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0CAN021302

February 28, 2013

U.S. Nuclear Regulatory Commission
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SUBJECT: Overall Integrated Plan in Response to March 12, 2012, Commission Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)
Arkansas Nuclear One – Units 1 and 2
Docket Nos. 50-313 and 50-368
License Nos. DPR-51 and NPF-6

REFERENCES:

1. NRC Order Number EA-12-049, *Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events*, dated March 12, 2012 (0CNA031206)

2. NRC Interim Staff Guidance JLD-ISG-2012-01, *Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events*, Revision 0, dated August 29, 2012 (ML12229A174)

3. Nuclear Energy Institute (NEI) 12-06, *Diverse and Flexible Coping Strategies (FLEX) Implementation Guide*, Revision 0, dated August 2012

4. Initial Status Report in Response to March 12, 2012, *Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)*, dated October 26, 2012, (0CAN101203)

Dear Sir or Madam:

On March 12, 2012, the NRC issued an order (Reference 1) to Entergy Operations, Inc. (Entergy). Reference 1 was immediately effective and requires provisions for mitigating strategies for beyond-design-basis external events. Specific requirements are outlined in the Enclosure of Reference 1.

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Reference 1 requires submission of an Overall Integrated Plan by February 28, 2013. The NRC Interim Staff Guidance (Reference 2) was issued August 29, 2012, and endorses industry guidance document NEI 12-06, Revision 0 (Reference 3) with clarifications and exceptions identified in Reference 2. Reference 3 provides direction regarding the content of this Overall Integrated Plan. The purpose of this letter is to provide that Overall Integrated Plan pursuant to Section IV, Condition C.1, of Reference 1.

Reference 3, Section 13, contains submittal guidance for the Overall Integrated Plan. The enclosure to this letter provides Arkansas Nuclear One's (ANO's) Overall Integrated Plan pursuant to Reference 3.

Reference 4 provided the ANO initial status report regarding Mitigation Strategies for Beyond-Design-Basis External Events, as required by Reference 1. Entergy has not yet identified any impediments to compliance with the Order, i.e., within two refueling cycles after submittal of the integrated plan. Future status reports will be provided as required by Section IV, Condition C.2, of Reference 1.

This letter contains no new regulatory commitments. If you have any questions regarding this report, please contact Stephenie Pyle at 479.858.4704.

I declare under penalty of perjury that the foregoing is true and correct; executed on February 28, 2013.

Sincerely, Michael R. Chisum for Jeremy Browning

JGB/nbm

Enclosure: ANO FLEX Overall Integrated Implementation Plan

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Enclosure to

0CAN021302

Arkansas Nuclear One (ANO) Diverse and Flexible Coping Strategies (FLEX) Overall Integrated Implementation Plan

ANO FLEX Overall Integrated Implementation Plan

General Integrated Plan Elements	
Determine Applicable Extreme External Hazard **Ref: Nuclear Energy Institute (NEI) 12-06 Section 4.0 -9.0 JLD-ISG-2012-01 Section 1.0**	In accordance with Reference 1, the Arkansas Nuclear One (ANO) site has been evaluated, and the following applicable hazards have been identified: • Seismic events • External flooding • Severe storms with high winds • Snow, ice, and extreme cold • Extreme heat Entergy Operations, Inc. (Entergy) has reviewed the NEI Diverse and Flexible Coping Mitigation Strategies (FLEX) guidance and determined the hazards that FLEX equipment should be protected from include seismic; flooding; severe storms with high winds; snow, ice and extreme cold; and extreme high temperatures. Entergy has determined the functional threats from each of these hazards and identified FLEX equipment that may be affected. The FLEX storage locations will provide the protection required from these hazards. Entergy is also developing procedures and processes to further address plant strategies for responding to these various hazards. <u>Seismic:</u> Per Safety Analysis Report (SAR) seismic input (Reference 4), the seismic criteria for ANO includes two design basis earthquake spectra: operating basis earthquake (OBE) and design basis earthquake (DBE). The site-specific design response spectra define the vibratory ground motion of the OBE and DBE. The maximum horizontal acceleration for the DBE is 0.20g and the OBE has a maximum horizontal acceleration of 0.10g. The seismic hazard applies to ANO. As a result, the credited FLEX equipment will be assessed based on the current ANO seismic licensing basis to ensure that the equipment remains accessible and available after a beyond-design-basis external event (BDBEE) and that the FLEX equipment does not become a target or source of a seismic interaction from other systems, structures, or components. The FLEX strategies developed for ANO will include documentation ensuring that any storage locations and deployment routes meet the FLEX seismic criteria.

	External Flooding: The types of events evaluated to determine the worst potential flood included (1) probable maximum flood (PMF) due to flood flow at Dardanelle Dam yielding a water level at 358 feet (ft) mean sea level (MSL), (2) catastrophic failure of the closest dam upstream of Dardanelle Dam yielding a water level of 361 ft MSL, and (3) the effect of wind induced waves. The maximum plant site flood level from any cause is Elevation 361 ft MSL. A flood of the magnitude of the maximum probable flood will be forecast about five days prior to its arrival at the plant site. The plant will be shut down by the time the flood level reaches 354 ft, which is the elevation where flooding of the turbine building would commence. The plant will be shut down using normal shutdown procedures and, during the flood, the operators will maintain the plant in a safe shutdown condition. In summary, the ANO site is not considered a "dry" site and the flooding hazard is screened in. High Wind: Figures 7-1 and 7-2 from NEI 12-06 (Reference 2) were used for this assessment. The ANO site is located at 35° - 18' N (References 4a and 4b, Sections 2.2.1 and 2.1.1, respectively); therefore, ANO is not susceptible to hurricanes based on its location in Arkansas. The plant site is north of the final contour line shown in Figure 7-1 of NEI 12-06 (Reference 2). It was determined that the ANO site has the potential to experience damaging winds caused by a tornado exceeding 130 mph. Figure 7-2 of NEI 12-06 (Reference 2) indicates a maximum wind speed of 200 miles per hour (mph) for Region 1 plants, including ANO, which is located at 35°-18' N, 93°-13' W (References 4a and 4b, Sections 2.2.1 and 2.1.1, respectively). Therefore, high-wind hazards are applicable to the ANO site. In summary, (1) based on Figure 7-1 of NEI 12-06 (Reference 2), ANO is not susceptible to hurricanes so the hazard is screened out and (2) based on local data and Figure 7-2 of NEI 12-06 (Reference 2), ANO has the potential to experience damaging winds so the hazard is screened in.

	Snow, Ice, and Extreme Cold: Per the FLEX guidance, all sites should consider the temperature ranges and weather conditions for their site in storing and deploying their FLEX equipment. That is, the equipment procured should be suitable for use in the anticipated range of conditions for the site, consistent with normal design practices. Applicability of snow and extreme cold: NEI 12-06 (Reference 2) states that plants above the 35th parallel should provide the capability to address the impedances caused by extreme snow and cold. The ANO site is located marginally above the 35th parallel at 35°-18' N (References 4a and 4b, Sections 2.2.1 and 2.1.1, respectively); therefore, the FLEX strategies must consider the impedances caused by extreme snowfall with snow removal equipment, as well as the challenges that extreme cold temperature may present. Applicability of ice storms: The ANO site, located at 35°-18' N, 93°-13' W (References 4a and 4b, Sections 2.2.1 and 2.1.1, respectively), is not a Level 1 or 2 region as defined by Figure 8-2 of NEI 12-06 (Reference 2); therefore, the FLEX strategies must consider the hindrances caused by ice storms. In summary, based on the available local data and Figures 8-1 and 8-2 of NEI 12-06 (Reference 2), the hazards of snow, ice, and extreme cold temperatures are screened in for the ANO site. Extreme Heat: Per NEI 12-06 (Reference 2), all sites must address high temperatures. Virtually every state in the lower 48 contiguous United States has experienced temperatures in excess of 110°F. Many states have experienced temperatures in excess of 120°F. All sites will consider the impacts of these conditions on the FLEX equipment and its deployment. The event considered herein is a loss of all alternating current (AC) power as a result of short extreme high temperatures coincident with high electrical grid demands, resulting in regional blackout. During this type of event,

	with the equipment and water inventories in the units operating within the technical specification (TS) limits, no additional limitations on initial conditions/failures/abnormalities are expected. In summary, per NEI 12-06, all sites will address high temperatures. Therefore, the extreme heat hazard is screened in for ANO.
Key Site assumptions to implement NEI 12-06 strategies. **Ref: NEI 12-06 Section 3.2.1**	Assumptions are consistent with those detailed in NEI 12-06 (Reference 2, Section 3.2.1) and the Executive Summary of the Pressurized Water Reactor Owners Group (PWROG) Core Cooling Position Paper (OG-12-482). <u>**ANO Site-Specific Assumptions**</u> The following assumptions are specific to the ANO site: A1. Flood and seismic re-evaluations pursuant to the 10 CFR 50.54(f) letter of March 12, 2012 (Reference 1), are not completed and therefore not assumed in this submittal. As the re-evaluations are completed, appropriate issues will be entered into the corrective action system and addressed on a schedule commensurate with other licensing bases changes. A2. Exceptions for the site security plan or other (license/site-specific) requirements will be addressed in the Flex Support Guidelines (FSGs). A3. Deployment resources are assumed to begin arriving at hour 6 after the event and the site is assumed to be fully staffed by 24 hours. A4. Hardened connections are assumed to be protected and diverse with respect to the applicable hazards. A5. A flood of the magnitude of the PMF will be forecast about five days prior to the flood's arrival at the plant site. It is assumed that at least 24 hours are available for the deployment of FLEX equipment for the preparation for a flooding scenario, and that power is available during this time. A6. Entergy will declare an extended loss of AC power (ELAP) within sufficient time to take actions to stage equipment and initiate coping strategies.

	A7. No events or single failures of systems, structures, and components in addition to those presented in NEI 12-06 (Reference 2), are assumed to occur immediately prior to or during the event, including security events. A8. This plan defines strategies capable of mitigating a simultaneous loss of all AC power and loss of normal access to the ultimate heat sink (UHS) resulting from a BDBEE by providing adequate capability to maintain or restore core cooling, containment, and spent fuel pool (SFP) cooling capabilities at all units on a site. Though specific strategies are being developed, due to the inability to anticipate all possible scenarios, the strategies are also diverse and flexible to encompass a wide range of possible conditions. These pre-planned strategies developed to protect the public health and safety will be incorporated into the unit guidance. The plant TSs contain the limiting conditions for normal unit operations to ensure that design safety features are available to respond to a design-basis accident and direct the required actions to be taken when the limiting conditions are not met. The result of the BDBEE may place the plant in a condition where it cannot comply with certain TSs and/or with its Security Plan, and, as such, may warrant invocation of 10 CFR 50.54(x) and/or 10 CFR 73.55(p). See Reference 9.
Extent to which the guidance, JLD-ISG-2012-01 and NEI 12-06, are being followed. Identify any deviations to JLD-ISG-2012-01 and NEI 12-06. **Ref: JLD-ISG-2012-01** **Ref: NEI 12-06 Section 13.1**	Entergy expects to comply with the guidance in JLD-ISG-2012-01 (Reference 3) and NEI 12-06 (Reference 2) in implementing FLEX strategies for the ANO site. See Attachment 1B.

Provide a sequence of events and identify any time constraint required for success including the technical basis for the time constraint. **Ref: NEI 12-06 Section 3.2.1.7 JLD-ISG-2012-01 Section 2.1**	The sequence of events and any associated time constraints are identified for ANO-1 and ANO-2 for Modes 1 through 4. See the attached sequence of events timeline (Attachment 1A) for a summary of this information.
Identify how strategies will be deployed in all modes. **Ref: NEI 12-06 section 13.1.6**	Deployment of FLEX equipment is described for each FLEX function in the subsequent sections below and covers all modes.

