

**ATTACHMENT A4**  
**TRAFFIC PATTERNS**

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1 On-site roads, sidewalks, and paved areas are used for the distribution and storage of vehicles  
2 and personnel and are designed to handle all traffic generated by employees, visitors, TRU  
3 mixed waste shipments, and movements of operational and maintenance vehicles. The facility  
4 entrance and TRU mixed waste haul roads are designed for AASHTO H20-S16 wheel loading.  
5 Service roads are designed for AASHTO H10 wheel loading. Access and on-site paved roads  
6 are designed to bear the anticipated maximum load of 115,000 lbs (52,163.1 kg), the maximum  
7 allowable weight of a truck/trailer carrying loaded Contact-Handled or Remote-Handled  
8 Packages. The facility is designed to handle approximately eight truck trailers per day, each  
9 carrying one or more Contact-Handled or Remote-Handled Packages. This is equivalent to  
10 3,640 TRU mixed waste-carrying vehicles per year.

11 The calculations to support the anticipated maximum load of 115,000 lbs. are shown below:

12 Soil Resistance R (psi) - is taken directly from the WIPP Soil Report and Bechtel calculation  
13 because there is no change.

#### 14 A. Pavement Thickness

15 The traffic frequency increase from 10 shipments per day to 10.15 shipments per day has only  
16 minimal impact on the Total Expanded Average Load (**EAL**) and the traffic index (**TI**) as shown  
17 below, both important parameters in pavement design.

18 Total EAL (TEAL):

19 13,780 ~ constant for 5 or more axles over 20 years, taken from Table 7-651.2A - Highway  
20 Design Manual (HDM).

21  $TEAL = 13,780 \times 25\text{yr.}/20\text{yr.} = 17,225$

22 Using 10.15 shipments per day ~  $17,225 \times 10.15 = 174,834$

23 Conversion of EAL to Traffic Index (TI).

24 For TEAL of 174,834 ~  $TI = 7.5$  - (from HDM, Table 7-651.2B)

25 Asphalt Concrete Thickness TAC:

26  $GE = 0.0032 \times TI \times (100 - R) \dots R = 80$

27 GE - Gravel Equivalent (Ft).

28  $GE = 0.0032 \times 7.5 \times 20 = 0.48'$  ...  $GfAC = 2.01 \Rightarrow TAC = 0.48/2.01 = 0.24' \Rightarrow$  use 2½" AC

29 Surface Course.

30 (Actually used: 3")

31 Gf - Gravel Equivalent Factor (constant from Table 7-651.2C from HDM).

#### 32 B. Bituminous Treated Base

33  $GE = 0.0032 \times TI \times (100 - R) \dots R = 55 \sim$  caliche subbase  $\Rightarrow GE = 1.08'$  GEBTB =  $1.08 - 2.01 \times$   
34  $0.21 = 0.66'$

35  $TBTB = GEBTB/GfBTB = 0.66/1.2 = 0.55' \Rightarrow$  Use 4" BTB

36 GfBTB ~ taken from table 7-651.2C

#### 37 C. Caliche Subbase ~ TCSB

38  $GE = 0.0032 \times TI \times (100 - R) \dots R = 50$  - prepared subgrade

39  $GE = 1.2$

1  $GECSB = 1.2 - (0.21 \times 2.07) - (0.33 \times 1.2) \Rightarrow 0.37'$   
2  $TCBS = 0.37/1.0 = 0.37' \sim 4\frac{1}{2}''$

3 Based on the results of the above calculation, the site paved roads designated for waste  
4 transportation are safe to be used by the heavier truckloads carrying shipping casks used in RH  
5 TRU mixed waste transportation to the WIPP.

6 A4-3 Waste Handling Building Traffic

7 CH TRU mixed waste will arrive by tractor-trailer at the WIPP facility in sealed Contact Handled  
8 Packages. Prior to unloading the packages from the trailer, security checks, radiological  
9 surveys, and shipping documentation reviews will be performed. A forklift or Yard Transfer  
10 Vehicle will remove the Contact Handled Packages and transport them a short distance through  
11 an air lock that is designed to maintain differential pressure in the WHB. The forklift or Yard  
12 Transfer Vehicle will place the shipping containers at one of the two TRUPACT-II unloading  
13 docks (**TRUDOCK**) inside the WHB or, in the case of the TRUPACT-III, at the payload transfer  
14 station in Room 108.

15 The TRUPACT-II may hold up to two 55-gallon drum seven-packs, two 85-gallon drum four-  
16 packs, two 100-gallon drum three-packs, two standard waste boxes (SWB), or one ten-drum  
17 overpack (**TDOP**). A HalfPACT may hold seven 55-gallon drums, one SWB, or four 85-gallon  
18 drums. The TRUPACT-III holds a single SLB2. A six-ton overhead bridge crane or Facility  
19 Transfer Vehicle with a transfer table will be used to remove the contents of the Contact  
20 Handled Package. Waste containers will be surveyed for radioactive contamination and  
21 decontaminated or returned to the Contact Handled Package as necessary.

22 Each facility pallet will accommodate four 55-gallon drum seven-packs, four SWBs, four 85-  
23 gallon drum four-packs, four 100-gallon drum three-packs, two TDOPs, or an SLB2. Waste  
24 containers will be secured to the facility pallet prior to transfer. A forklift or facility transfer vehicle  
25 will transport the loaded facility pallet the air lock at the Waste Shaft (Figures A4-3, A4-3a, and  
26 A4-3b). The facility transfer vehicle will be driven onto the waste shaft conveyance deck, where  
27 the loaded facility pallet will be transferred to the waste shaft conveyance and downloaded for  
28 emplacement.

29 RH TRU mixed waste will arrive at the WIPP facility in a payload container contained in a  
30 shielded cask loaded on a tractor-trailer. Prior to unloading the cask from the trailer, radiological  
31 surveys, security checks, and shipping documentation reviews will be performed, and the trailer  
32 carrying the cask will be moved into the Parking Area or directly into the RH Bay of the Waste  
33 Handling Building Unit.

