)
Crucero			X	Significant portion of route traverses wilderness protection area (California Desert Conservation Act of 1994)
Ludlow			X	Significant portion of route traverses wilderness protection area (California Desert Conservation Act of 1994)
Lincoln County A and B			X	Nellis Air Force Range conflicts, DOD lands
Lincoln County C			X	Nellis Air Force Range conflicts, no direct access, would require intermodal transfer station, rough topography
Valley			X	Significant potential land use conflicts with private and Nature area lands (Red Rock Canyon Conversation Act), combined with Valley Modified

Proposed Transportation Corridor, Caliente Route

E270000m E370000m E470000m E570000m E670000m E770000m

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N4655000m
N4555000m
N4455000m
N4355000m
N4255000m
N4155000m
N4055000m
N3955000m
N3855000m



Transportation Corridor

Nevada Land Ownership

- | | |
|------------------------------|---|
| Private | National Parks, Monuments, and Recreation Areas |
| State | Federal Wildlife Refuges and Management Areas |
| Water | Department of Energy |
| Indian | Department of Defense |
| Bureau of Land Management | |
| United States Forest Service | |

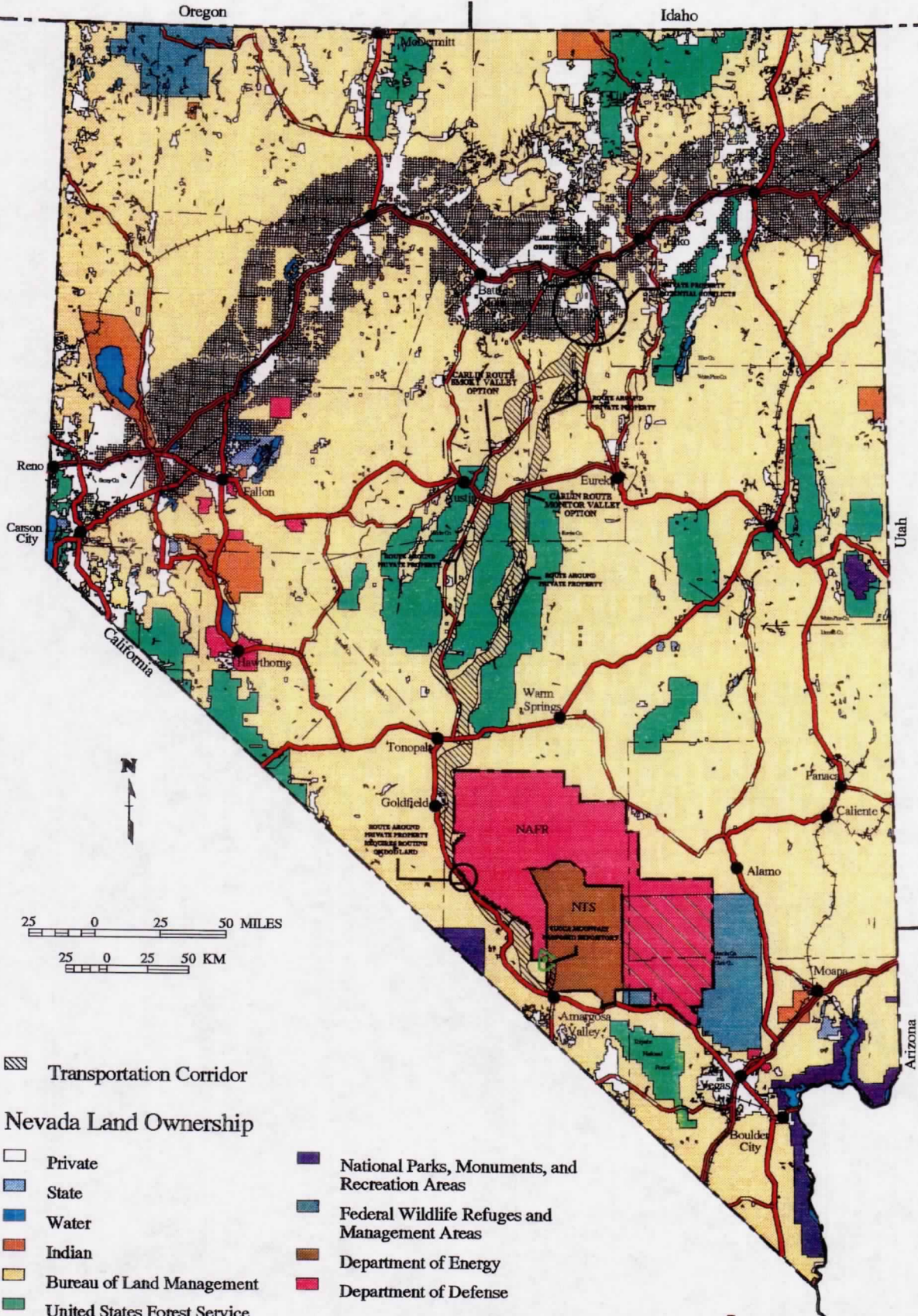


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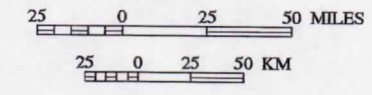
Proposed Transportation Corridor, Carlin Route