Provide a milestone schedule. This schedule should include:
• **Modifications timeline**
   o **Phase 1**
   o **Phase 2**
   o **Phase 3**
• **Procedure guidance development complete**
   o **Strategies**
   o **Maintenance**
• **Storage plan (reasonable protection)**
• **Staffing analysis completion**
• **FLEX equipment acquisition timeline**
• **Training completion for the strategies**
• **Regional Response Centers operational**
 	
Ref: NEI 12-06 Section 13.1
	See attached milestone schedule in Attachment 2.

Identify how the programmatic controls will be met **Ref: NEI 12-06 Section 11 JLD-ISG-2012-01 Section 6.0**	Equipment associated with these strategies will be procured as commercial equipment with design, storage, maintenance, testing, and configuration control in accordance with NEI 12-06, (Reference 2, Section 11). The unavailability of equipment and applicable connections that directly perform a FLEX mitigation strategy will be managed using plant equipment control guidelines developed in accordance with NEI 12-06, (Reference 2, Section 11.5). Programs and controls will be established to assure personnel proficiency in the mitigation of beyond-design-basis events is developed and maintained in accordance with NEI 12-06, (Reference 2, Section 11.6). Existing plant configuration control procedures will be modified to ensure that changes to the plant design, physical plant layout, roads, buildings, and miscellaneous structures will not adversely impact the approved FLEX strategies in accordance with NEI 12-06, (Reference 2, Section 11.8). Procedure Guidance: Procedures and guidance to support deployment and FLEX coping strategy implementation, including interfaces with emergency operating procedures (EOPs), special events procedures, abnormal operating procedures (AOPs), and system operating procedures, will be coordinated within the site procedural framework. The procedural documentation will be auditable, consistent with generally accepted engineering principles and practices, and controlled within the Entergy document control system. Entergy is participating with the PWROG to develop and implement the FSGs at ANO in a timeline to support the implementation of FLEX by Fall of 2014 for ANO-1 and by Fall of 2015 for ANO-2. The PWROG has generated these guidelines in order to assist utilities with the development of site-specific procedures to cope with an ELAP in compliance with the requirements of NEI 12-06 (Reference 2). Actions that maneuver the plant will remain contained within the typical controlling procedures, and the FSGs will be implemented as necessary to maintain the key safety functions of core cooling, containment, and SFP cooling in

	parallel with the controlling procedure actions. <u>Maintenance and Testing:</u> The FLEX mitigation equipment will be initially tested (or other reasonable means used) to verify performance conforms to the limiting FLEX requirements. It is expected that the testing will include the equipment and the assembled sub-system to meet the planned FLEX performance. Additionally, Entergy plans to use the guidance in the maintenance and testing template upon issuance by the Electric Power Research Institute (EPRI). The template will be developed to meet the FLEX guidelines established in Section 11.5 of NEI 12-06 (Reference 2). <u>Staffing:</u> The FLEX strategies documented in the event sequence analysis assume: • On-site staff are at minimum shift staffing levels • No independent, concurrent events • All personnel on-site are available to support site response Entergy plans to address staffing considerations in accordance with NEI 12-06 (Reference 2) to fully implement FLEX at the site. <u>Configuration Control:</u> Per NEI 12-06 (Reference 2) and the Interim Staff Guidance (Reference 3), the FLEX strategies must be maintained to ensure that future plant changes do not adversely impact the FLEX strategies. Therefore, Entergy plans to maintain the FLEX strategies and modify existing plant configuration control procedures to ensure changes to the plant design, physical plant layout, roads, buildings, and miscellaneous structures will not adversely impact the approved FLEX strategies.

Describe training plan	Training plans will be developed for plant groups such as the emergency response organization (ERO), fire, security, emergency planning (EP), operations, engineering, mechanical maintenance, and electrical maintenance. The training plan development will be done in accordance with ANO site procedures using the Systematic Approach to Training and will be implemented to ensure that the required Entergy ANO site staff is trained prior to implementation of FLEX. The training program will comply with the requirements outlined in Section 11.6 of NEI 12-06 (Reference 2).
Describe Regional Response Center plan	The industry is expected to establish two Regional Response Centers (RRCs) to support utilities during beyond design basis events. Each RRC is expected to hold five sets of equipment; four of which should be able to be fully deployed when requested; the fifth set would have equipment in a maintenance cycle. Equipment will be moved from an RRC to a local assembly area, established by the Strategic Alliance for FLEX Emergency Response (SAFER) team and the utility. Communications will be established between the affected nuclear site and the SAFER team and required equipment moved to the site as needed. First arriving equipment, as established during development of the nuclear site's playbook, is expected to be delivered to the site within 24 hours from the initial request. Entergy will negotiate and execute a contract with the SAFER for the ANO site which will meet the requirements of NEI 12-06 (Reference 2, Section 12).
Notes: N/A	

Maintain Core Cooling and Heat Removal
Determine Baseline coping capability with installed coping[1] modifications not including FLEX modifications, utilizing methods described in Table 3-2 of NEI 12-06: • **Emergency Feedwater (EFW)** • **Depressurize Steam Generator (SG) for Makeup with Portable Injection Source** • **Sustained Source of Water** Ref: JLD-ISG-2012-01 Sections 2 and 3
PWR-Installed Equipment Phase 1
During a station blackout (SBO), operator actions are currently governed by the applicable SBO procedures. Heat is removed from the core through the SG using the atmospheric dump valves (ADVs)/main steam safety valves, with the SG being fed by the turbine-driven EFW pumps at both units. Following loss of remote control of the ADV and the turbine-driven EFW pump, local manual action is possible and will be used to continue plant control consistent with current procedures. The "Q" condensate storage tank (QCST) will supply inventory for both units but will require modification to assure wind-generated missile protection or be supplemented with a source independent of wind-generated missile effects. Cooldown for ANO-1 is deferred until the reactor coolant system (RCS) inventory control is assured. This strategy is being confirmed through the planned reanalysis underway with the PWROG, which modifies the current Babcock and Wilcox Nuclear Steam Supply System (NSSS) generic analysis of Reference 7. ANO-2 will initiate an early cooldown consistent with the Reference 7 assumptions. The turbine-driven EFW pumps will be utilized by both units to provide condensate flow from an event-qualified source to supply the SGs. The turbine-driven EFW pumps are located in the auxiliary building (AB). The building is designed to withstand the effects of earthquakes, tornadoes, floods, external missiles, and other appropriate natural phenomena. Power supplied to the turbine-driven EFW pump, valve operators, and other necessary support systems is independent of AC power sources. The QCST (T-41B; shared by both units) is sufficient for decay heat removal (DHR) without crediting water remaining in the SGs post-trip. The ADVs need to be opened in order to remove the steam generated from the SGs and support the natural circulation cooling. For ANO-1, each main steam line, between the reactor building penetration and the corresponding main steam isolation valve (MSIV), is provided with spring-loaded safety valves and air-operated dump valves which discharge to atmosphere. This arrangement permits controlled release of steam for RCS cooling when the MSIVs are closed.

[1] Coping modifications consist of modifications installed to increase initial coping time, i.e., generators to preserve vital instruments or increase operating time on battery powered equipment.

This will be accomplished by manual operation either from the control room, or by using local operation. For ANO-2, two sets of steam dump bypass system ADVs and isolation valves are provided in the main steam lines upstream of the MSIVs, one set in each main steam line. This arrangement permits controlled release of steam for RCS cooling when the MSIVs are closed. This can be accomplished by local operation. Phase 1 core heat removal during Modes 5 and 6 will follow existing procedural guidance for loss of DHR/shutdown cooling (SDC) system capability.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	Existing procedures/strategies/guidelines will be revised to consider FSGs.
Identify modifications	1. None
Key Reactor Parameters	1. SG Level 2. SG Pressure 3. QCST Level 4. RCS Pressure 5. Core Exit Thermocouples (CETs) 6. RCS Temperature
Notes: The key parameters will either be monitored from the control room or taken locally.	

Maintain Core Cooling and Heat Removal	
PWR Portable Equipment Phase 2	
The transition into Phase 2 for core heat removal will only be required if the operating conditions of the turbine-driven EFW pump cannot be maintained. In preparation of this postulated occurrence, the primary strategy involves staging a FLEX pump to deliver coolant to both SGs. The seismically-qualified QCST is available for several hours. As the QCST depletes, portable diesel-driven pumps will be staged to transfer inventory to the QCST. Preferred sources of inventory include the ANO-1 and ANO-2 condensate storage tanks (CSTs), the ANO-2 reactor water makeup tank (RMWT), and the ANO-1 raw water hold-up tank (RWHT), which each are non-seismically-qualified and are not assured of availability in all event cases. Suction from the emergency cooling pond (ECP), the Dardanelle Reservoir, and the cooling tower will provide an indefinite source of inventory via an inventory transfer pump. Support of core heat removal during conditions without SGs available will follow existing procedural guidance (References 8a, 8b, and 8c) for loss of DHR/SDC system capability. During conditions without SGs available, SG feed pumps would be utilized as RCS makeup pumps due to the higher flow demand required. Diesel fuel required for FLEX equipment will be sourced from available onsite diesel fuel storage tanks for both ANO-1 and ANO-2. Conceptual routings for reactor core cooling and heat removal strategies with SGs available (Modes 1 through 4) are contained in Attachment 3. Conceptual routings for transfer of inventory to the QCST are contained in Attachment 3. Conceptual routings for core heat removal with SGs not available (Modes 5 and 6) are contained in Attachment 3.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	Procedures and guidance to support deployment and implementation including interfaces to existing site procedures/strategies/guidelines will be developed in accordance with NEI 12-06 (Reference 2, Section 11.4). Further, the PWROG is developing generic and NSSS-specific FSGs. The FSGs developed for ANO will align with the PWROG guidance.
Identify modifications	1. The ANO-1 and ANO-2 primary and secondary connection points for the FLEX SG feed pump discharge during Modes 1 through 4 would be accessible locations on the EFW system. 2. The ANO-1 and ANO-2 primary and secondary FLEX SG feed pump suction for Modes 1 through 4 would require connections from the QCST piping to the pump.

Maintain Core Cooling and Heat Removal	
PWR Portable Equipment Phase 2	
	3. Missile protection beyond the current barrier of the QCST or connection to a wind-generated missile independent source. 4. Hose and/or piping connection(s) between alternate water sources and the QCST or QCST piping.
Key Reactor Parameters	1. SG Level 2. SG Pressure 3. QCST Level 4. RCS Pressure 5. CETs 6. RCS Temperature
Notes: The key parameters will either be powered from batteries and monitored from the control room or taken locally.	

Storage / Protection of Equipment: Describe storage / protection plan or schedule to determine storage requirements	
Seismic	The FLEX equipment storage location(s) will withstand the NEI 12-06 (Reference 2) hazards as applicable to ANO.
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	
Severe Storms with High Winds	
Snow, Ice, and Extreme Cold	
High Temperatures	

Deployment Conceptual Design

In all external events, a deployment strategy is planned that will deliver FLEX equipment to the appropriate event-determined staging area.

In the specific case of a flooding event, it is expected that several days' notice will be given before a flood level will approach either plant grade and/or the magnitude of the PMF. Therefore, it is assumed that at least 24 hours is available for the deployment of the FLEX equipment for the flooding scenario (i.e., primary connection). It is also assumed that power is available during this time. Deployment of portable FLEX equipment for the flooding scenario consists of transporting all required equipment from the storage location to the primary staging locations via the train bay. All paths and roads on-site are assumed to be maintained as unobstructed in this scenario, so the easiest path will used.

Any portable FLEX equipment will be trailer-mounted or on wheels for ease of deployment. This will give the current vehicles at ANO the capability to move any portable FLEX equipment. Available forklifts or pickup trucks will be utilized for deploying any portable FLEX equipment. Most of this equipment will be utilized for both the movement of any portable FLEX equipment and debris removal.

A strategy to clear debris for FLEX coping strategies will be implemented.