34 The cask is unloaded from the trailer in the RH Bay and is placed on the Cask Transfer Car.  
35 The Cask Transfer Car is used to move the cask to the Cask Unloading Room. At this point, a  
36 crane moves the waste to the Hot Cell or the Transfer Cell. Some RH TRU mixed waste may be  
37 moved to the Hot Cell for overpacking before being moved to the Transfer Cell. Once in the  
38 Transfer Cell, the Transfer Cell Shuttle Car moves the waste beneath the facility cask. A crane  
39 is used to move the waste from the Transfer Cell Shuttle Car into the facility cask. The Facility  
40 Cask Transfer Car then moves the facility cask to the underground. A more detailed description  
41 of waste handling in the WHB is included in Attachment A1. Figures A4-5, A4-6 and A4-7 show  
42 RH TRU mixed waste transport routes.

1 A4-4 Underground Traffic

2 The Permittees shall designate the traffic routes of TRU mixed waste handling equipment and  
3 construction equipment and record this designation on a map that is posted in a location where  
4 it can be examined by personnel entering the underground. The map will be updated whenever  
5 the routes are changed. Maps will be available in facility files until facility closure. The ventilation  
6 and traffic flow path in the TRU mixed waste handling areas underground are restricted and  
7 separate from those used for mining and haulage (construction) equipment, except that during  
8 waste transport in W-30, ventilation need not be separated north of S-1600 (Figures A4-4 and  
9 A4-4a). In general, the Permittees restrict waste traffic to the intake ventilation drift to maximize  
10 isolation of this activity from personnel. The exhaust drift in the waste disposal area will normally  
11 not be used for personnel access. Non-waste and non-construction traffic is generally  
12 comprised of escorted visitors only and is minimized during each of the respective operations.

13 Adequate clearances that exceed the mining regulations of 30 CFR §57 exist underground for  
14 safe passage of vehicles and pedestrians. Pedestrians/personnel are required to yield to  
15 vehicles in the WIPP underground facility. This condition is reinforced through the WIPP  
16 equipment operating procedures, the WIPP Safety Manual, the WIPP safety briefing required for  
17 all underground visitors, the General Employee Training annual refresher course, and the  
18 Underground annual refresher course that are mandated by 30 CFR §57, the New Mexico Mine  
19 Code, and DOE Order 5480.20A.

20 In addition, other physical means are utilized to safeguard pedestrians/personnel when  
21 underground such as:

22 All equipment operators are required to sound the vehicle horn when approaching  
23 intersections.

24 All airlock and bulkhead vehicle doors are equipped with warning bells or strobe lights to  
25 alert personnel when door opening is imminent.

26 Hemispherical mirrors are used at blind intersections so that persons can see around  
27 corners.

28 All heavy equipment is required to have operational back-up alarms.

29 Heavily used intersections are well lighted.

30 Typically, the traffic routes during waste disposal in all Panels will use the same main access  
31 drifts.

32 All traffic safety is regulated and enforced by the Federal and State mine codes of regulations  
33 (30 CFR §57 and New Mexico State Mine Code). The agencies that administer these codes  
34 make regular inspection tours of the WIPP underground facilities for the purpose of  
35 enforcement.

36 All underground equipment is designed for off-road use since all driving surfaces are excavated  
37 in salt. No loads on the underground roadways will exceed the bearing strength of in situ halite.

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## **TABLES**

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**Table A4-1  
Waste Isolation Pilot Plant Site Design Designation Traffic Parameters <sup>a</sup>**

<b>Traffic Parameter</b>	<b>North Access Road (No. of Vehicles, unless otherwise stated)</b>	<b>South Access Road (No. of Vehicles, unless otherwise stated)</b>	<b>On-Site Waste Haul Roads Contact-Handled and Remote-Handled Package Traffic)</b>
Average Daily Traffic (ADT) <sup>b</sup>	800	800	8
Design Hourly Volume (DHV) <sup>c</sup>	144	144	NA <sup>g</sup>
Hourly Volume (Max. at Shift Change)	250	250	NA
Distribution (D) <sup>d</sup>	67%	67%	NA
Trucks (T) <sup>e</sup>	2%	2%	100%
Design Speed <sup>h,i</sup>	70 mph (113 kph)	60 mph (97 kph)	25 mph (40 kph)
Control of Access <sup>f</sup>	None	None	Full

- <sup>a</sup> For WIPP personnel and TRU mixed waste shipments only.
- <sup>b</sup> ADT—Estimated number of vehicles traveling in both directions per day.
- <sup>c</sup> DHV—A two-way traffic count with directional distribution.
- <sup>d</sup> D—The percentage of DHV in the predominant direction of travel.
- <sup>e</sup> T—The percentage of ADT comprised of trucks (excluding light delivery trucks).
- <sup>f</sup> Control of Access—The extent of roadside interference or restriction of movement.
- <sup>g</sup> NA—Not applicable.
- <sup>h</sup> mph—miles per hour.
- <sup>i</sup> kph—kilometers per hour.