E270000m E370000m E470000m E570000m E670000m E770000m

11

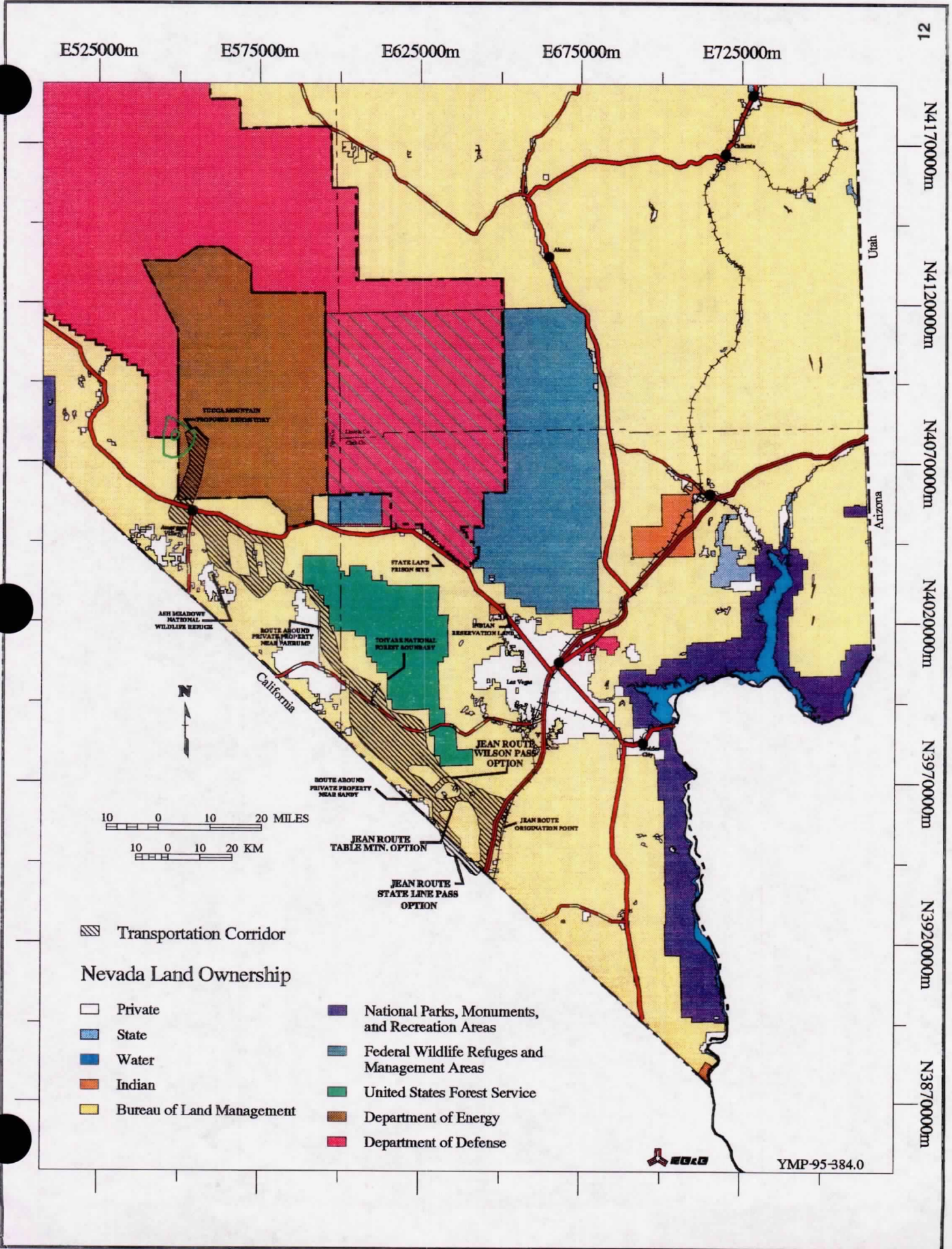


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N4455000m
N4355000m
N4255000m
N4155000m
N4055000m
N3955000m
N3855000m



- Transportation Corridor
- Nevada Land Ownership**
- Private
 - State
 - Water
 - Indian
 - Bureau of Land Management
 - United States Forest Service
 - National Parks, Monuments, and Recreation Areas
 - Federal Wildlife Refuges and Management Areas
 - Department of Energy
 - Department of Defense

Proposed Transportation Corridor, Jean Route Option



N4170000m
N4120000m
N4070000m
N4020000m
N3970000m
N3920000m
N3870000m

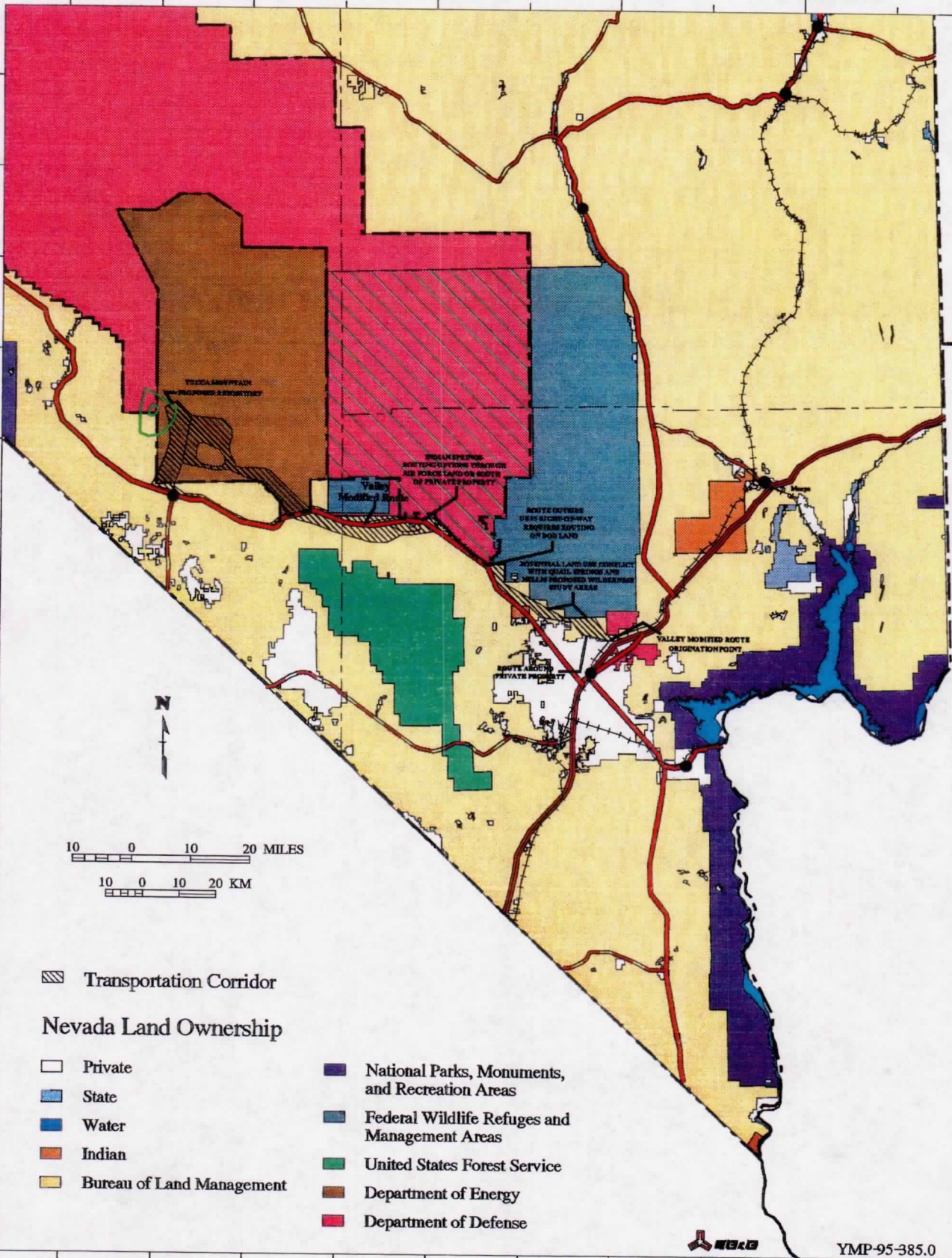













Proposed Transportation Corridor, Valley Modified Route

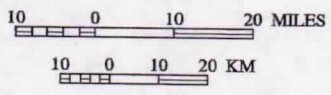
31

E525000m E575000m E625000m E675000m E725000m

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N4070000m
N4020000m
N3970000m
N3920000m
N3870000m