Strategy	Modifications	Protection of connections
The ANO-1 and ANO-2 event strategies are to rely upon the installed turbine-driven EFW pumps with inventory from the QCST;	ANO-1 and ANO-2 primary and secondary connections are required to the EFW system and the QCST piping.	The primary and secondary piping connections are located to be protected from the event specific conditions.

The plant will steam through the ADV with either remote or local manual control of the valves and the turbine-driven EFW pump; Transition to FLEX SG feed pump is possible; The FLEX SG feed pumps will feed the SG through connection into normal EFW piping; Primary and secondary staging locations address all external event possibilities; Primary staging is located in the AB at the end of the train bay. The ANO-1 secondary staging location will be outside the southwest corner of the AB on ground level. The ANO-2 secondary staging location will be outside the northwest corner of the AB on ground level. The strategy, previously described, is used for Modes 1 through 4, but for Modes 5 and 6 (SGs not available), the SG FLEX feed pump is used for RCS makeup.	Potential use of the FLEX SG feed pump for Modes 5 and 6 would require discharge connections to ANO-1 high pressure injection (HPI) and ANO-2 high pressure safety injection (HPSI)/charging piping.	The FLEX connections will be constructed to withstand the NEI 12-06 (Reference 2) hazards as applicable to ANO.
If any other alternate water source survives the event (such as the ANO-1 and ANO-2 CSTs, the ANO-2 RMWT, and the ANO-1 RWHT, the ECP, the Dardanelle Reservoir, and the cooling tower), it can provide additional inventory to the QCST.	Hose and/or piping connection(s) will be made between alternate water sources and the QCST or QCST piping. (It should be noted that no modifications will be required for the ECP, Dardanelle Reservoir, or the cooling tower.)	The FLEX connections will be constructed to withstand the NEI 12-06 (Reference 2) hazards as applicable to the specific water source.
Notes: N/A		

Maintain Core Cooling and Heat Removal	
PWR Portable Equipment Phase 3	
It is calculated that the decay heat is able to maintain the required steam pressure to the turbine-driven EFW pump for 72 hours if provided acceptable sources of SG feed. Because condensate-grade water sources, diesel fuel supplies, and other large equipment cannot be assured to be on site, strategies for delivery of off-site equipment from the RRC must be developed. This strategy credits that back-ups to the Phase 2 equipment will be delivered from the RRC to be on-site during Phase 3 should any Phase 2 equipment fail during the indefinite coping period. Alternate water sources were evaluated for their capability to extend SG feed time after plant trip. The primary water source is the QCST. Site alternate water sources include the CSTs for ANO-1 and ANO-2, the ANO-1 RWHT, the ANO-2 RMWT, Dardanelle Reservoir, and ECP. Phase 3 strategies and the equipment necessary are independent of operational mode at the start of the event. The strategy will involve accessing the UHS with inventory through the service water system (SWS) to one of the DHR/SDC system heat exchangers, combined with re-powering one of the DHR/SDC system pumps.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	FSGs will be developed to support the Phase 3 core cooling and heat removal strategies.
Identify modifications	A hose connection for an RRC pump will be installed in order to supply water from the UHS through the installed SWS piping, and discharging back into the UHS.
Key Reactor Parameters	1. SG Level 2. SG Pressure 3. QCST Level 4. RCS Pressure 5. CETs 6. RCS Temperature
Notes: N/A	

Deployment Conceptual Design Deployment strategies for Phase 3 equipment will be determined during detailed design.		
Strategy	**Modifications**	**Protection of connections**
A hose connection for an RRC pump will be used to supply water from the UHS through the installed SWS piping and discharge back into the UHS.	A hose connection to the UHS for an RRC pump will be installed.	The FLEX connections will be constructed to withstand the NEI 12-06 (Reference 2) hazards as applicable to ANO.

Maintain Core Cooling and Heat Removal		
PWR Portable Equipment Phase 3		
The RRC will provide debris removal equipment capable of clearing paths blocked by large debris. Any further level of design of this equipment will not be completed during the conceptual design phase, and will need to be completed during detailed design.	None	N/A
Notes: N/A		

Maintain RCS Inventory Control
Determine Baseline coping capability with installed coping[2] modifications not including FLEX modifications, utilizing methods described in Table 3-2 of NEI 12-06: • **Low Leak reactor coolant pump (RCP) Seals or RCS makeup required** • **All Plants Provide Means to Provide Borated RCS Makeup**
PWR-Installed Equipment Phase 1:
Based on the current conditions and performance of the RCP seals, RCP seal leakage is not anticipated to be an immediate concern. Under scenario conditions, it is not currently possible to add RCS inventory for either unit. This issue arises days into the event since ANO plans to cool down post-event; however, the capability to provide RCS makeup remains a Phase 2 action. The FLEX-phased approach will provide a means to add inventory to the RCS, but it will occur in Phase 2. On loss of DHR for Modes 5 and 6 (no SGs available), ANO will seal containment and let the RCS heat up and eventually start boiling. A strategy for RCS makeup will be specified in Phase 2. The WCAP-17601 (Reference 7) methodology is used to investigate limiting plant-specific scenarios for RCS inventory control, shutdown margin, and Modes 5 and 6 boric acid precipitation control with respect to the guidelines set forth in the NEI FLEX 12-06 (Reference 2) strategies. <u>RCS Inventory Control:</u> For ANO-1 RCS inventory control is not required until Phase 2. ANO-2 has a large accessible volume in the safety injection tanks (SITs) and is implementing a cooldown and depressurization strategy consistent with the PWROG Core Cooling recommendations for the ELAP scenario. <u>RCS Shutdown Margin:</u> For ANO-1 cooldown is not anticipated during Phase 1; therefore, shutdown margin is not applicable. ANO-2 has adequate shutdown margin and therefore, does not need to take actions to provide additional negative reactivity during an ELAP event for RCS temperatures in excess of 350°F. For temperatures less than this value, or conditions outside the constraints of NEI 12-06 (Reference 2), such as a failure to insert control rods, additional boration may be required.

[2] Coping modifications consist of modifications installed to increase initial coping time, i.e., generators to preserve vital instruments or increase operating time on battery powered equipment.

Maintain RCS Inventory Control	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	Existing procedures/strategies/guidelines will be revised to consider FSGs.
Identify modifications	ANO-2 SIT level power supply will need to be added to the batteries.
Key Reactor Parameters	1. RCS Pressure 2. ANO-2 SIT Level 3. Pressurizer Level (Modes 1 – 4) 4. Reactor Vessel Level (Modes 5 and 6)
Notes: The key parameters will either be powered from batteries and monitored from the control room or taken locally.	

Maintain RCS Inventory Control	
PWR Portable Equipment Phase 2:	
RCS inventory control and boration in Modes 1 through 4 will be provided by using a FLEX RCS makeup pump to inject borated water into the HPI or makeup system for ANO-1 and the HPSI or charging system for ANO-2 in Phase 2 of the FLEX strategies. The strategy to facilitate cool down is to pump boric acid solution from the ANO-1 boric acid addition tank (BAAT) and the ANO-2 boric acid makeup tank (BAMT) to the FLEX suction piping that feeds the FLEX RCS makeup pumps. This FLEX supply piping allows the FLEX pumps to draw from the ANO-1 Borated Water Storage Tank (BWST) and ANO-2 Refueling Water Tank (RWT) from both the primary and the secondary staging areas. The FLEX RCS makeup pump will be deployed to maintain RCS inventory to maintain Natural Circulation Cooling (NCC). The primary and secondary RCS makeup strategies share a common injection connection into the RCS. ANO-2 is capable of re-powering the charging pumps since they are 480V-powered components once the FLEX generator is installed. ANO-2 can supply RCS makeup utilizing these pumps with suction from the RWT. During Modes 5 and 6 with SGs not available, the FLEX SG feed pumps will be utilized for RCS makeup due to their higher volume capacity with like connections. Conceptual routings for RCS inventory control are contained in Attachment 3. Conceptual routings for RCS inventory control with SGs not available (Modes 5 and 6) are contained in Attachment 3. <u>RCS Shutdown Margin:</u> For ANO-1 existing analyses indicates that the minimum BWST volume and concentration, required by TS 3.5.4, is sufficient to borate from hot full power critical boron concentration to cold shutdown (200°F) without letdown and thus, satisfy the 10CFR50 Appendix R requirement concerning boration without RCS letdown. The intended FLEX makeup capability supports the inventory makeup capability in existing analyses. For ANO-2 this was discussed in Phase 1. <u>RCS Mode 5 and Mode 6 Boric Acid Precipitation Control</u> The first concern for an ELAP during shutdown conditions is the selection of a makeup pump with sufficient capacity to match the expected steaming rate. The second concern is when to provide flushing flow in order to prevent the precipitation of boric acid. The capacity of the makeup provided during these modes addresses these concerns.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	FSGs will be developed to support the Phase 2 strategies for RCS inventory control.

Maintain RCS Inventory Control	
PWR Portable Equipment Phase 2:	
Identify modifications	1. The ANO-1 primary and secondary FLEX RCS makeup pump suction requires a connection to BWST/BAAT piping. 2. The ANO-1 primary and secondary FLEX RCS makeup pump discharge requires a connection to RCS HPI/makeup piping. 3. The ANO-2 primary and secondary FLEX RCS makeup pump suction location requires a connection to RWT/BAMT piping. 4. The ANO-2 primary and secondary FLEX RCS makeup pump discharge requires a connection to HPSI/charging piping. 5. For Modes 5 and 6 use of the FLEX SG feed pump would require discharge connections to ANO-1 HPI and ANO-2 HPSI/charging piping. 6. ANO-2 SIT level power supply will need to be added to the batteries. 7. Missile protection for BWST and RWT (potential modification required based on analysis).
Key Reactor Parameters	1. RCS Pressure 2. ANO-2 SIT Level 3. Pressurizer Level (Modes 1 – 4) 4. Reactor Vessel Level (Modes 5 and 6)
Notes: The key parameters will either be powered from batteries and monitored from the control room or taken locally.	
Storage / Protection of Equipment: **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	The FLEX equipment storage location(s) will withstand the NEI 12-06 (Reference 2) hazards as applicable to ANO.
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	
Severe Storms with High Winds	
Snow, Ice, and Extreme Cold	
High Temperatures	

Maintain RCS Inventory Control		
PWR Portable Equipment Phase 2:		
Deployment Conceptual Modification In all external events, a deployment strategy is planned that will deliver any required FLEX equipment to the appropriate event-determined staging area. In the specific case of a flooding event, it is expected that several days' notice will be given before a flood level will approach either plant grade and/or the magnitude of the PMF. Therefore, it is assumed that at least 24 hours is available for the deployment of the FLEX equipment for the flooding scenario (i.e., primary connection). It is also assumed that power is available during this time. Deployment of FLEX equipment for the flooding scenario consists of transporting all required equipment from the storage location(s) to the primary staging locations via the train bay. All paths and roads on-site are assumed to be maintained as unobstructed in this scenario, so the easiest path will used. Any portable FLEX equipment will be trailer-mounted or on wheels for ease of deployment. This will give the current vehicles at ANO the capability to move any portable FLEX equipment. Available forklifts or pickup trucks will all be utilized for deploying any portable FLEX equipment. Most of this equipment will be utilized for both the movement of any portable FLEX equipment and debris removal. A strategy to clear debris for FLEX coping strategies will be implemented.		
Strategy	**Modifications**	**Protection of connections**
For ANO-1, a FLEX RCS makeup pump would inject borated water into the HPI/makeup system with suction from the BWST/BAAT. The primary and secondary discharge connections are to be hard-piped as much as practical to minimize the required length of high pressure hose.	ANO-1 primary and secondary connections are required to the RCS HPI/makeup piping and the BWST/BAAT piping. ANO-2 primary and secondary connections are required to the HPSI/charging piping and the RWT/BAMT piping. Potential use of the FLEX SG feed pump for Modes 5 and 6 would require discharge connections to ANO-1 HPI and ANO-2 HPSI/charging piping. ANO-2 SIT level power supply will need to be added to the batteries.	The FLEX connections will be constructed to withstand the NEI 12-06 (Reference 2) hazards as applicable to ANO.