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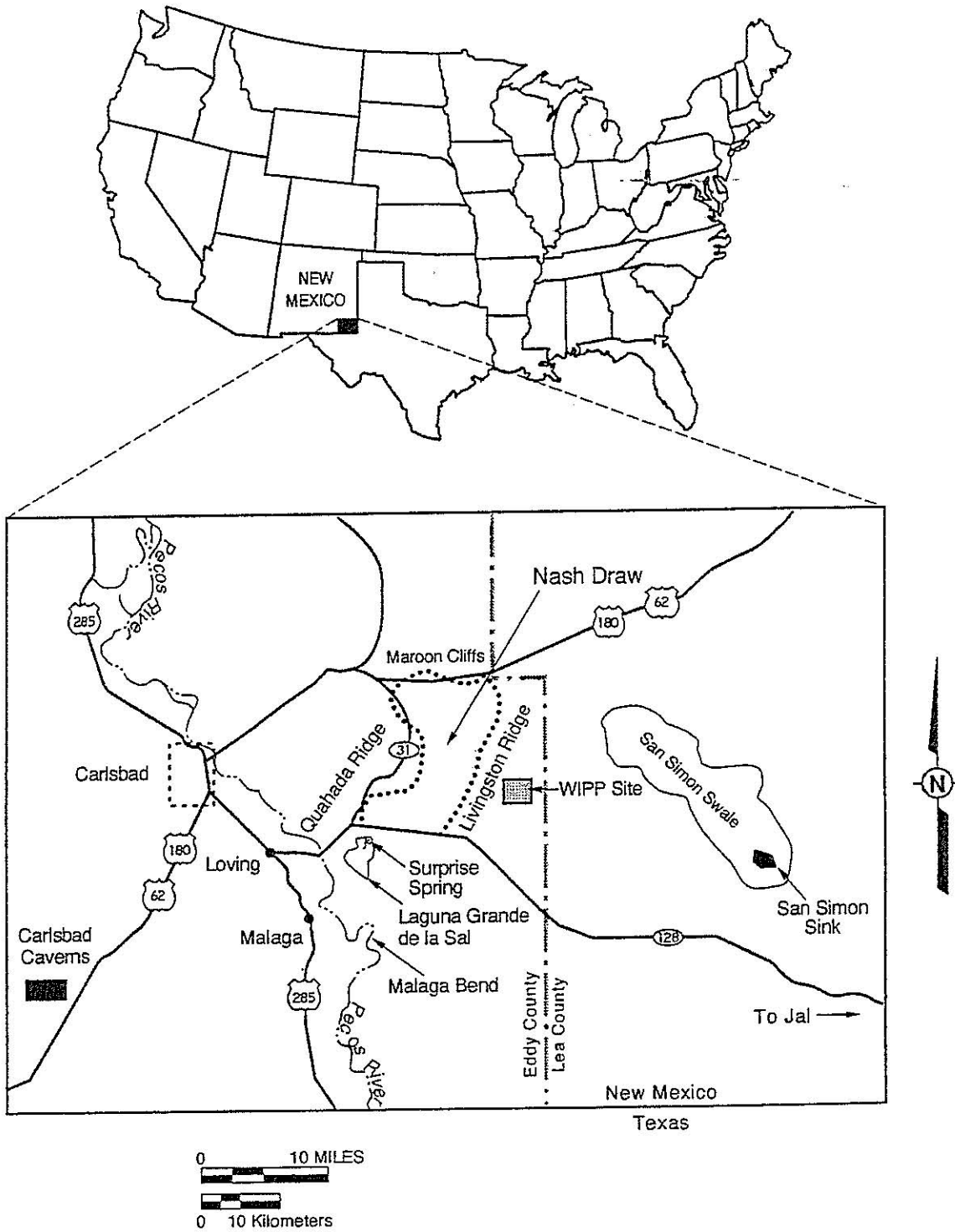
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## FIGURES

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