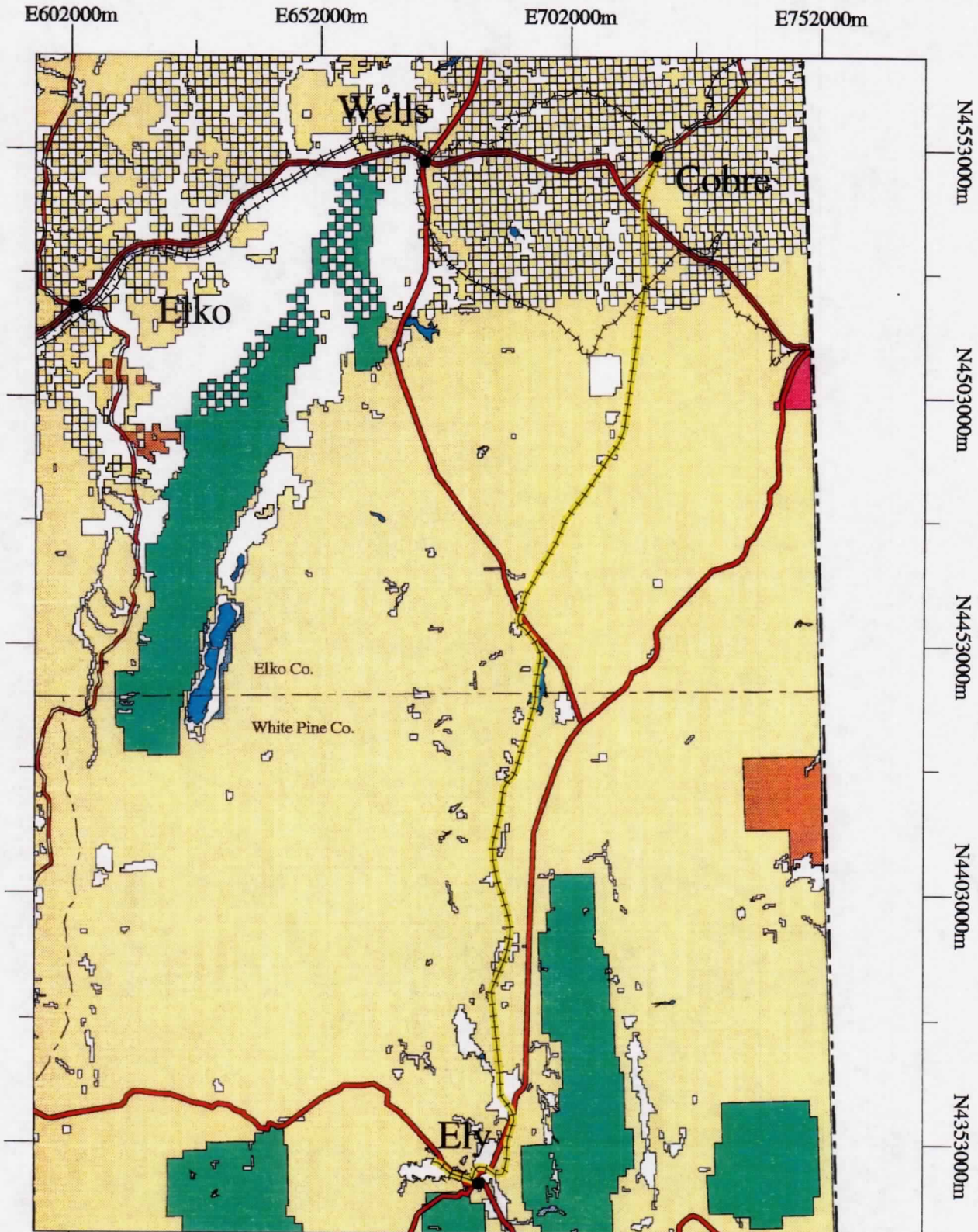


-  Transportation Corridor
- Nevada Land Ownership**
-  Private
-  State
-  Water
-  Indian
-  Bureau of Land Management
-  National Parks, Monuments, and Recreation Areas
-  Federal Wildlife Refuges and Management Areas
-  United States Forest Service
-  Department of Energy
-  Department of Defense



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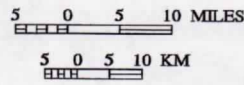
Cherry Creek Route



Nevada Land Ownership

- Private
- State
- Water
- Indian
- Bureau of Land Management
- United States Forest Service
- National Parks, Monuments, and Recreation Areas
- Federal Wildlife Refuges and Management Areas
- Department of Energy
- Department of Defense

Existing Railroad



Mina Route

E240000m E290000m E340000m E390000m E440000m

51

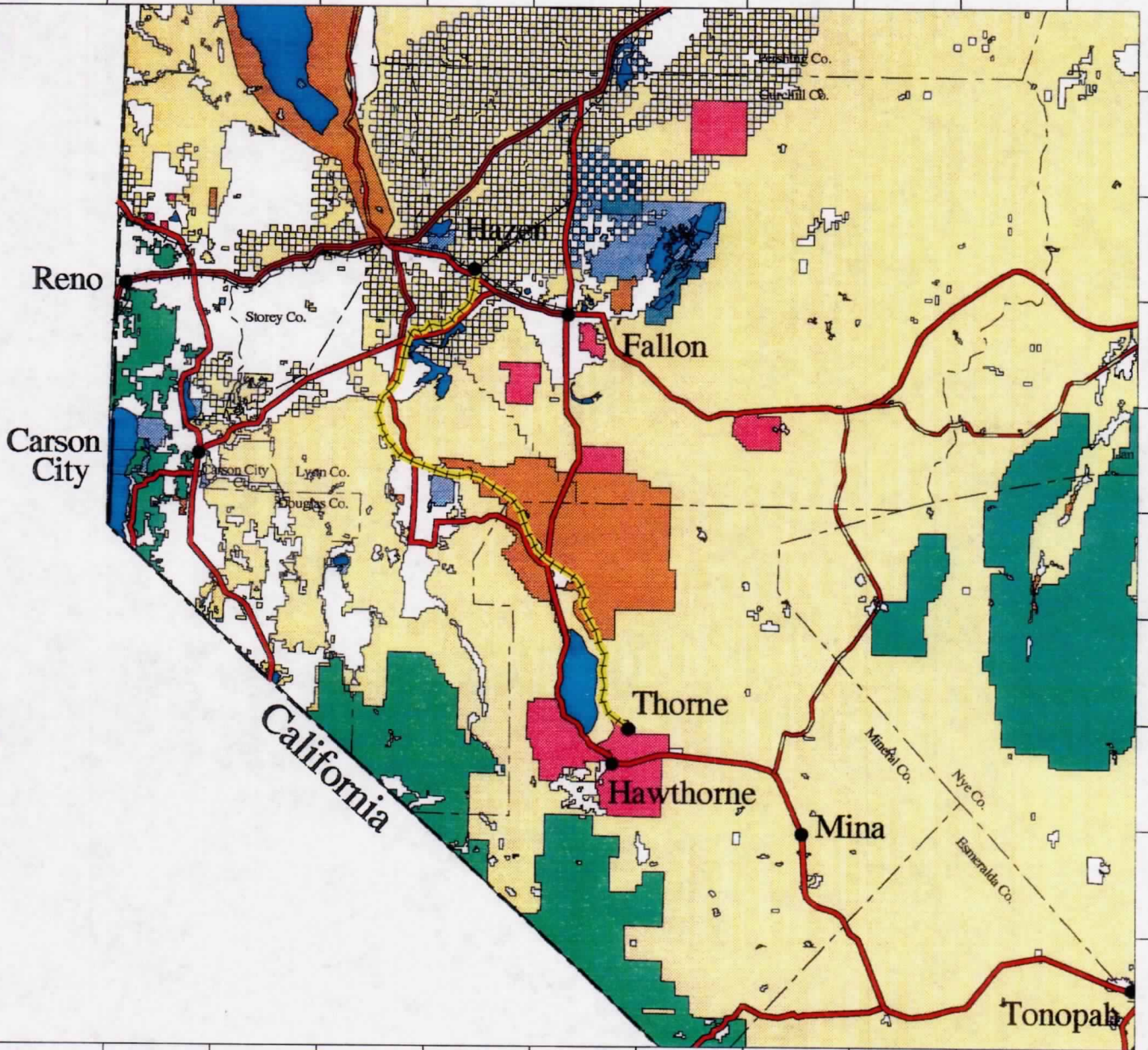
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N4325000m