Maintain RCS Inventory Control		
PWR Portable Equipment Phase 2:		
For ANO-2, a FLEX RCS makeup pump would inject borated water into the HPSI/charging system with suction from the RWT/BAMT. The primary discharge connection is to be hard-piped as much as practical to minimize the required length of high pressure hose. Primary staging is located in the AB at the end of the train bay. The secondary staging location will be outside the Post Accident Sampling System (PASS) building on ground level. Modes 5 and 6 (with SGs not available) may require a higher capacity pump, e.g., the FLEX SG feed pump.	Missile protection for BWST and RWT (potential modification required based on analysis).	
Notes: N/A		

Maintain RCS Inventory Control	
PWR Portable Equipment Phase 3:	
For Phase 3, Entergy intends to continue with the Phase 2 strategies with additional support and equipment provided by offsite resources. Phase 3 design will be completed during the detailed design phase. If it is determined in the detailed design phase that a mobile boration unit or a mobile water purification system is required these items will be obtained from the RRC.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	FSGs will be developed to support the Phase 3 RCS inventory control strategies.
Identify modifications	No modifications are currently identified for Phase 3.
Key Reactor Parameters	1. RCS Pressure 2. ANO-2 SIT Level 3. Pressurizer Level (Modes 1 – 4) 4. Reactor Vessel Level (Modes 5 and 6)
Notes: N/A	

Deployment Conceptual Modification		
Deployment strategies for Phase 3 equipment will be determined during detailed design.		
Strategy	**Modifications**	**Protection of connections**
N/A	N/A	N/A
Notes: N/A		

Maintain Containment	
Determine Baseline coping capability with installed coping[3] modifications not including FLEX modifications, utilizing methods described in Table 3-2 of NEI 12-06: • Containment Spray • Hydrogen igniters (ice condenser containments only)	
PWR-Installed Equipment Phase 1:	
Containment function is not challenged early in the event; therefore, no actions are required in Phase 1 in support of containment function. For Modes 5 and 6, containment function will be addressed using current procedural actions of References 8a, 8b, and 8c.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	N/A
Identify modifications	N/A
Key Containment Parameters	Containment Pressure
Notes: N/A	

[3] Coping modifications consist of modifications installed to increase initial coping time, i.e., generators to preserve vital instruments or increase operating time on battery powered equipment.

Maintain Containment	
PWR Portable Equipment Phase 2:	
Containment function is not challenged early in the event; therefore, no actions are required in Phase 2 in support of containment function. Per the analysis supporting Reference 5, containment is not expected to be challenged for the duration of Phase 2. For Modes 5 and 6, containment closure will be addressed using current procedural actions of References 8a, 8b, and 8c.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	N/A
Identify modifications	N/A
Key Containment Parameters	Containment Pressure
Notes: N/A	
Storage / Protection of Equipment: **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	N/A
Flooding	
Severe Storms with High Winds	
Snow, Ice, and Extreme Cold	
High Temperatures	

Deployment Conceptual Modification N/A		
Strategy	**Modifications**	**Protection of connections**
N/A	N/A	N/A
Notes: N/A		

Maintain Containment	
PWR Portable Equipment Phase 3:	
Using RRC equipment for restoration of SW to containment cooling, containment function will not be challenged even later in the event; therefore, no further actions are required in Phase 3 in support of containment function. For Modes 5 and 6, containment closure will be addressed using current procedural actions of References 8a, 8b, and 8c.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	FSGs will be developed to support the Phase 3 containment strategies as needed.
Identify modifications	N/A
Key Containment Parameters	Containment Pressure

Deployment Conceptual Modification

Strategy	Modifications	Protection of connections
The large UHS pump delivered from the RRC will utilize the same SWS connections to establish flow to the containment coolers; the large generator will support loads of the containment cooler fans.	No additional modification.	N/A
The RRC will provide debris removal equipment capable of clearing paths blocked by large debris. Any further level of design of this equipment will not be completed during the conceptual design phase, and will need to be completed during detailed design.	None	N/A

Notes: N/A

Maintain SFP Cooling	
Determine Baseline coping capability with installed coping[4] modifications not including FLEX modifications, utilizing methods described in Table 3-2 of NEI 12-06: • **Makeup with Portable Injection Source**	
PWR-Installed Equipment Phase 1:	
SFP cooling is not challenged early in the event for either unit. During phase 1, SFP cooling will be by boil-off of inventory in the pool. SFP makeup will be addressed in phase 2, but during phase 1 a makeup hose will be staged to ensure that makeup capability is available for phase 2. For ANO-1, for the maximum credible heat load, the time to boil is 3.87 hours. The boil-off rates of 28.10 gpm and 66.50 gpm were determined for normal and maximum decay heat in the SFP, respectively. These values correspond to a required volumetric flow rate of 27.32 gpm and 64.66 gpm, respectively, to replace any boil-off losses in the SFP using water with coolant properties at 130°F. For ANO-2, for the maximum credible heat load, the time to boil is 2.19 hours. ANO-2 SFP has a smaller volume and a higher decay heat load than the ANO-1 SFP. The boil-off rates of 42.92 gpm and 81.73 gpm were determined for normal and maximum decay heat in the SFP, respectively. These values correspond to a required volumetric flow rate of 41.73 gpm and 79.46 gpm, respectively, to replace any boil-off losses in the SFP using water with coolant properties at 130°F.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	Procedures/strategies/guidelines will be revised, as necessary, to consider timing of requirements for access to the SFP.
Identify modifications	No modifications are required for Phase 1.
Key SFP Parameter	SFP Level
Notes: The key parameters will either be monitored from the control room or taken locally.	

[4] Coping modifications consist of modifications installed to increase initial coping time, i.e., generators to preserve vital instruments or increase operating time on battery powered equipment.

Maintain SFP Cooling	
PWR Portable Equipment Phase 2:	
SFP cooling in the ELAP condition is accomplished by local pool boiling and evaporation supported by coolant makeup. SFP cooling is not challenged early in the event (Phase 1) for either unit due to the limited inventory loss due to boiling. However, access to the SFP area as a part of Phase 2 response could be challenged due to environmental conditions local to the pool. Thus, actions that require access to the SFP deck will be completed prior to Phase 2. Makeup will be provided using the FLEX SG feed pump that is in use (either from the primary or secondary staging location) or separate FLEX SFP makeup pump. The strategies for the discharge connection to the SFP are to: • install branch connection to the SFP deck to accommodate a hose connection or oscillating spray fire nozzle • provide makeup via connection into existing SFP Cooling system piping (only available from primary staging location) Both SFPs are located in a structure that does not require additional ventilation. Conceptual routings for makeup to the SFP are contained in Attachment 3.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	FSGs will be developed to support the Phase 2 SFP cooling strategies.
Identify modifications	1. A branch connection from the ANO-1 FLEX SG feed pump discharge line(s) to the ANO-1 SFP would be required for both primary and secondary staging locations. 2. A branch connection from the ANO-2 FLEX SG feed pump discharge line(s) to the ANO-2 SFP would be required for both primary and secondary staging locations. 3. A connection into existing SFP cooling system piping would be required.
Key SFP Parameter	SFP Level
Notes: The key parameters will be monitored from the control room or taken locally.	

Storage / Protection of Equipment: Describe storage / protection plan or schedule to determine storage requirements	
Seismic	The FLEX equipment storage location(s) will withstand the NEI 12-06 (Reference 2) hazards as applicable to ANO.
Flooding	
Severe Storms with High Winds	
Snow, Ice, and Extreme Cold	
High Temperatures	

Deployment Conceptual Design

In all external events, a deployment strategy is planned that will deliver any required FLEX equipment to the appropriate event-determined staging area.

In the specific case of a flooding event, it is expected that several days' notice will be given before a flood level will approach either plant grade and/or the magnitude of the PMF. Therefore, it is assumed that at least 24 hours is available for the deployment of the FLEX equipment for the flooding scenario (i.e., primary connection). It is also assumed that power is available during this time. Deployment of FLEX equipment for the flooding scenario consists of transporting all required equipment from the storage location(s) to the primary staging locations via the train bay. All paths and roads on-site are assumed to be maintained as unobstructed in this scenario, so the easiest path will used.

Any portable FLEX equipment will be trailer-mounted or on wheels for ease of deployment. This will give the current vehicles at ANO the capability to move any portable FLEX equipment. Available forklifts or pickup trucks will all be utilized for deploying any portable FLEX equipment. Most of this equipment will be utilized for both the movement of any portable FLEX equipment and debris removal.

A strategy to clear debris for FLEX coping strategies will be implemented.

Strategy	**Modifications**	**Protection of connections**
The FLEX SG feed pumps will be used to supply water via branch connections from their discharge lines to either a hose or oscillating fire monitor nozzle.	See Core Cooling modifications for suction source. A branch connection from the ANO-1 FLEX SG feed pump or the FLEX SFP makeup pump discharge line(s) to the ANO-1 SFP would be required.	The FLEX connections will be constructed to withstand the NEI 12-06 (Reference 2) hazards as applicable to ANO.

Primary and secondary staging locations address all external event possibilities; Primary staging for the FLEX SG feed pump or the FLEX SFP makeup pump is located in the AB at the end of the train bay. The secondary staging location will be outside the southwest corner of the AB on ground level (ANO-1). The secondary staging location will be outside the northwest corner of the AB on ground level (ANO-2). Hose or piping will be routed from the SFP deck to the applicable staging area. If the connection into existing SFP cooling system piping from the primary staging area is used, a hose will be connected at the primary staging area.	A branch connection from the ANO-2 FLEX SG feed pump or the FLEX SFP makeup pump discharge line(s) to the ANO-2 SFP would be required. A connection into existing SFP cooling system piping would be required.	
Notes: N/A		

Maintain SFP Cooling	
PWR Portable Equipment Phase 3:	
For Phase 3, Entergy intends to continue with the Phase 2 strategies (boil-off) with additional support and equipment provided by off-site resources. RRC equipment can be installed into the existing SWS piping to provide makeup indefinitely. This strategy credits that back-ups to the Phase 2 equipment will be delivered from the RRC to be on-site during Phase 3 should any Phase 2 equipment fail during the indefinite coping period.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	FSGs will be developed to support the Phase 3 SFP cooling strategies.
Identify modifications	A hose connection for an RRC pump will be installed in order to supply water from the UHS through the installed SWS piping.
Key SFP Parameter	SFP Level
Notes: The key parameters will either be monitored from the control room or taken locally.	

Deployment Conceptual Design Deployment strategies for Phase 3 equipment will be determined during detailed design.		
Strategy	**Modifications**	**Protection of connections**
A hose connection for an RRC pump will be used to supply water from the UHS through the installed SWS piping.	A hose connection to the UHS for an RRC pump will be installed.	The FLEX connections will be constructed to withstand the NEI 12-06 (Reference 2) hazards as applicable to ANO.
The RRC will provide debris removal equipment capable of clearing paths blocked by large debris. Any further level of design of this equipment will not be completed during the conceptual design phase, and will need to be completed during detailed design.	None	N/A
Notes: N/A		

Safety Functions Support	
Determine baseline coping capability with installed coping[5] modifications not including FLEX modifications	
PWR-Installed Equipment Phase 1	
Support for the safety functions is provided by continued observation of plant conditions by site personnel in the control room or taken locally. During Phase 1, the installed vital batteries are used to maintain the critical instrumentation, and some control systems (ANO-1 only), available to the site personnel. The time which vital power will be available can be extended by performing a load shed of all loads which are not considered to be critical for monitoring the conditions of the plant during an ELAP. DC load shed will be required in order to extend battery life until installed battery chargers can be re-powered via the FLEX portable diesel generators (PDGs).	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	Procedures/strategies/guidelines will be revised to consider the FSGs.
Identify modifications	No modifications are required for Phase 1.
Key Parameters	DC Bus Voltage
Notes: N/A	

[5] Coping modifications consist of modifications installed to increase initial coping time, i.e., generators to preserve vital instruments or increase operating time on battery powered equipment.