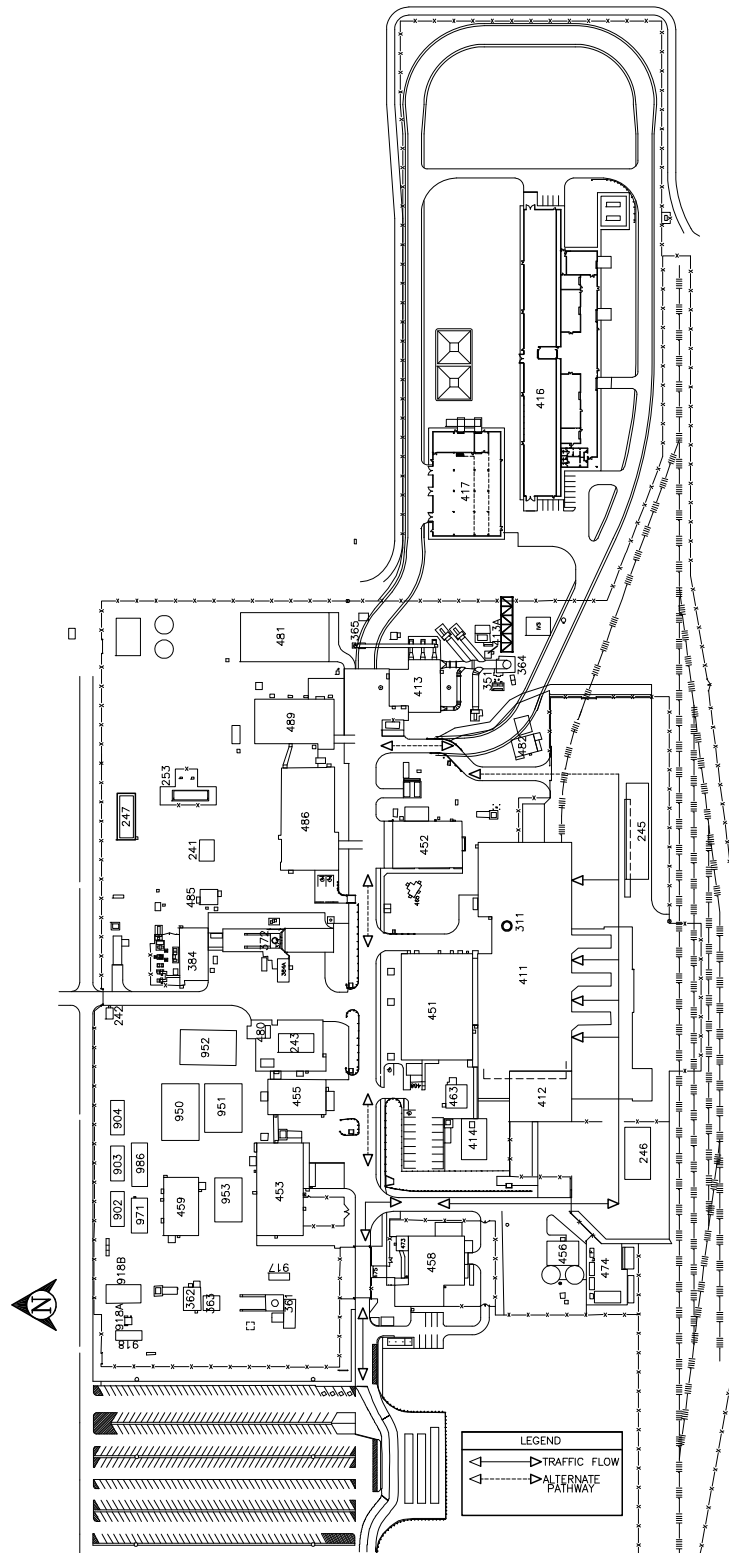
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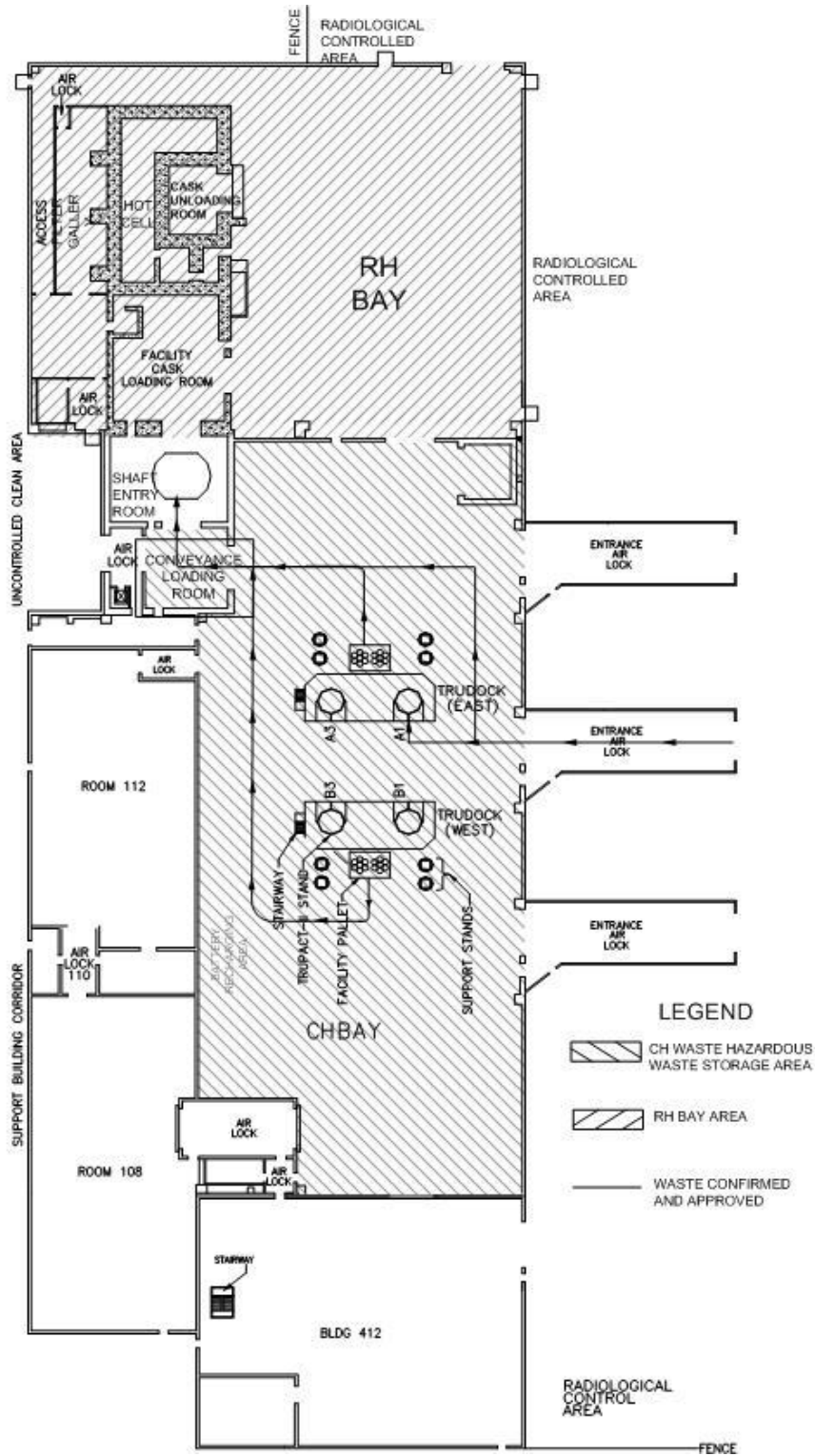
**Figure A4-1**  
**General Location of the WIPP Facility**