N4275000m

N4225000m



Nevada Land Ownership

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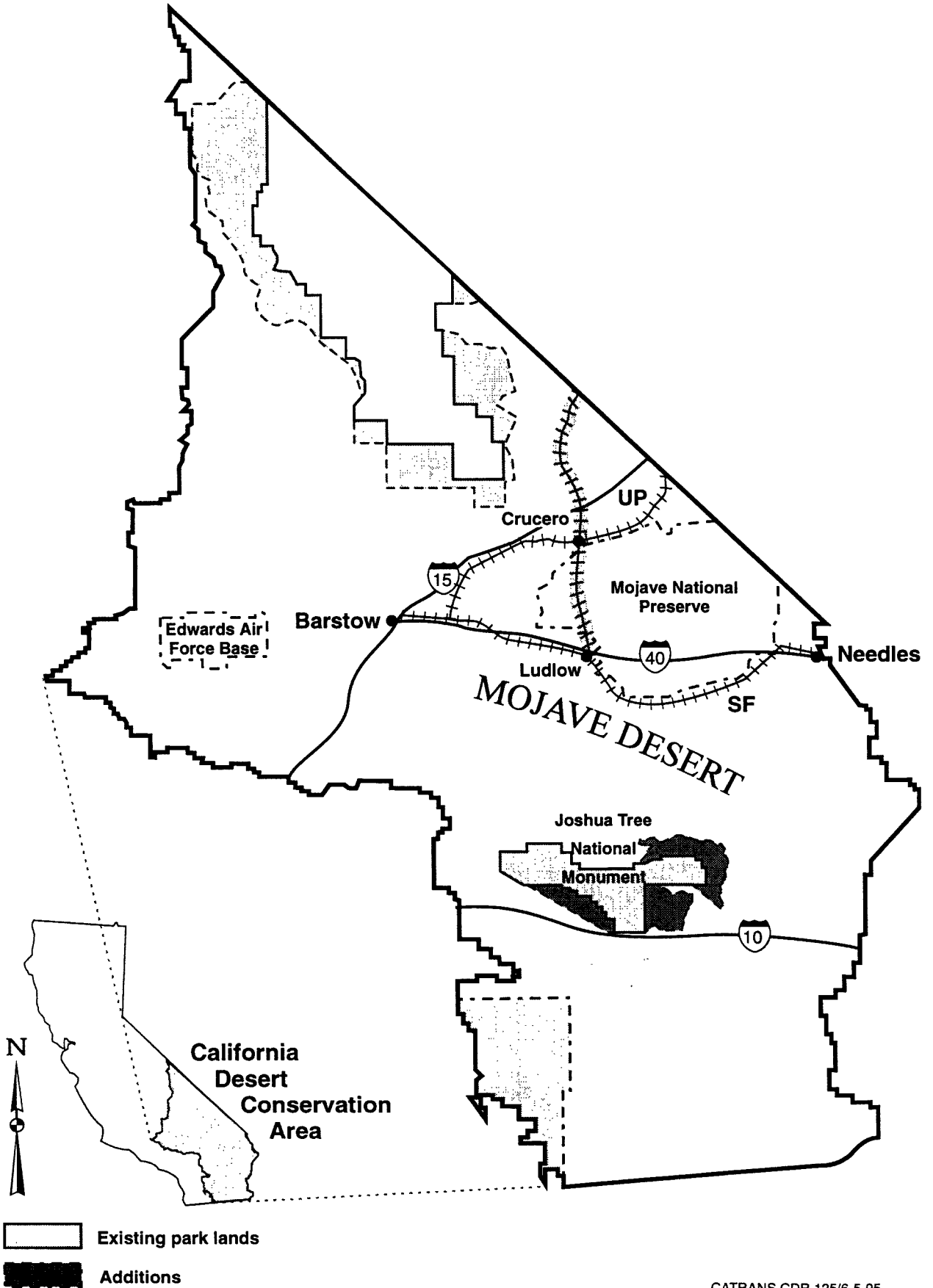
Transportation Corridor