Safety Functions Support	
PWR Portable Equipment Phase 2	
The electrical portion of the ANO-1 and ANO-2 Phase 2 coping strategy consists of two main goals: • Maintain power to essential instrumentation by powering the battery charger. • Provide electric power to FLEX pumps and other equipment. In a non-seismic BDBEE, the primary staging location will be used. All FLEX pumps are located inside the AB, and the FLEX PDG location will depend on if the event is a flood event or a non-flood event. In a flood event, the FLEX PDG will be staged on the turbine deck, as there is ample warning time and available power to lift the PDGs to an elevation above the PMF elevation (361'). In a high wind or extreme temperature event, the FLEX PDG will be staged in the train bay outside the primary staging location. In a seismic BDBEE, the secondary staging location will be used. Maintaining power to essential instrumentation will be achieved by re-powering an installed battery charger via the FLEX PDG. Powering the FLEX pumps will be achieved by connecting the FLEX PDG to electrical connections either on the turbine deck or in the train bay. Additional installed equipment may be required to be powered by the FLEX generators. This will include fuel oil transfer pumps. Additional equipment that may be required to be powered include portable fans/lighting, pressurizer heaters, and other essential equipment. Refueling strategies will be evaluated as part of the detailed design phase. Conceptual routings for safety function support are contained in Attachment 3. The portable equipment is listed in the following table.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	FSGs will be developed to support the Phase 2 safety functions strategies.
Identify modifications	Installation of spare breaker in applicable existing switchgear and raceway from PDG staging location to tie-in points
Key Parameters	DC Bus Voltage
Notes: N/A	

Storage / Protection of Equipment: Describe storage / protection plan or schedule to determine storage requirements	
Seismic	The FLEX equipment storage location(s) will withstand the NEI 12-06 (Reference 2) hazards as applicable to ANO.
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	
Severe Storms with High Winds	
Snow, Ice, and Extreme Cold	
High Temperatures	

Deployment Conceptual Design

In all external events, a deployment strategy is planned that will deliver any required FLEX equipment to the appropriate event-determined staging area.

In the specific case of a flooding event, it is expected that several days' notice will be given before a flood level will approach either plant grade and/or the magnitude of the PMF. Therefore, it is assumed that at least 24 hours is available for the deployment of the FLEX equipment for the flooding scenario (i.e., primary connection). It is also assumed that power is available during this time. Deployment of FLEX equipment for the flooding scenario consists of transporting all required equipment from the storage location(s) to the primary staging locations via the train bay. All paths and roads on-site are assumed to be maintained as unobstructed in this scenario, so the easiest path will used.

Any portable FLEX equipment will be trailer-mounted or on wheels for ease of deployment. This will give the current vehicles at ANO the capability to move any portable FLEX equipment. Available forklifts or pickup trucks will all be utilized for deploying any portable FLEX equipment. Most of this equipment will be utilized for both the movement of any portable FLEX equipment and debris removal.

A strategy to clear debris for FLEX coping strategies will be implemented.

Strategy	Modifications	Protection of connections
For ANO-1 and ANO-2, a PDG will be used to maintain power to essential instrumentation by re-powering an existing battery charger that feeds vital DC buses and provide electric power to the FLEX pumps for SG feed and RCS makeup as necessary.	Conduit will be run from the PDG staging locations to both the FLEX pumps and the tie-in point for the battery charger that feeds vital DC buses.	The FLEX connections will be constructed to withstand the NEI 12-06 (Reference 2) hazards as applicable to ANO.

Staging location of PDG is event-dependent.		
Notes: N/A		

Safety Functions Support	
PWR Portable Equipment Phase 3	
Similar Phase 3 coping strategies will be employed for both ANO-1 and ANO-2. Off-site equipment from the RRC will arrive on-site to supply Phase 3 coping capabilities. Electrically, this includes 4160V generators capable of re-powering 4160V buses. In turn, the 4160V buses will feed the 480V Engineered Safeguards buses so the Phase 2 PDGs are no longer required for this function. There will be a single connection point on each unit for the 4160V generators that will be protected from the applicable BDBEEs (seismic, flooding, high wind, and extreme temperatures) for both ANO-1 and ANO-2. The RRC equipment will be capable of floating the 4160V generator to the connection point. Conceptual routings for safety function support are contained in Attachment 3. The portable equipment and commodities are listed in the following tables.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	FSGs will be developed to support the Phase 3 safety functions strategies.
Identify modifications	Installation of a tie-in to the installed ANO-1 and ANO-2 4160V Engineered Safeguards buses
Key Parameters	DC Bus Voltage
Notes: N/A	
Deployment Conceptual Design	
In all external events, a deployment strategy is planned that will deliver any required FLEX equipment to the appropriate event-determined staging area. In the specific case of a flooding event, it is expected that several days' notice will be given before a flood level will approach either plant grade and/or the magnitude of the PMF. Therefore, it is assumed that at least 24 hours is available for the deployment of the FLEX equipment for the flooding scenario (i.e., primary connection). It is also assumed that power is available during this time. Deployment of FLEX equipment for the flooding scenario consists of transporting all required equipment from the storage location(s) to the primary staging locations via the train bay. All paths and roads on-site are assumed to be maintained as unobstructed in this scenario, so the easiest path will used. Any portable FLEX equipment will be trailer-mounted or on wheels for ease of deployment. This will give the current vehicles at ANO the capability to move any portable FLEX equipment. Available forklifts or pickup trucks will all be utilized for deploying any portable FLEX equipment. Most of this equipment will be utilized for both the movement of any portable FLEX equipment and debris removal.	

Safety Functions Support		
PWR Portable Equipment Phase 3		
A strategy to clear debris for FLEX coping strategies will be implemented.		
Strategy	**Modifications**	**Protection of connections**
The ANO-1 and ANO-2 Phase 3 electrical coping strategy is to re-power 4160V Engineered Safeguards buses.	Installation of a tie-in to the installed ANO-1 and ANO-2 4160V Engineered Safeguards buses.	The FLEX connections will be constructed to withstand the NEI 12-06 (Reference 2) hazards as applicable to ANO.
Notes: N/A		

PWR Portable Equipment Phase 2							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Maintenance*
List portable equipment (Quantity)	*Core*	*Containment*	*SFP*	*Instrumentation*	*Accessibility*	*Flow Rate and Required Head*	*Maintenance / PM requirements*
ANO-1 SG Feed Pump 1	X		X			600 gpm 2827 ft	Will follow EPRI template requirements
*ANO-1/2 SG Feed Pump 2 (N+1)	X		X			600 gpm 2827 ft	Will follow EPRI template requirements
ANO-2 SG Feed Pump 3	X		X			600 gpm 2827 ft	Will follow EPRI template requirements
ANO-1 RCS Injection Pump 1	X					40 gpm 3537 ft	Will follow EPRI template requirements
*ANO-1/2 RCS Injection Pump 2 (N+1)	X					40 gpm 3537 ft	Will follow EPRI template requirements
ANO-2 RCS Injection Pump 3	X					40 gpm 3537 ft	Will follow EPRI template requirements
Inventory Transfer Pump 1	X		X			650 gpm 225 ft	Will follow EPRI template requirements
*Inventory Transfer Pump 2 (N+1)	X		X			650 gpm 225 ft	Will follow EPRI template requirements
Inventory Transfer Pump 3	X		X			650 gpm 225 ft	Will follow EPRI template requirements

PWR Portable Equipment Phase 2							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Maintenance*
List portable equipment (Quantity)	*Core*	*Containment*	*SFP*	*Instrumentation*	*Accessibility*	*Flow Rate and Required Head*	*Maintenance / PM requirements*
Pick Up Truck(s)					X	To be determined (TBD)	Will follow EPRI template requirements
Debris Removal Equipment					X	TBD	Will follow EPRI template requirements
Trailer					X	TBD	Will follow EPRI template requirements
SG Feed Suction Hose	X					TBD	Will follow EPRI template requirements
SG Feed Discharge Hose	X					TBD	Will follow EPRI template requirements
RCS injection Suction Hose	X					TBD	Will follow EPRI template requirements
RCS injection Discharge Hose	X					TBD	Will follow EPRI template requirements
SFP Discharge Hose			X			TBD	Will follow EPRI template requirements
Inventory Transfer Suction Hose	X		X			TBD	Will follow EPRI template requirements

PWR Portable Equipment Phase 2							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Maintenance*
List portable equipment (Quantity)	*Core*	*Containment*	*SFP*	*Instrumentation*	*Accessibility*	*Flow Rate and Required Head*	*Maintenance / PM requirements*
Inventory Transfer Discharge Hose	X		X			TBD	Will follow EPRI template requirements
ANO-1 480V DG	X		X	X		TBD	Will follow EPRI template requirements
* ANO-1/2 480V Diesel Generator (DG) (N+1)	X		X	X		TBD	Will follow EPRI template requirements
ANO-2 480V DG	X		X	X		TBD	Will follow EPRI template requirements

*N+1 is based upon N units. ANO only needs three items so long as the "swing" item can function for both units. See NEI 12-06 (Reference 2, p. 23).

PWR Portable Equipment Phase 3							
Use and (potential/flexibility) diverse uses						*Performance Criteria*	*Notes*
List portable equipment	Core	Containment	SFP	Instrumentation	Accessibility	Flow Rate and Required Head	
ANO-1 SW RRC Pump	X	X	X			2500 gpm 52.15 ft	9.8 gph fuel required
ANO-1/2 SW RRC Pump (N+1)	X	X	X			2500 gpm 52.15 ft	9.8 gph fuel required
ANO-2 SW RRC Pump	X	X	X			2500 gpm 52.15 ft	9.8 gph fuel required
Large Fuel Truck	X	X	X	X		TBD	Fuel Replenish/Transfer
Large Debris Removal Equipment					X	TBD	
SW Suction Hose	X	X	X			TBD	
SW Discharge Hose	X	X	X			TBD	
Large 4160V DG	X	X		X		TBD	
Large 4160V DG (N+1)	X	X		X		TBD	

Phase 3 Response Equipment/Commodities	
Item	**Notes**
Radiation Protection Equipment • Survey instruments • Dosimetry • Off-site monitoring/sampling • Radiological counting equipment • Radiation protection supplies • Equipment decontamination supplies • Respiratory protection	N/A

Commodities
• Food
  o Meals ready to eat
  o Microwavable meals
• Potable water
	N/A

Fuel Requirements • #2 Diesel Fuel • Diesel fuel bladders	N/A
Heavy Equipment • 4 wheel-drive transportation equipment (tow vehicle) • Debris clearing equipment (skid steer type)	N/A

References:

1. NRC EA-12-049, “Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for BDBEE,” March 12, 2012 [ADAMS Accession Number ML12056A045]

2. NEI 12-06, Revision 0, “Diverse and Flexible Coping Strategies (FLEX) Implementation Guide,” August 2012

3. NRC JLD-ISG-2012-01, Revision 0, “Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events,” August 2012

4. ANO SARs
   a. ANO-1 SAR, Amendment 25, Facility Operating License Number DPR-51, Docket Number 50-313
   b. ANO-2 SAR, Amendment 24, Facility Operating License Number NPF-6, Docket Number 50-368

5. Entergy Document, “Arkansas Nuclear One Station Response to INPO IER 11-4, ‘Near-Term Actions to Address the Effects of an Extended Loss of All AC Power in Response to the Fukushima Daiichi Event’,” Attached in EDMS as ‘ANO IER 11-4 Responses.zip’

6. ANO Procedures
   a. ANO-1 Procedure 1202.008, “Blackout”
   b. ANO-2 Procedure 2202.008, “Station Blackout”

7. WCAP-17601-P, Revision 1, “RCS Response to the Extended Loss of AC Power Event for Westinghouse, Combustion Engineering and Babcock & Wilcox NSSS Designs,” January 2013