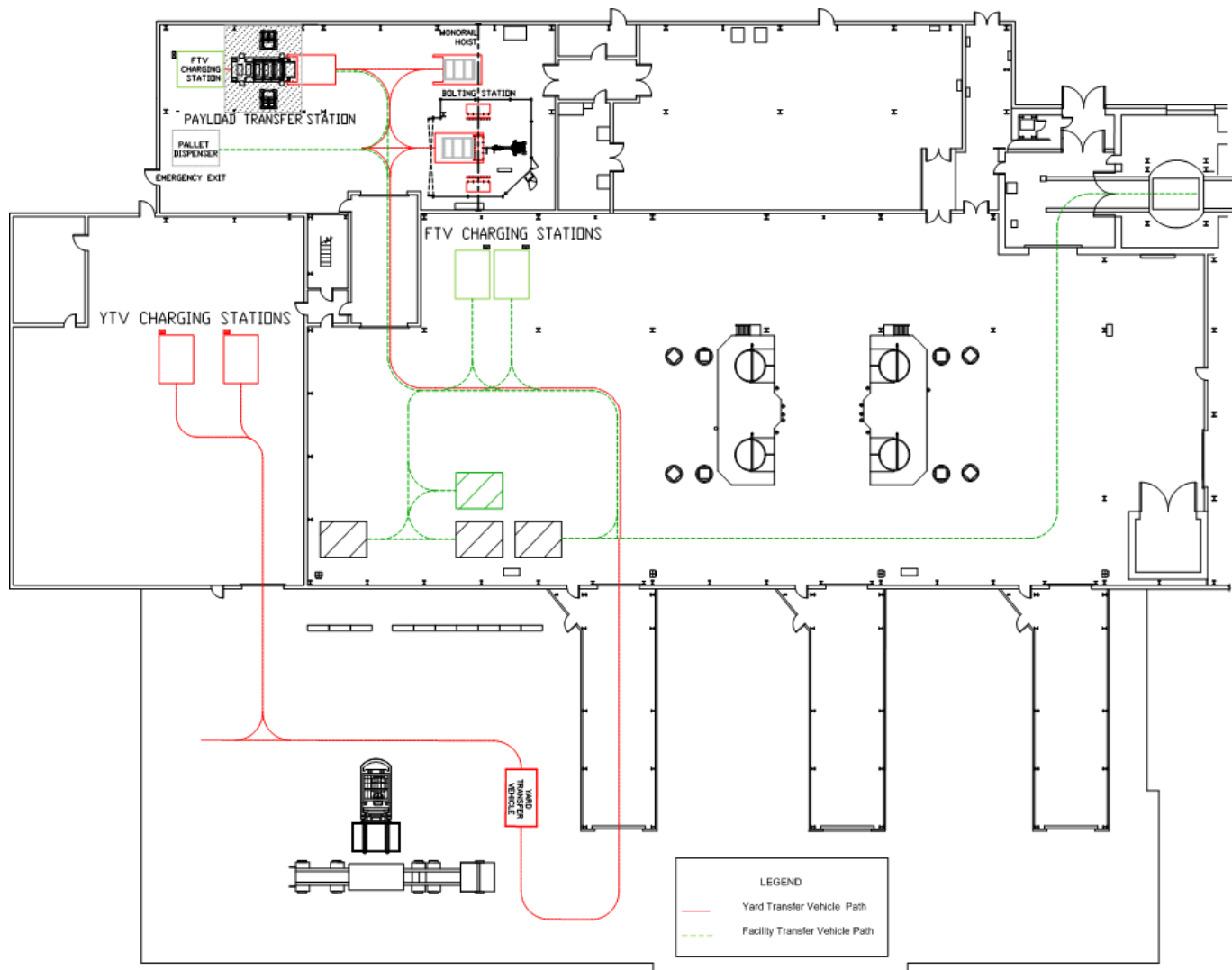




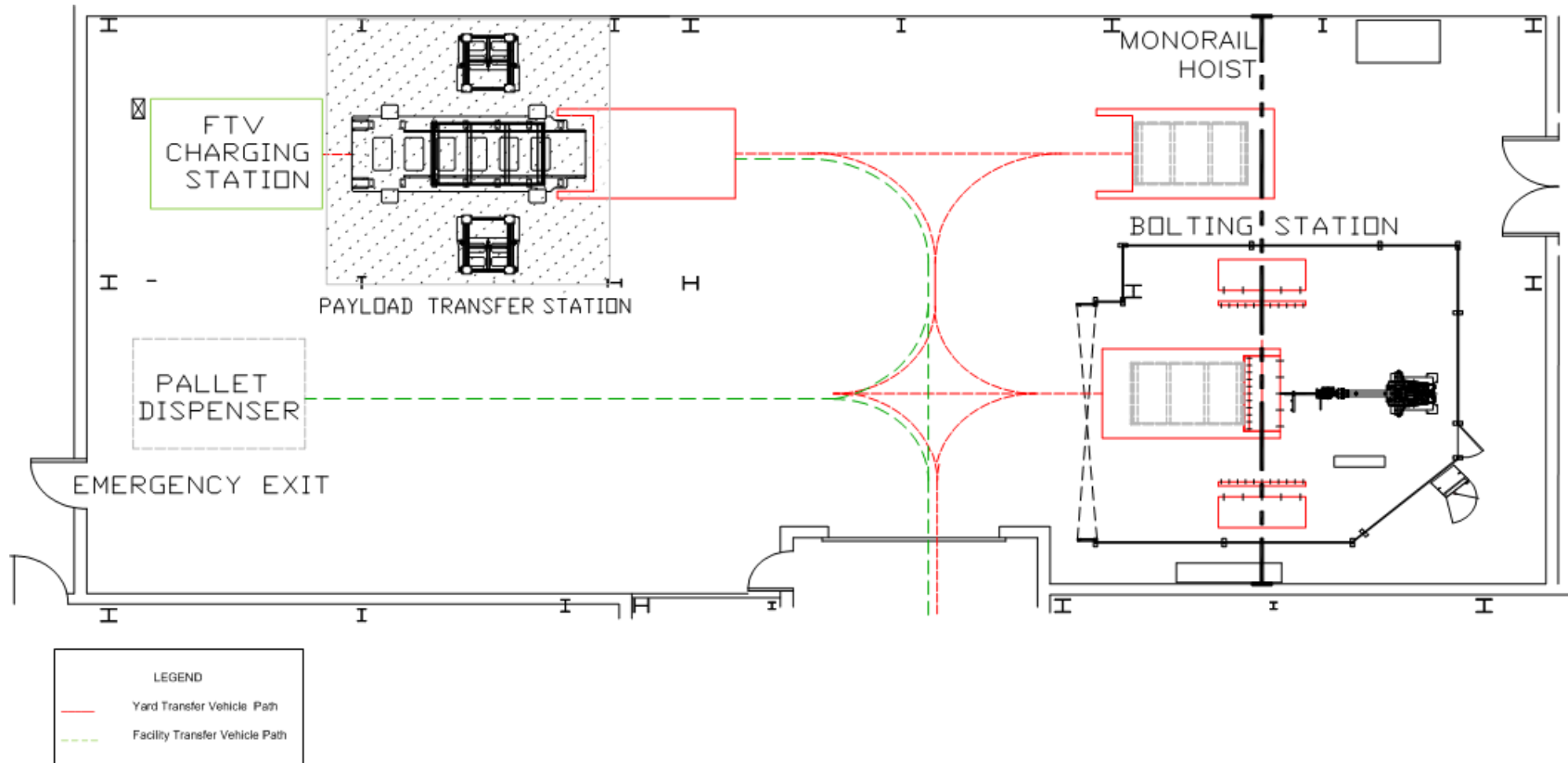
**Figure A4-2-NFB**  
**WIPP Traffic Flow Diagram with Building 416**