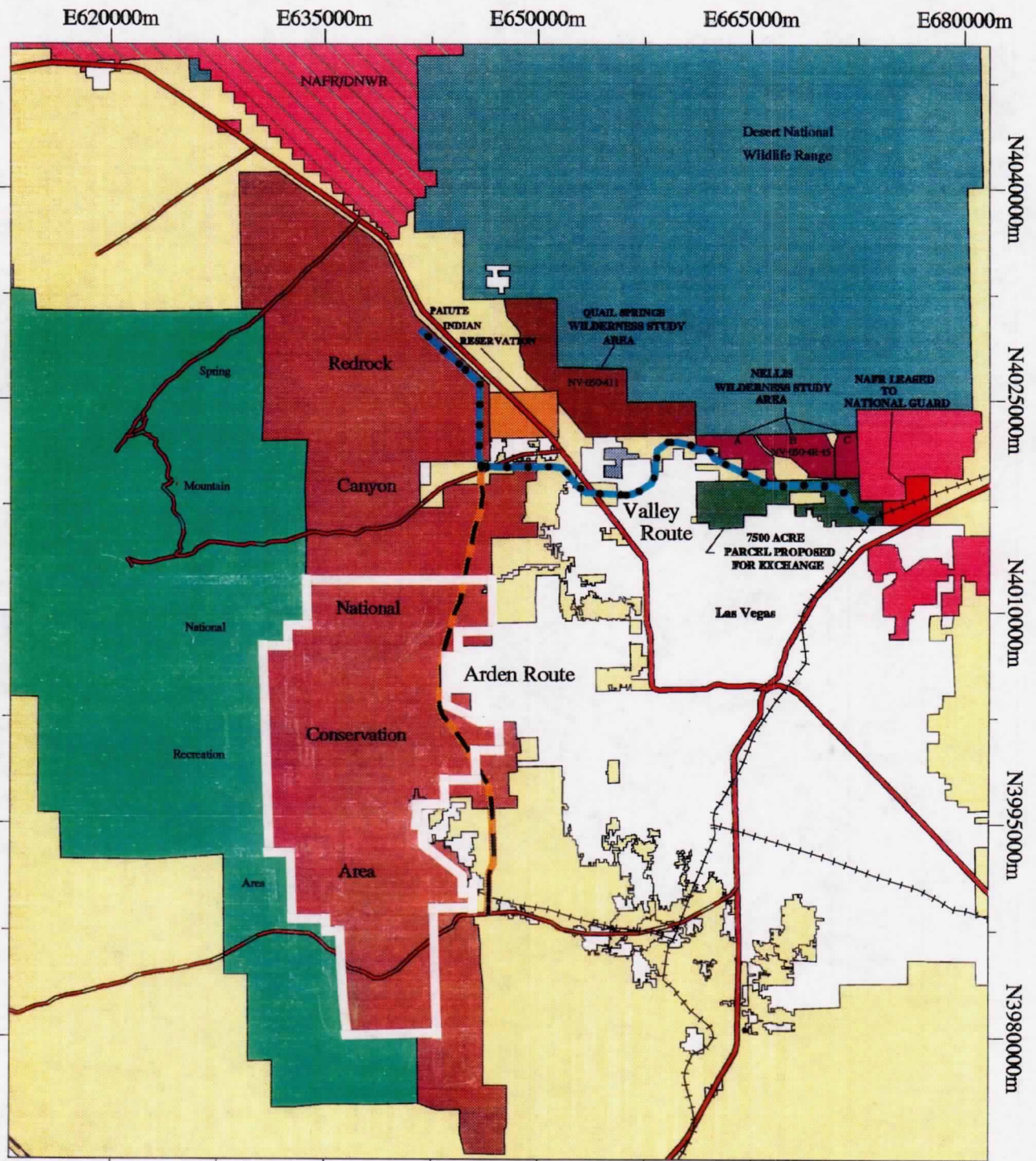
5 0 5 10 MILES

5 0 5 10 KM

Ludlow and Crucero Routes



Arden and Valley Routes



Nevada Land Ownership

- Private
- State
- Department of Defense
- U.S. Forest Service
- Bureau of Land Management
- National Parks, Recreation Areas, Monuments
- Federal Wildlife Refuges and Management Areas

- Nellis Air Force Wilderness Study Area (BLM)
- Nellis Air Force Range Leased to National Guard (DOD)
- Paiute Indian Reservation
- 7500 Acre Parcel Proposed for Exchange (BLM)
- Quail Springs Wilderness Study Area (BLM)
- Redrock Canyon National Conservation Area (BLM)