8. ANO Procedures
   a. ANO-1 Procedure 1203.028, “Loss of Decay Heat Removal”
   b. ANO-2 Procedure 2203.029, “Loss of Shutdown Cooling”
   c. ANO-2 Procedure 2202.011, “Lower Mode Functional Recovery

9. Task Interface Agreement 2004-04, "Acceptability of Proceduralized Departures from TSs Requirements at the Surry Power Station," (TAC Nos. MC4331 and MC4332)," dated September 12, 2006. (Accession No. ML060590273)

Attachment 1A – ANO-1 Sequence of Events Timeline

Action Item	Elapsed Time (hours)	Action	Time Constraint Y/N	Remarks / Applicability
	0	Event Starts	N/A	Plant at 100% power
	0	Perform Actions Consistent with Station Blackout Procedure	N/A	Actions performed per EOP (Reference 6a)
1	1	Declare ELAP	Y	ELAP declared when power sources cannot be restored
2	3	Perform Battery Load Shed	Y	Extended battery load shedding performed to extend life to Phase 2
3	5	Clear Debris	Y	Debris cleared for deployment paths for equipment
4	6	Perform Damage Assessment	Y	FSG requirement to devise coping strategies
5	6	Deploy and Connect FLEX 480V Generator	Y	Electrically-powered RCS makeup pump staged
6	6	Align FLEX RCS Makeup Pump from suction source	Y	A makeup flow rate of 35 gpm is used assumed a 20°F/hr cooldown. BWST volume should last throughout the 72 hour ELAP event.
7	6	Align FLEX Pump suction to additional sources as needed for RCS heat removal	Y	The required time for QCST makeup is based on the credited TS QCST volume and the assumed cooldown strategy at ANO-1, which starts at 8 hours.
8	8	Commence Plant Cooldown	Y	Pending outcome of PWROG analysis
9	12	Deploy hose for SFP makeup	Y	Prior to onset of boiling
10	16	Refuel Diesel Equipment	Y	Assuming 10 hours of fuel is available in all diesel equipment, the RCS makeup pump and 480V generator need to be refueled at ANO-1 starting at 16 hours. The QCST makeup pump needs to be refueled at 18 hours.
11	24	Prepare site for receipt of RRC equipment	Y	RRC equipment expected to be able to arrive 24 hours after the event
12	24	Align SG Feed Pump to SFP	Y	Assuming 15 feet of water is needed above the fuel racks for shielding, makeup to the ANO-1 SFP is not required until 47.67 hours after the event.

13	N/A	Establish any required ventilation	N	The need for ventilation through 72 hours has not been determined.
14	N/A	Align FLEX SG Feed Pump	N	Steam pressure is expected to be sufficient to operate the turbine-driven EFW pumps throughout the 72-hour ELAP event. The backup FLEX SG feed pumps should be deployed when time/resources permit.
15	N/A	Align 4160V Generators	N	The 4160V generator aligned when possible
16	N/A	Establish Large Fuel Truck Service	N	On-site fuel resources expected to last for over 72 hours
17	N/A	Establish FLEX SW RRC Pump	N	The final details of this equipment will be finalized in the detailed design phase.

Attachment 1A – ANO-2 Sequence of Events Timeline

Action item	Elapsed Time (hours)	Action	Time Constraint Y/N	Remarks / Applicability
	0	Event Starts	N/A	Plant at 100% power
	0	Perform Actions Consistent with Station Blackout Procedure	N/A	Actions performed per EOP (Reference 6b)
1	1	Declare ELAP	Y	ELAP declared when power sources cannot be restored
2	3	Perform Battery Load Shed	Y	Extended battery load shedding performed to extend life to Phase 2
3	5	Commence Plant Cooldown to a Cold Leg Temperature of 350°F	Y	Assuming an initial cold leg temperature of 550°F cooled to a temperature of 350°F, this cooldown will take 2.67 hours with a 2 hour hold.
4	5	Clear Debris	Y	Debris cleared for deployment paths for equipment
5	6	Perform Damage Assessment	Y	FSG requirement to devise coping strategies
6	8	Align FLEX Pump suction to additional sources as needed for RCS heat removal	Y	The required time for QCST makeup is based on the credited TS QCST volume and the assumed cooldown strategy at ANO-1, which starts at 8 hours. The QCST is a shared resource for both units. The exact need time for makeup to this water source is unknown until the cooldown strategy has been finalized.
7	12	Deploy hose for SFP makeup	Y	Prior to onset of boiling
8	16	Refuel Diesel Equipment	Y	Assuming 10 hours of fuel is available in all diesel equipment, the QCST makeup pump needs to be refueled at 18 hours.
9	18	Align FLEX RCS Makeup Pump from suction source	Y	RCS makeup is to be supplied at 17.5 hours at a flow rate of 20 gpm.
10	18	Deploy and Connect FLEX 480V Generator	Y	Electrically-powered RCS makeup pump staged.
11	24	Prepare site for receipt of RRC equipment	Y	RRC equipment expected to be able to arrive 24 hours after the event

12	24	Align SG Feed to SFP	Y	Assuming 15 feet of water is needed above the fuel racks for shielding, makeup to the ANO-2 SFP is not required until 24.74 hours after the event.
13	N/A	Establish any required ventilation	N	The need for ventilation through 72 hours has not been determined.
14	N/A	Align FLEX SG Feed Pump	N	Steam pressure is expected to be sufficient to operate the turbine-driven EFW pumps throughout the 72-hour ELAP event. The backup FLEX SG feed pumps should be deployed when time/resources permit.
15	N/A	Align 4160V Generators	N	The 4160V generator aligned when possible
16	N/A	Establish Large Fuel Truck Service	N	On-site fuel resources expected to last for over 72 hours
17	N/A	Establish FLEX SW RRC Pump	N	The final details of this equipment will be finalized in the detailed design phase.

Attachment 1B – NSSS Significant Reference Analysis Deviation Table

Item	Parameter of interest	WCAP value (WCAP-17601-P, Revision 1)	WCAP page	Plant applied value	Gap and discussion
ANO-1					
	All	There are currently no identified deviations in the ANO-1 FLEX conceptual design with respect to the PWROG guidance pending completion of PWROG-sponsored revision to WCAP-17601 (Reference 7) that is in progress for the updated NSSS strategy for B&W NSSS designs.			
ANO-2					
	All	Entergy has evaluated WCAP-17601 (Reference 7) considering ANO-2 site-specific parameters and determined that the conclusions of that document are generally applicable to ANO-2. There are currently no identified deviations in the ANO-2 FLEX conceptual design with respect to the PWROG guidance.			

Attachment 2 – Milestone Schedule

The following milestone schedule is provided. The dates are planning dates that are subject to change as the FLEX program design and implementation details are developed. Any changes to the following target dates will be reflected in the subsequent six-month status reports.

ANO Milestone Schedule		
Activity	**Original Target Completion Date**	**Status (Will be updated every 6 months)**
Submit Overall Integrated Implementation Plan	**February-2013**	**Complete**
Update 1	*August-2013*	
Update 2	*February-2014*	
Update 3	*August-2014*	
Update 4	*February-2015*	
Update 5	*August-2015*	
Perform Staffing Analysis	**December-2013**	
Modifications		
Modifications Evaluation	*June-2013*	
Engineering and Implementation	*June-2013 - October 2015*	
ANO-1 Implementation Outage	*November-2014*	
ANO-2 Implementation Outage	*October-2015*	
On-site FLEX Equipment		
Purchase	*June-2014*	
Procure	*November-2014*	
Off-site FLEX Equipment		
Develop Strategies with RRC	*November-2013*	
Install Off-site Delivery Station (if necessary)	*October-2014*	
Procedures		
PWROG issues NSSS-specific guidelines	*June-2013*	
Create ANO FSG	*November-2014*	
Create Maintenance Procedures	*November-2014*	
Training		
Develop Training Plan	*June-2014*	
Implement Training	*November-2014*	
Submit Completion Report	**December-2015**	

Attachment 3 – Conceptual Drawing Mark-ups

Please see enclosed drawings.

Attachment 3
Conceptual Sketches

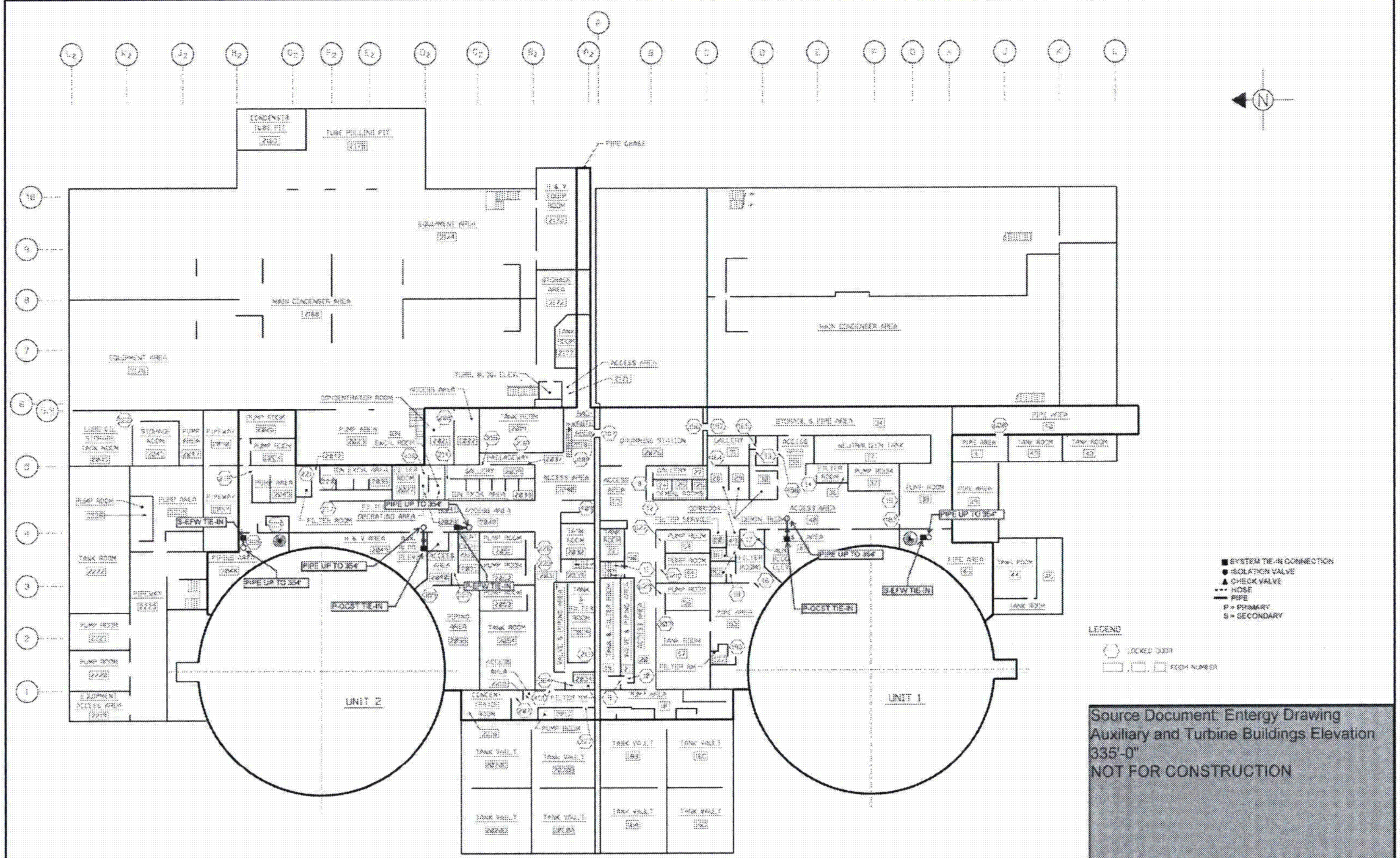


Figure G3.1.1-1 Reactor Core Cooling and Heat Removal (Steam Generators Available) Conceptual Routings