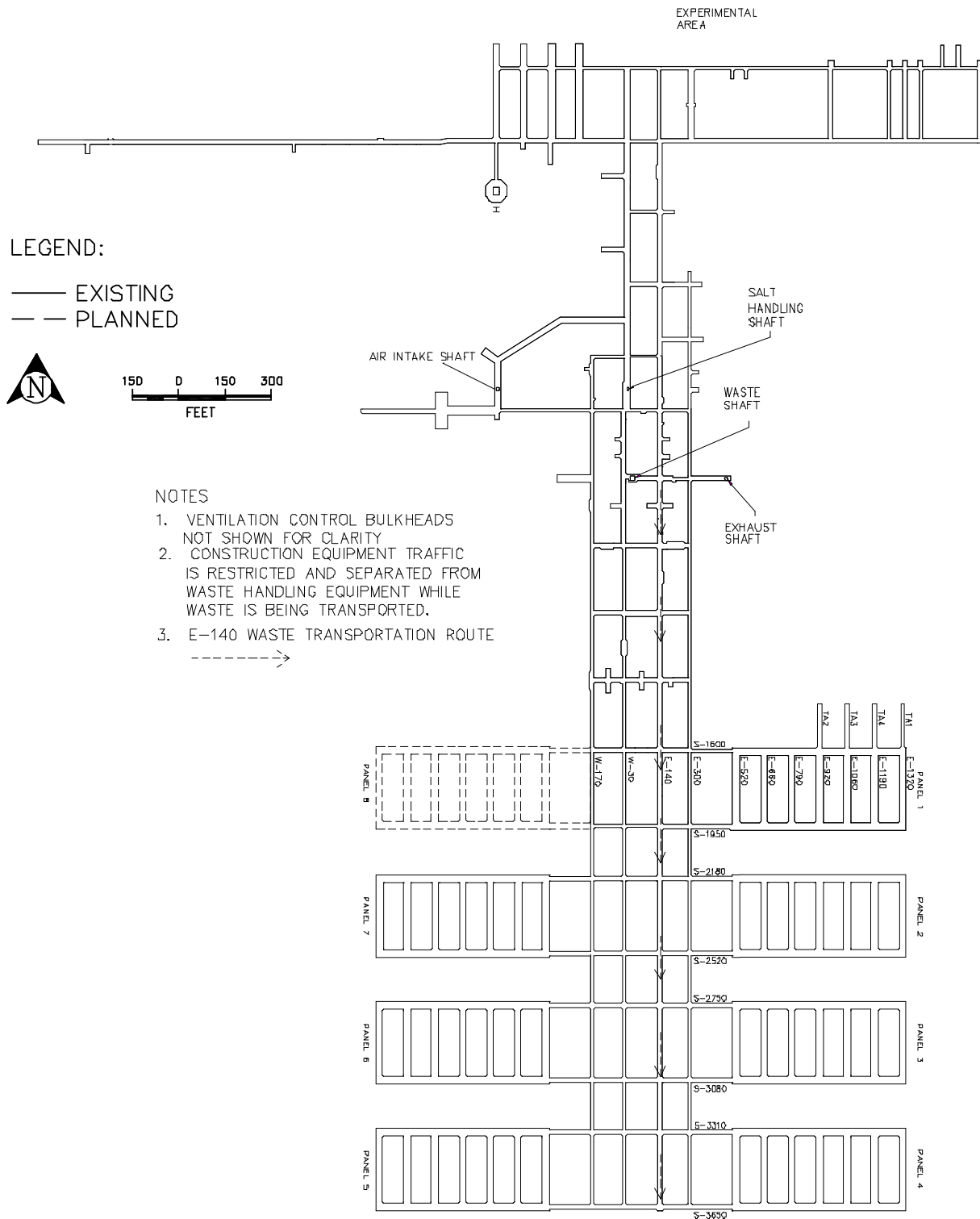
**Figure A4-3**  
**Waste Transport Routes in Waste Handling Building - Container Storage Unit**