Rail Corridors

- Arden Route - Eliminated
- Valley Route - Eliminated

N

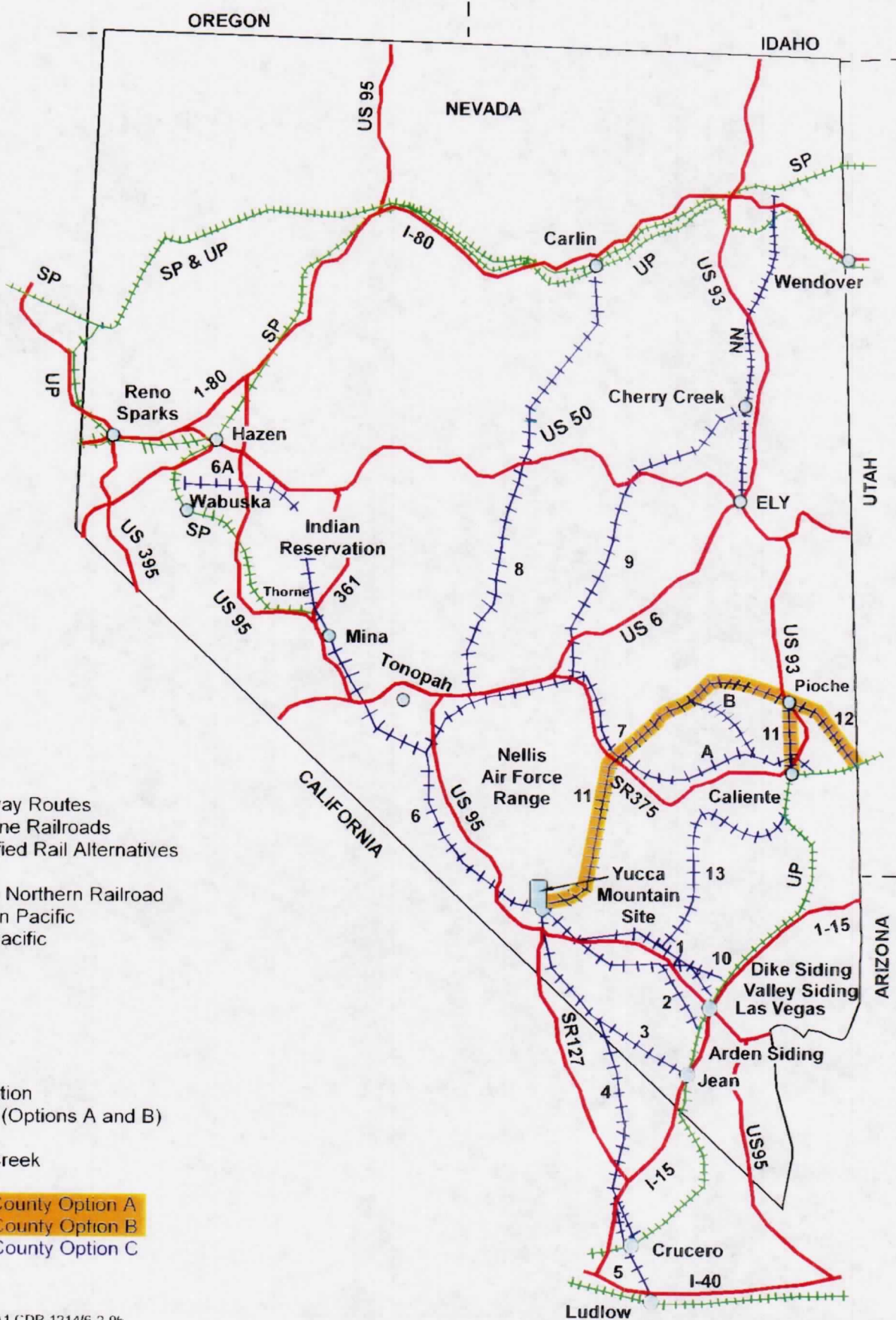


1 0 1 2 3 4 5 MILES

1 0 1 2 3 4 5 KM



Lincoln County Option A & B

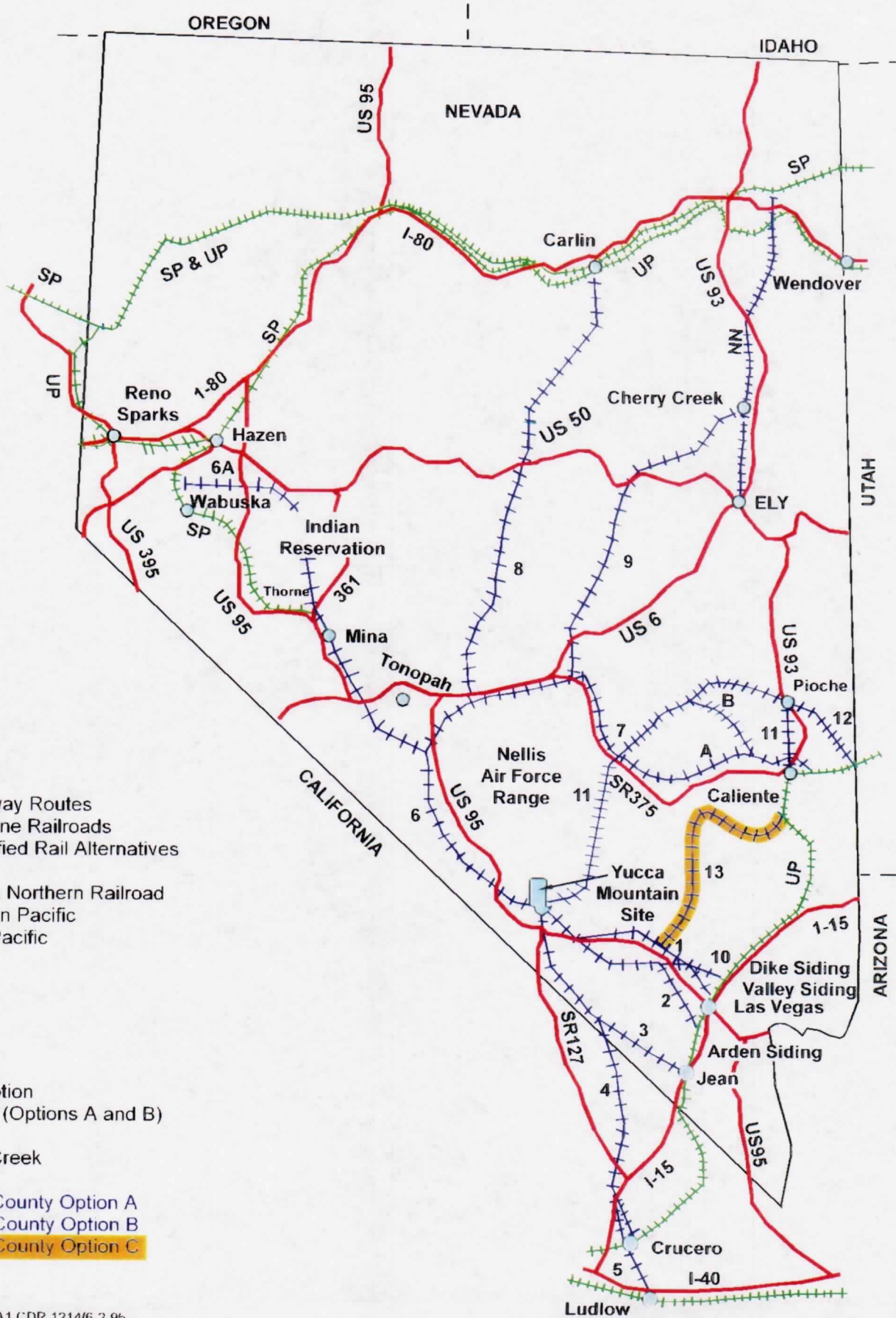


Legend

- Highway Routes
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- + + + + Identified Rail Alternatives

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Lincoln County Option C



Legend

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Cost Estimate Approach/Assumptions

- Utilized unit costs developed in Caliente Conceptual Design Report
- Costs estimated based on estimated length within a grade classification (0-3%, 3-6%, >6%)
- Also considered costs of tunnels, grade separations, and drain structures
- Added 35% contingency to construction costs
- Estimated planning, engineering, construction management, and administration costs as 24% of construction total
- Operations and Maintenance costs were based on DOE-owned and -operated equipment with single mission usage

Cost Comparison of Alternative Routes (FY94 Million Dollars)

Routes Selected for Future Evaluation	Route Mileage	Estimated Cost of Rail Design & Construction	Estimated Annual Cost of Rail Operation & Maintenance
Caliente-Option B	355	\$1,094.8	\$5.8
Carlin-Monitor Option	350	\$1,105.2	\$5.8
Carlin-Smoky Valley Option	365	\$1,175.7	\$5.9
Modified Valley Route	103	\$355.4	\$3.6
Jean-Table Mt. Option	121	\$472.0	\$3.6
Jean-Wilson Pass Option	116	\$457.1	\$3.5
Jean-State Line Pass Option	127	\$438.3	\$3.6

Heavy Haul Option

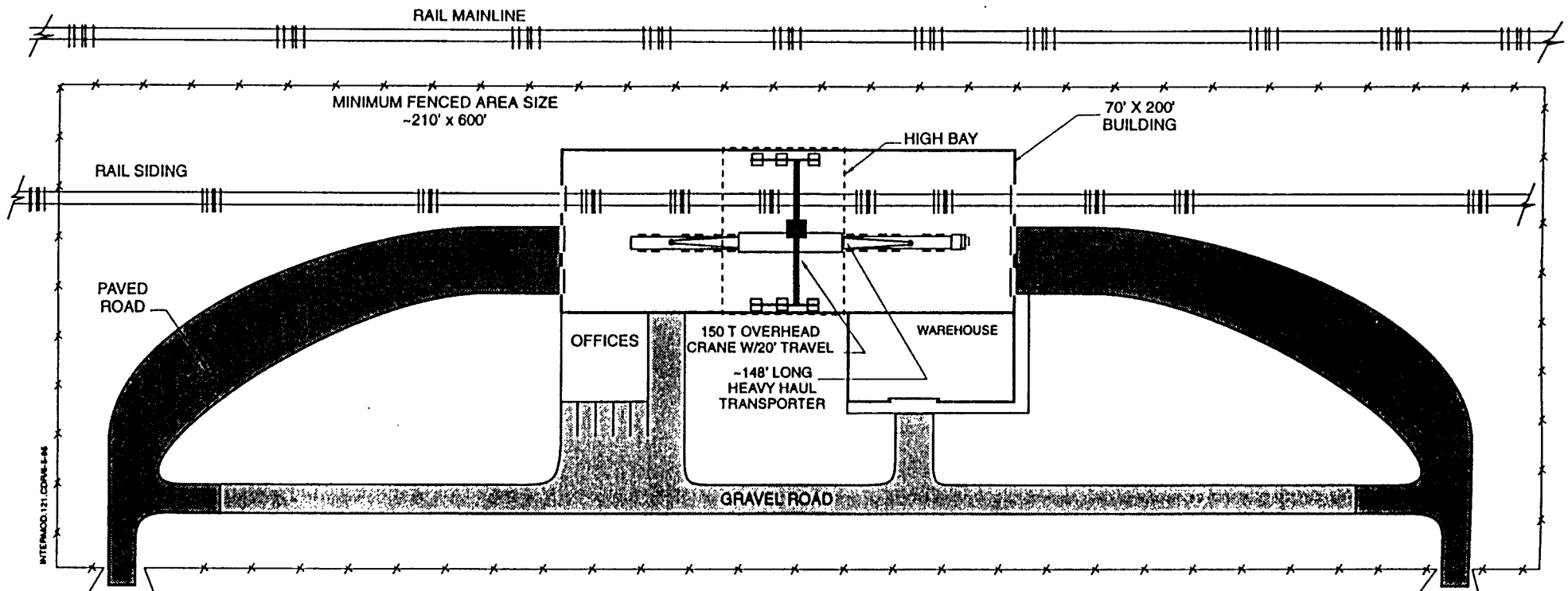
- **Road transportation requires heavy haul**
 - **SNF**
 - « 125 tons maximum loaded cask weight
 - « 75 tons maximum loaded cask weight
 - **HLW**
 - « 115 tons maximum loaded cask weight
- **Heavy haul requirements***
 - **Intermodal transfer station**
 - **Transporter**
- **Three heavy haul routes identified**
 - **Caliente**
 - **Arden**
 - **Valley/Dike Siding**