Source Document: Entergy Drawing Auxiliary and Turbine Buildings Elevation 335'-0"
NOT FOR CONSTRUCTION

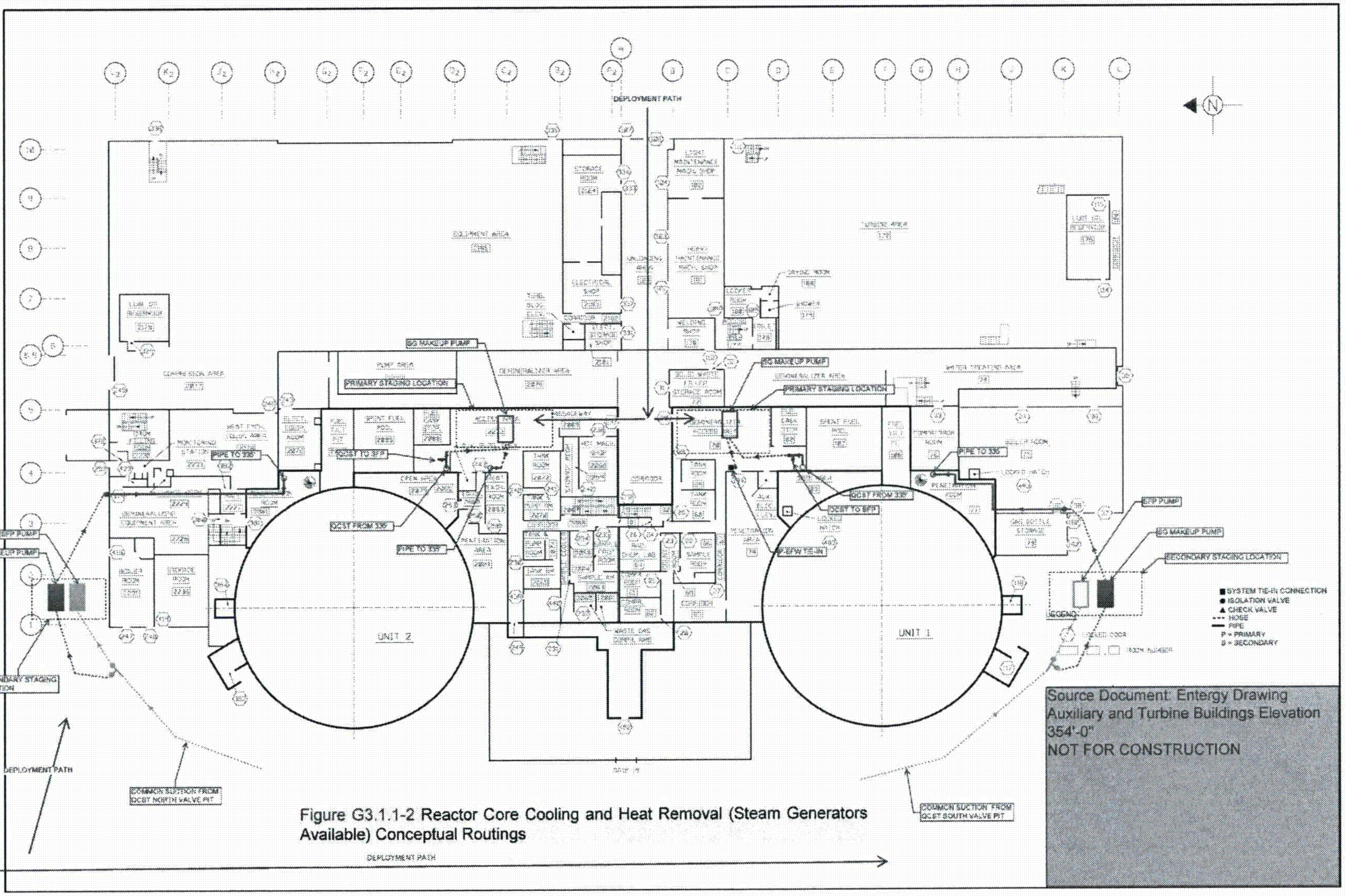


Figure G3.1.1-2 Reactor Core Cooling and Heat Removal (Steam Generators Available) Conceptual Routings

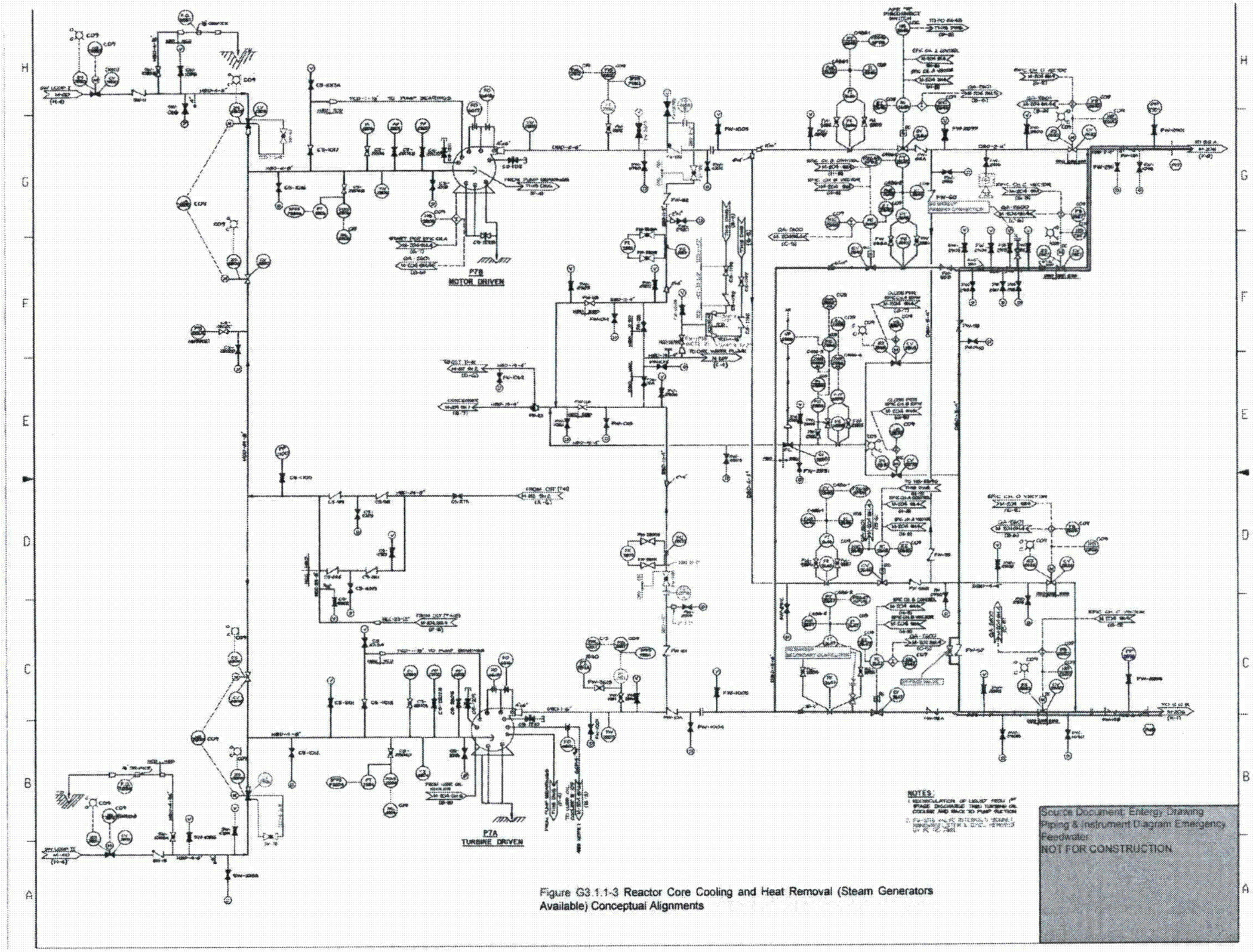


Figure G3.1.1-3 Reactor Core Cooling and Heat Removal (Steam Generators Available) Conceptual Alignments

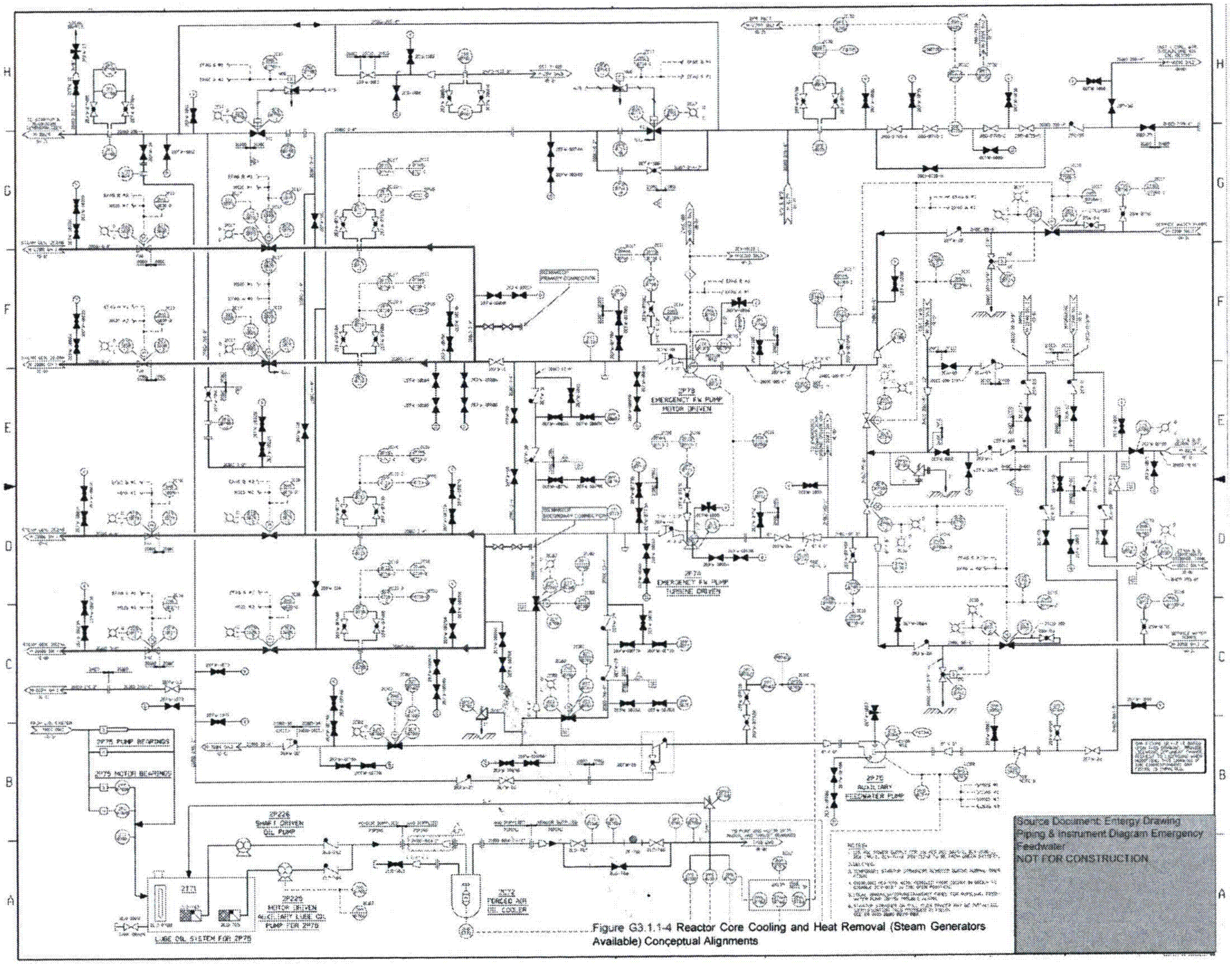


Figure G3.1.1-4 Reactor Core Cooling and Heat Removal (Steam Generators Available) Conceptual Alignments