**Figure A4-3a**  
**Typical Transport Route for TRUPACT-III and Standard Large Box 2**

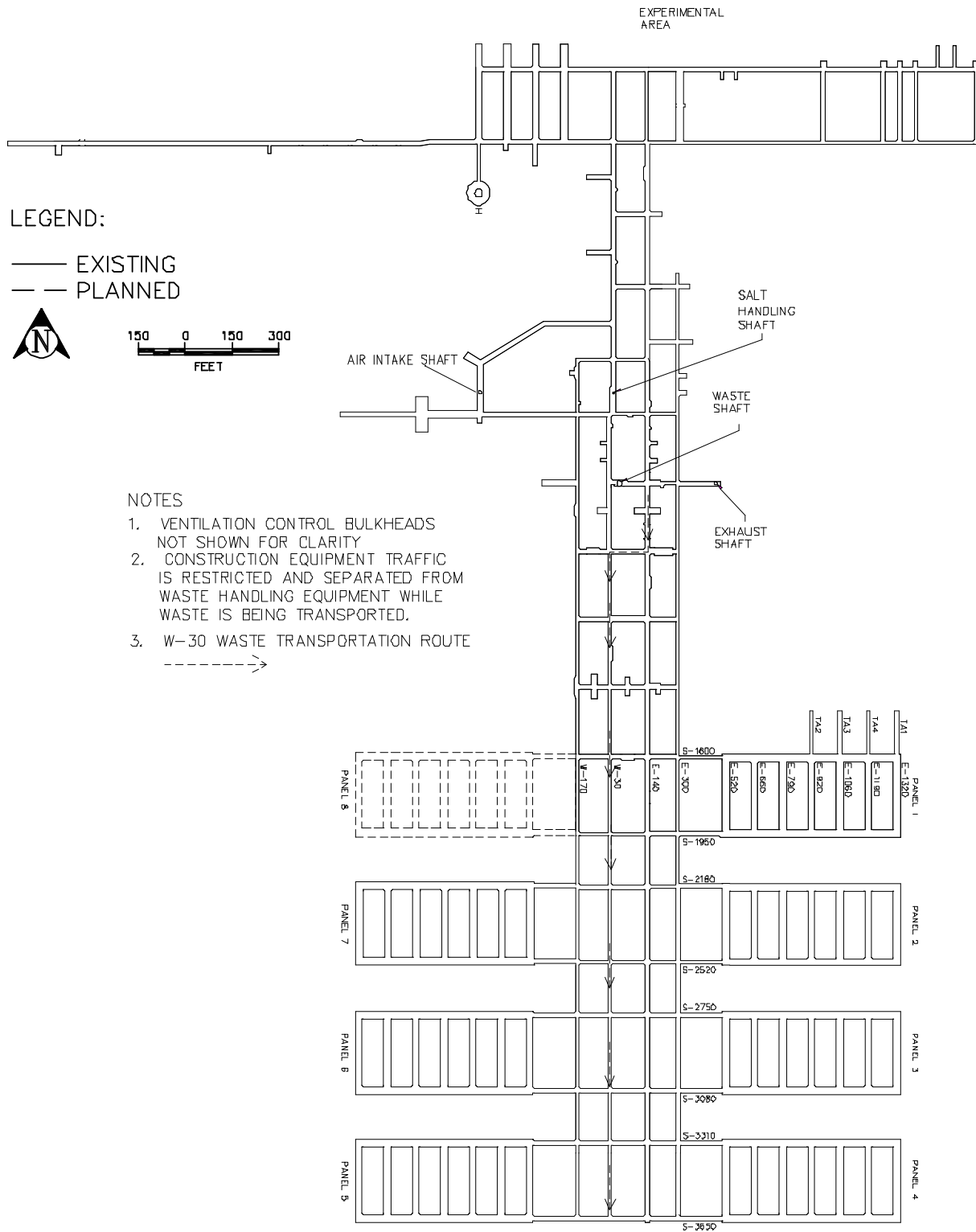


**Figure A4-3b**  
**Typical Transport Route for TRUPACT-III and Standard Large Box 2 in Room 108**



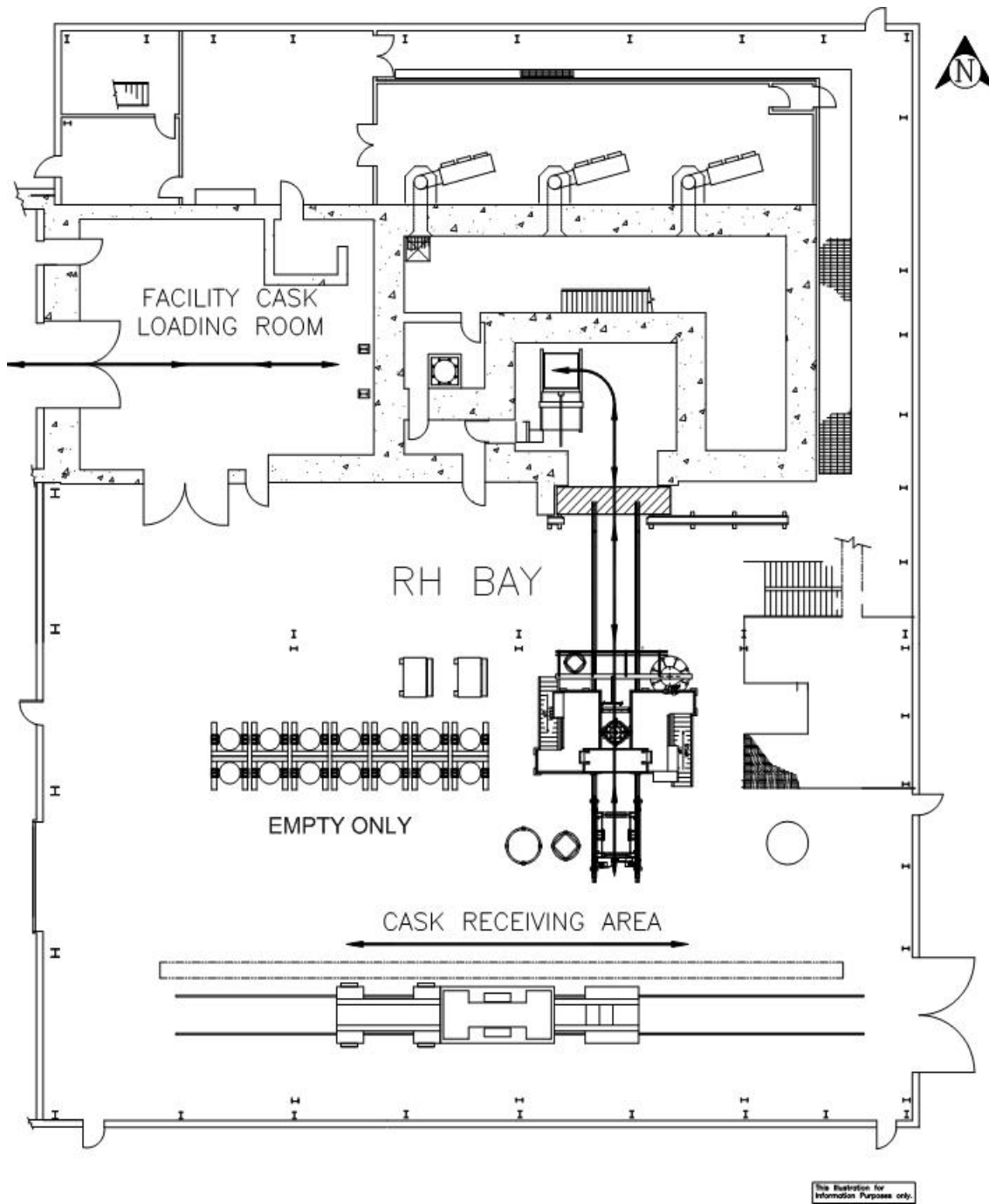
- LEGEND:
- EXISTING
  - - PLANNED
- NOTES
1. VENTILATION CONTROL BULKHEADS NOT SHOWN FOR CLARITY
  2. CONSTRUCTION EQUIPMENT TRAFFIC IS RESTRICTED AND SEPARATED FROM WASTE HANDLING EQUIPMENT WHILE WASTE IS BEING TRANSPORTED.
  3. E-140 WASTE TRANSPORTATION ROUTE  
 ----->