* **Assume use of existing highways only**

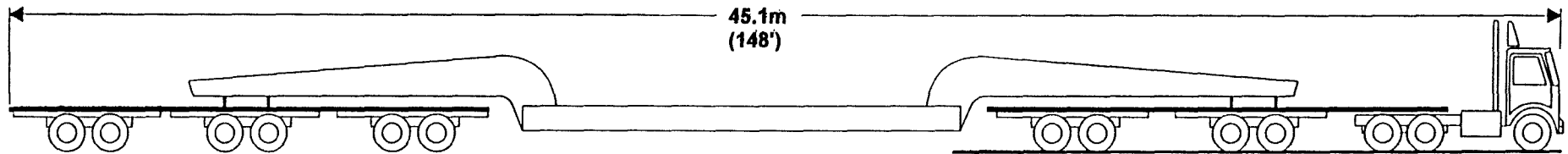
Intermodal Transfer Station Concept

- **It must be capable of transferring an MPC/ transportation cask from rail to heavy haul truck**
- **Crane load capacity must be sufficient for 125 ton payload**

Intermodal Transfer Station Concept



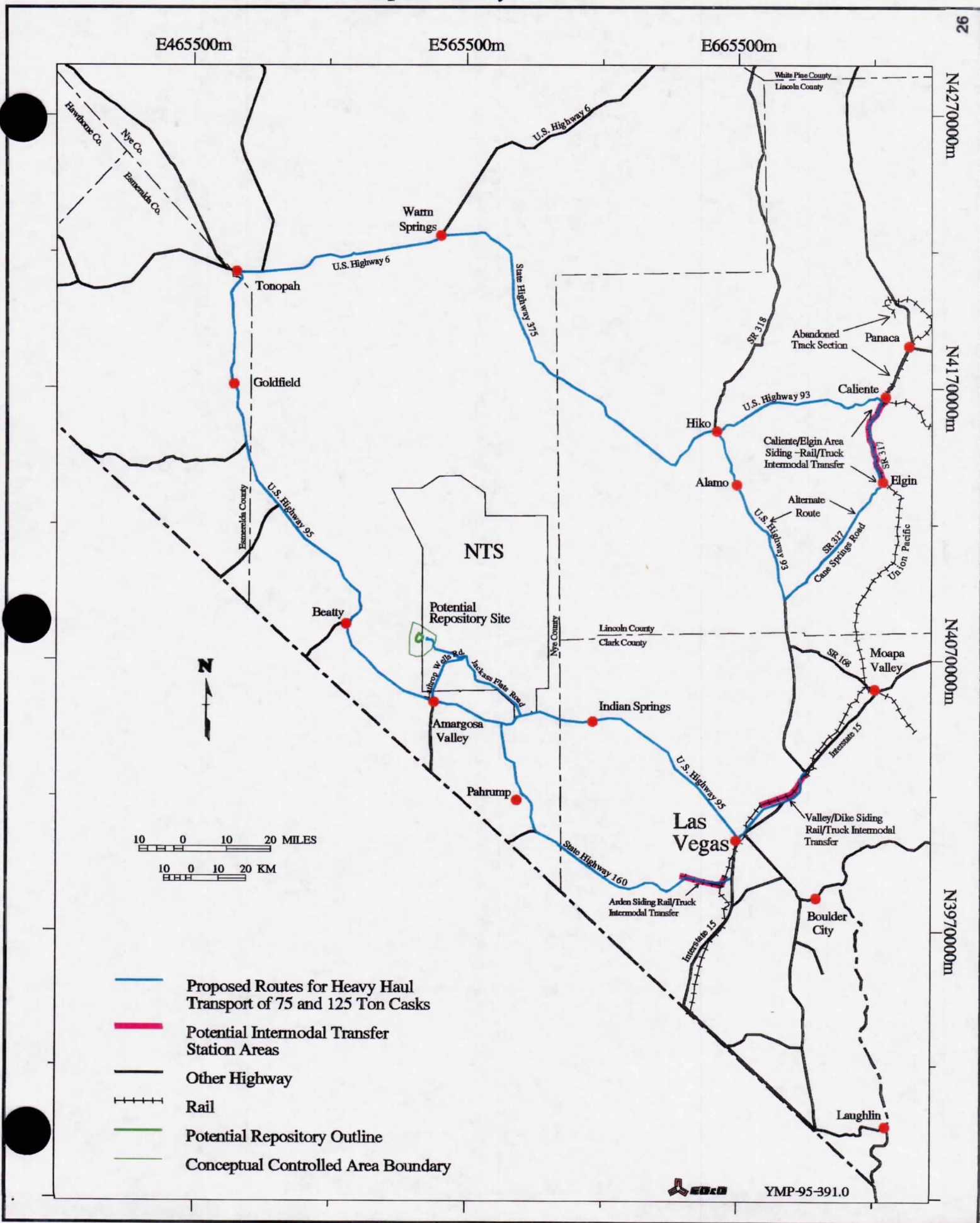
Heavy Haul Transporter



NOT TO SCALE

- **Maximum tandem axle loading 58,400 lbs**
- **13 axles**
- **Total empty weight of tractor and trailer 120,000 lbs**
- **Steerable trailer**

Proposed Heavy Haul Routes



- Proposed Routes for Heavy Haul Transport of 75 and 125 Ton Casks
- Potential Intermodal Transfer Station Areas
- Other Highway
- - - - Rail
- Potential Repository Outline
- - - - Conceptual Controlled Area Boundary

Heavy Haul Cost

- **Annual permit from state of Nevada is approximately \$30,000/year**
- **Truck company contract cost approximately \$10,000 - \$15,000/ shipment**
- **Intermodal transfer facility approximately \$2.6 million**
- **Total cost over 24-year period about \$170 million (based on 11,230 shipments)**

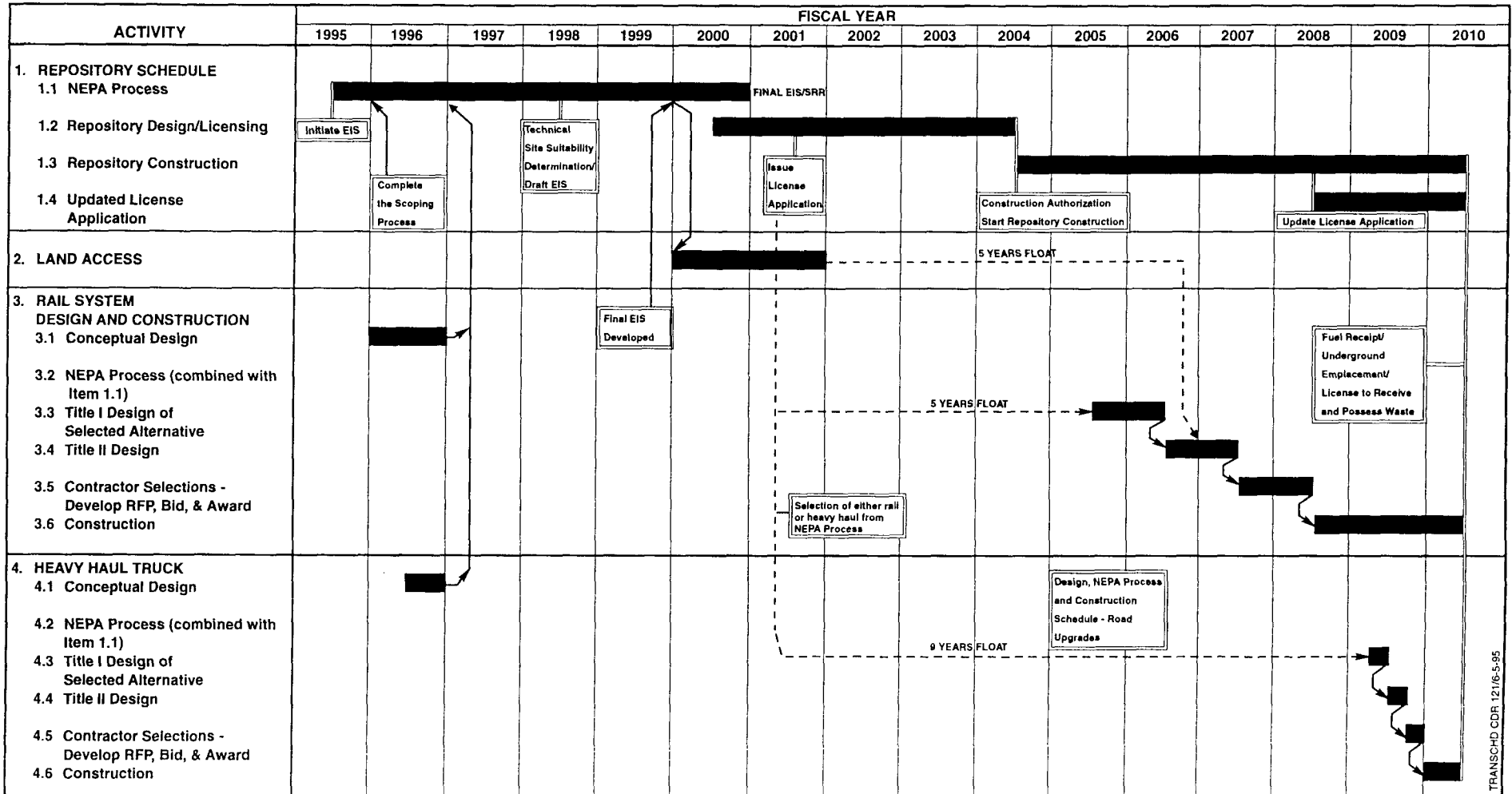
Heavy Haul Issues

- **Caliente route (SR 375, US 6 & SR 317) requires re-routing three months each year due to Nevada frost restriction regulations**
- **Arden route (SR 160) currently has wide load restrictions (8'6" maximum width allowed vs. 11.0' transportation cask width)**
- **Valley/Dike siding route (I 15 & US 95) traverses Las Vegas area**
- **Heavy haul shipments have time-of-day and day-of-week restrictions**

Legal Weight Truck

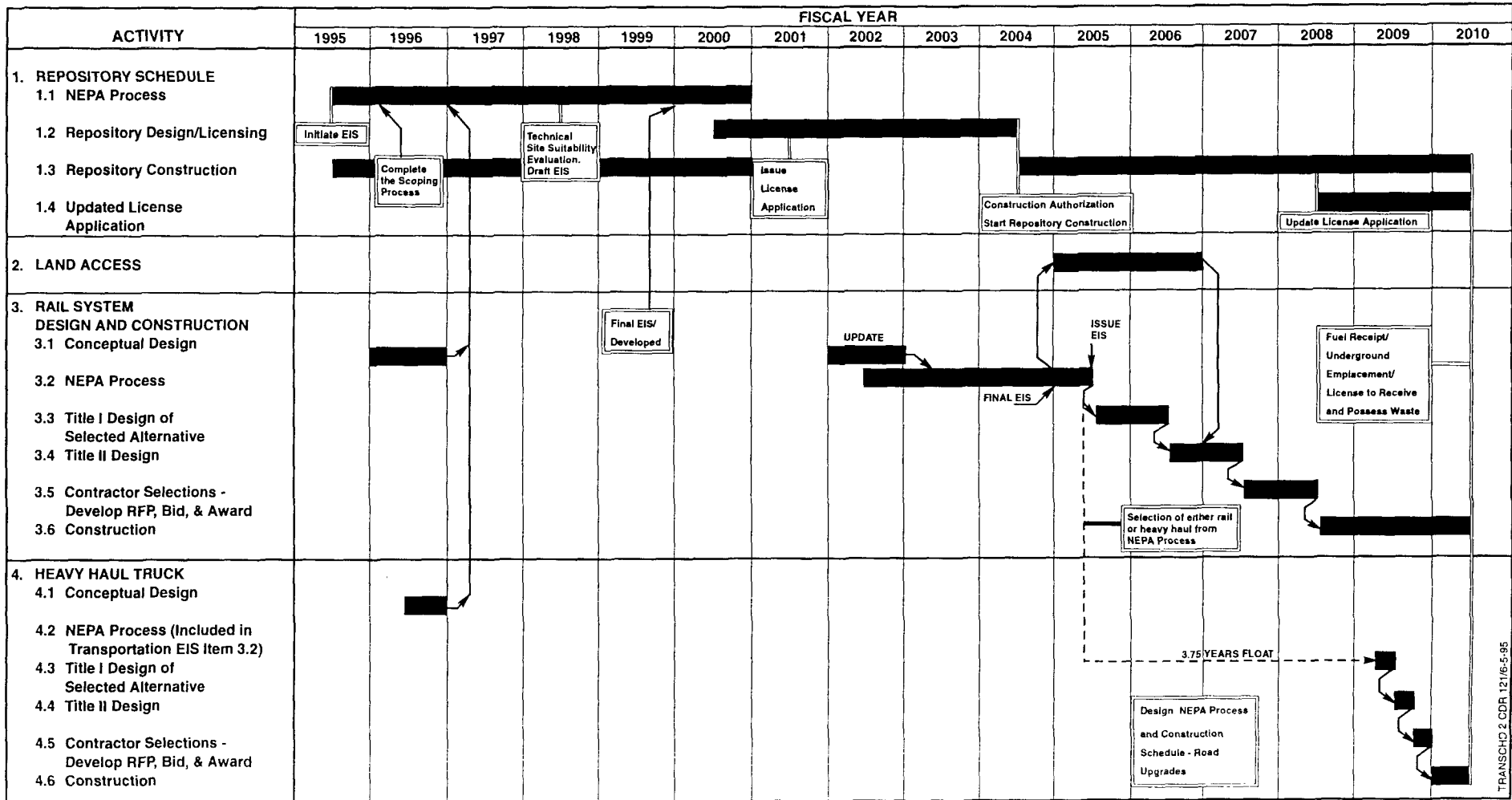
- **Legal weight truck (LWT) limited to a gross vehicle weight of not greater than 80,000 lbs.**
- **According to current DOE plan, 4-11% of SNF will be transported by LWT. Based on the assumption that 4-19 reactors cannot accommodate rail transport**
- **LWT routes in Nevada will be determined using United States Department of Transportation regulations, which allow for State designation of preferred alternatives (49CFR 397.101 & 397.103)**

Yucca Mountain Railroad/Heavy Haul Truck Transportation Schedule (EIS Development with no Additional Analysis)



TRANSCHD CDR 12/16-5-95

Yucca Mountain Railroad/Heavy Haul Truck Transportation Schedule (EIS Development with Additional Analysis)



TRANSDC 2 CDR 12/16/95-95

Nevada Transportation Strategy

- **IDENTIFICATION PHASE:**
 - 4 Rail Corridors
 - 3 Heavy Haul Truck Routes
 - Legal Weight Truck
- **EVALUATION PHASE:**
 - NEPA
 - Conceptual Design
- **DECISION**
 - Mode
 - Schedule
 - Route
 - Usage