**Figure A4-4**  
**Typical Underground Transport Route Using E-140**

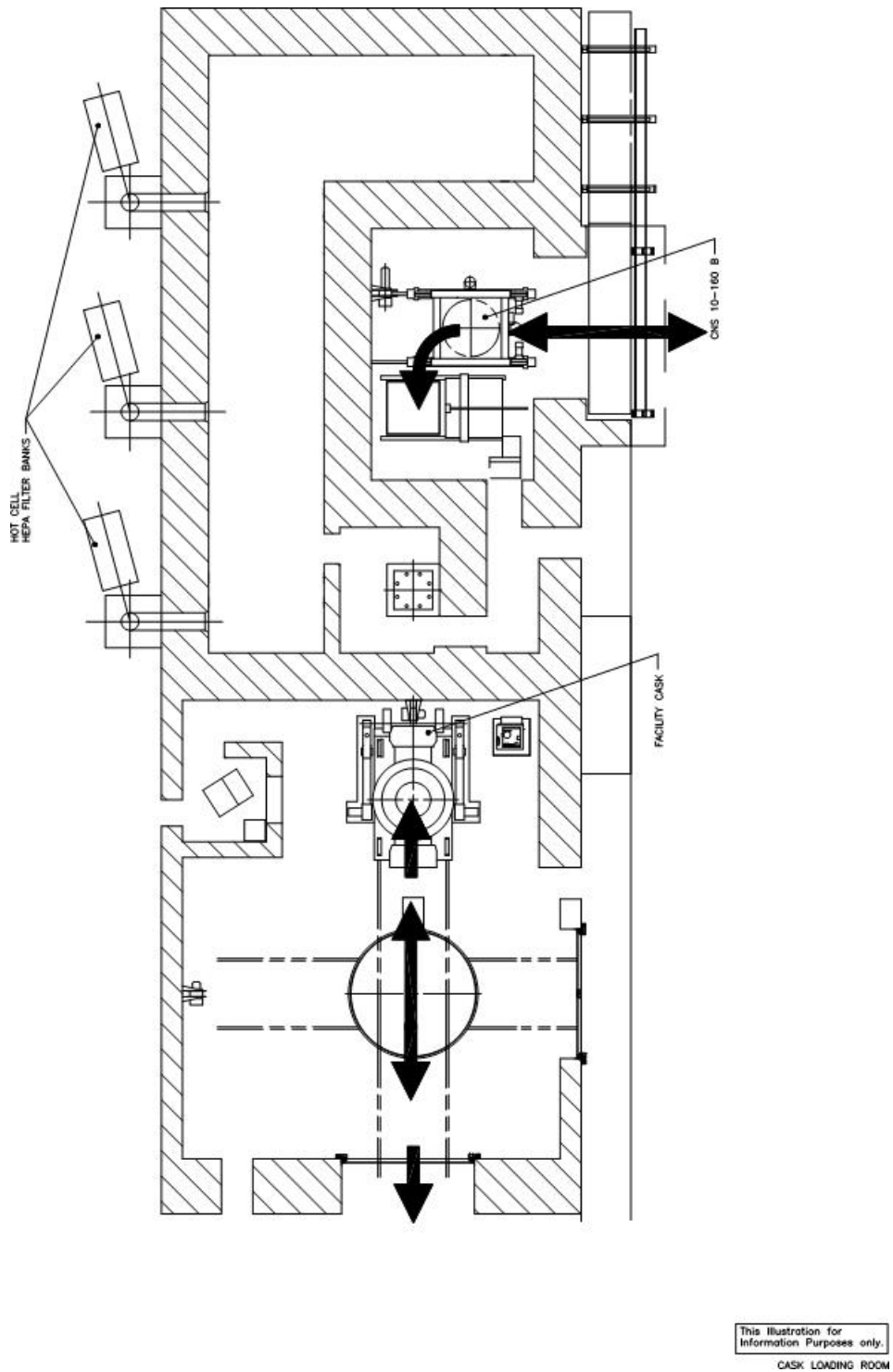


- LEGEND:  
 — EXISTING  
 - - PLANNED
- NOTES  
 1. VENTILATION CONTROL BULKHEADS NOT SHOWN FOR CLARITY  
 2. CONSTRUCTION EQUIPMENT TRAFFIC IS RESTRICTED AND SEPARATED FROM WASTE HANDLING EQUIPMENT WHILE WASTE IS BEING TRANSPORTED.  
 3. W-30 WASTE TRANSPORTATION ROUTE  
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**Figure A4-4a**  
**Typical Underground Transport Route Using W-30**

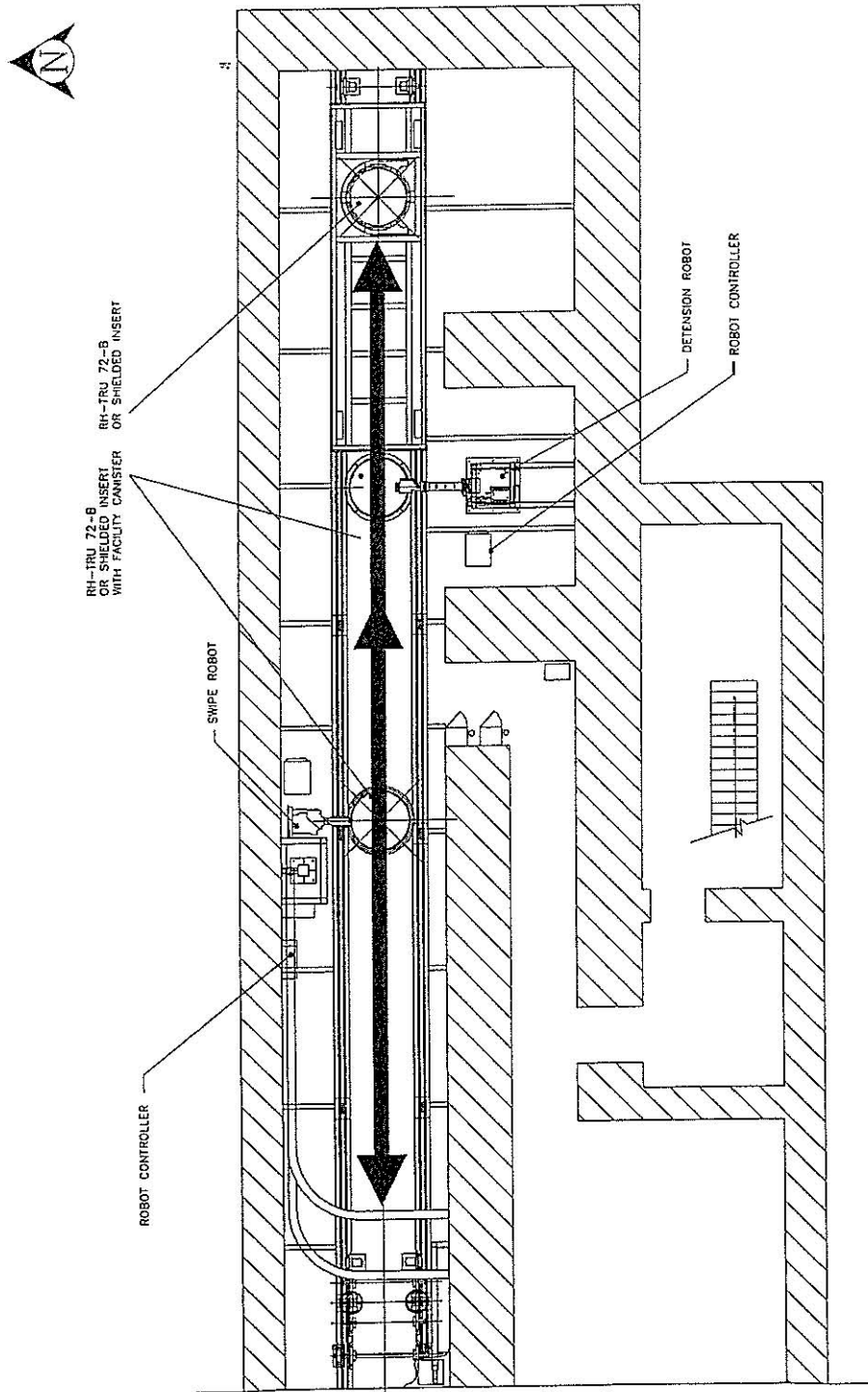


**Figure A4-5**  
**RH Bay Waste Transport Routes**



**Figure A4-6**  
**RH Bay Cask Loading Room Waste Transport Route**





**Figure A4-7**  
**RH Bay Canister Transfer Cell Waste Transport Route**