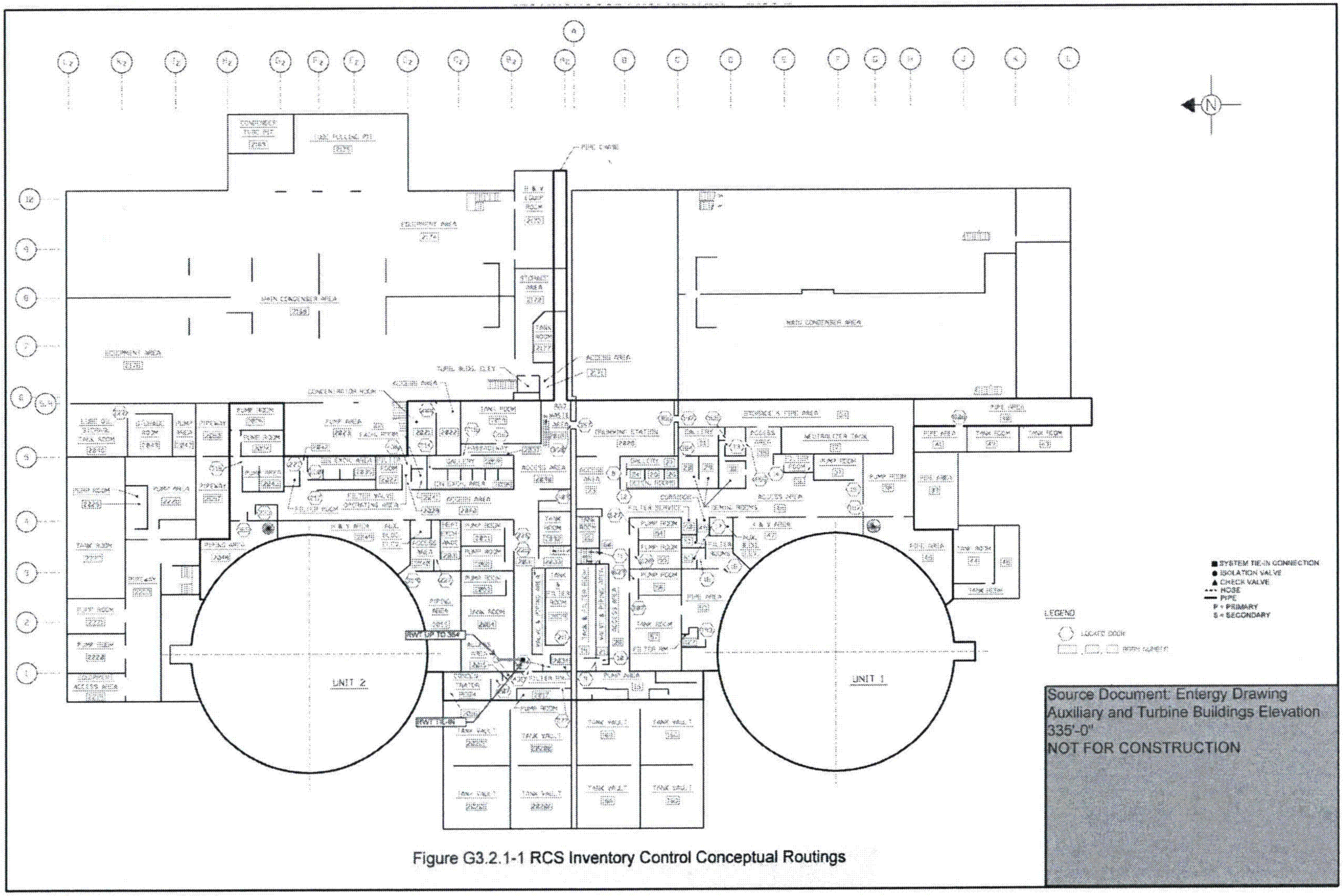


Figure G3.2.1-1 RCS Inventory Control Conceptual Routings

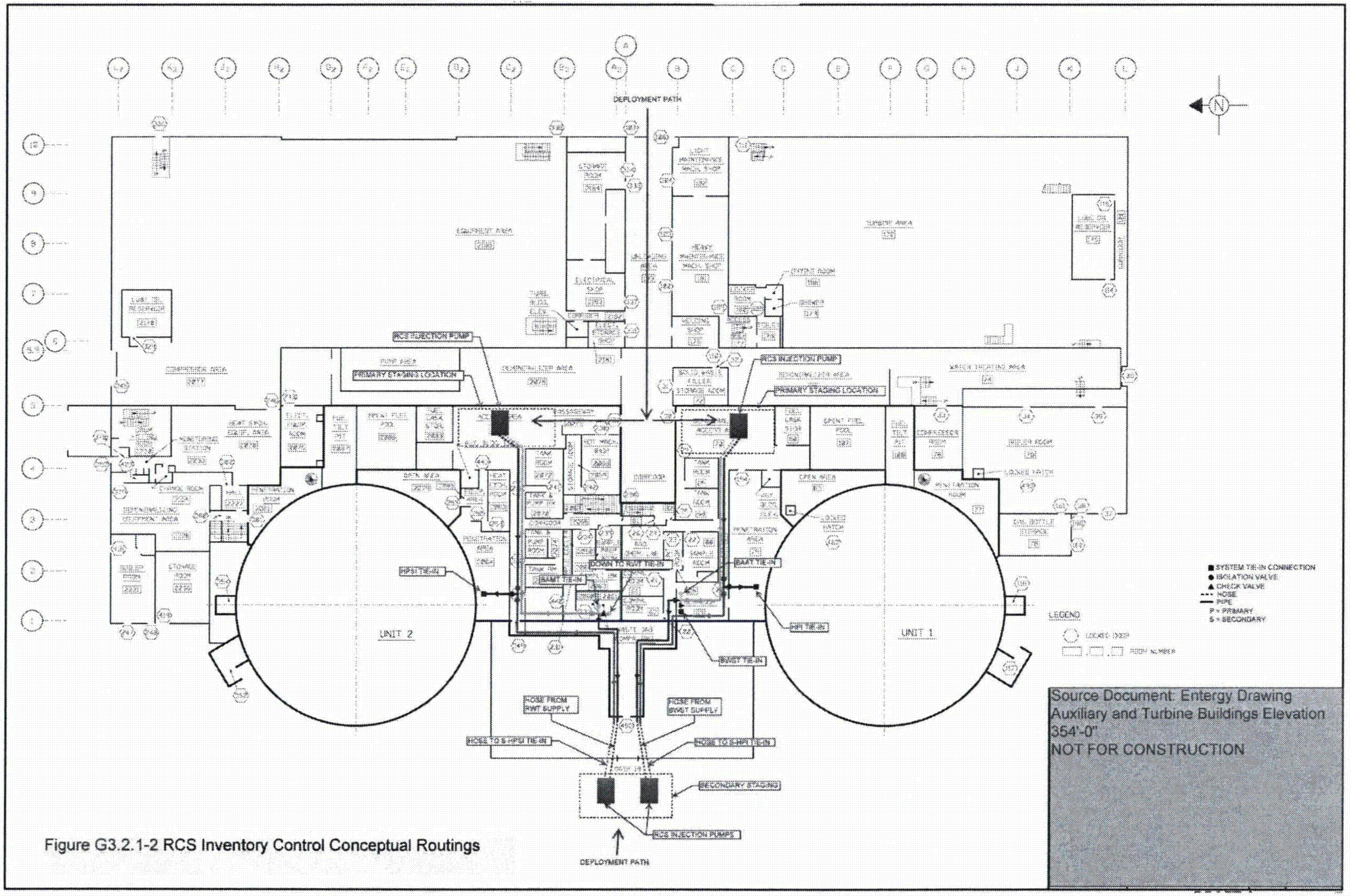


Figure G3.2.1-2 RCS Inventory Control Conceptual Routings

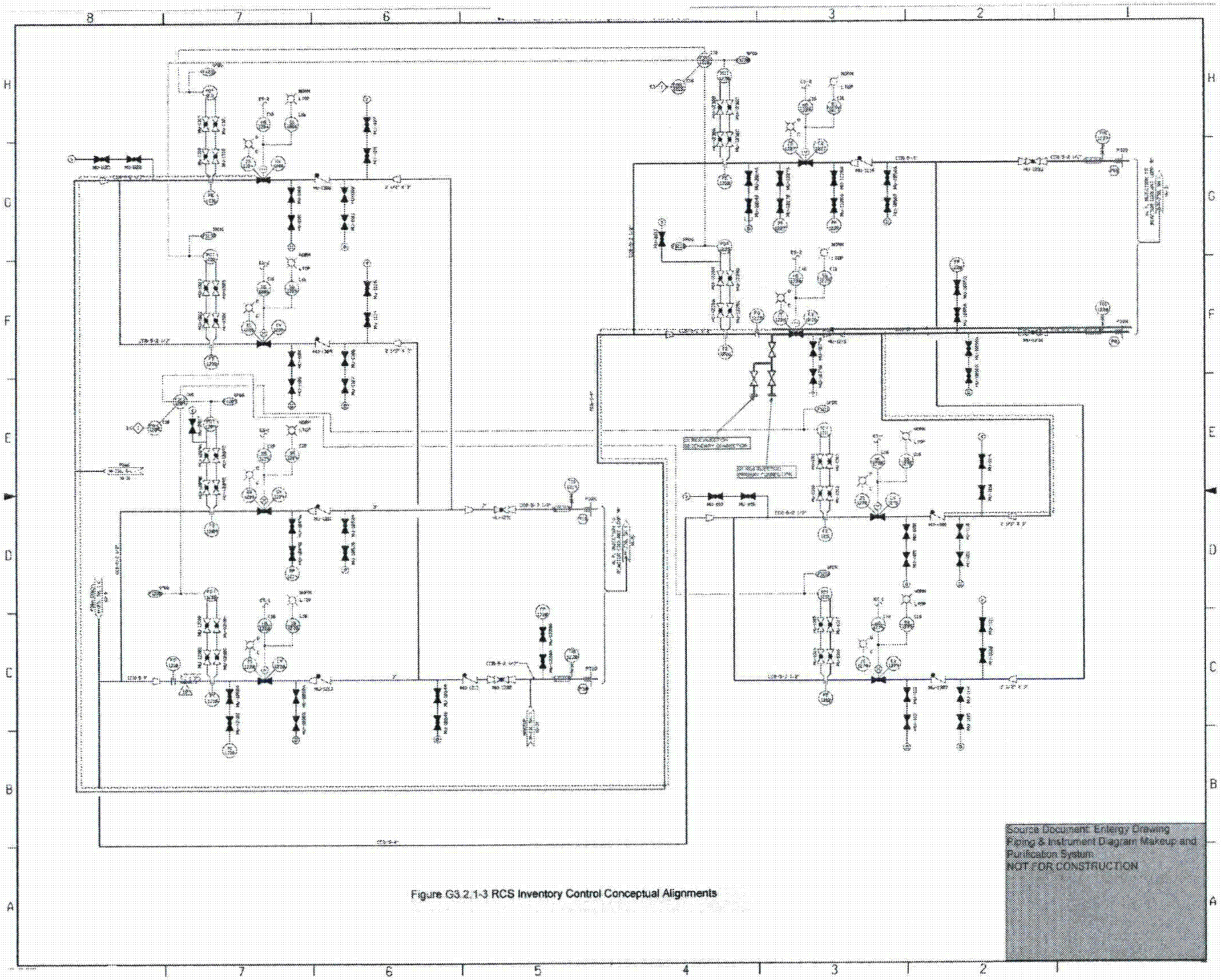


Figure G3.2.1-3 RCS Inventory Control Conceptual Alignments

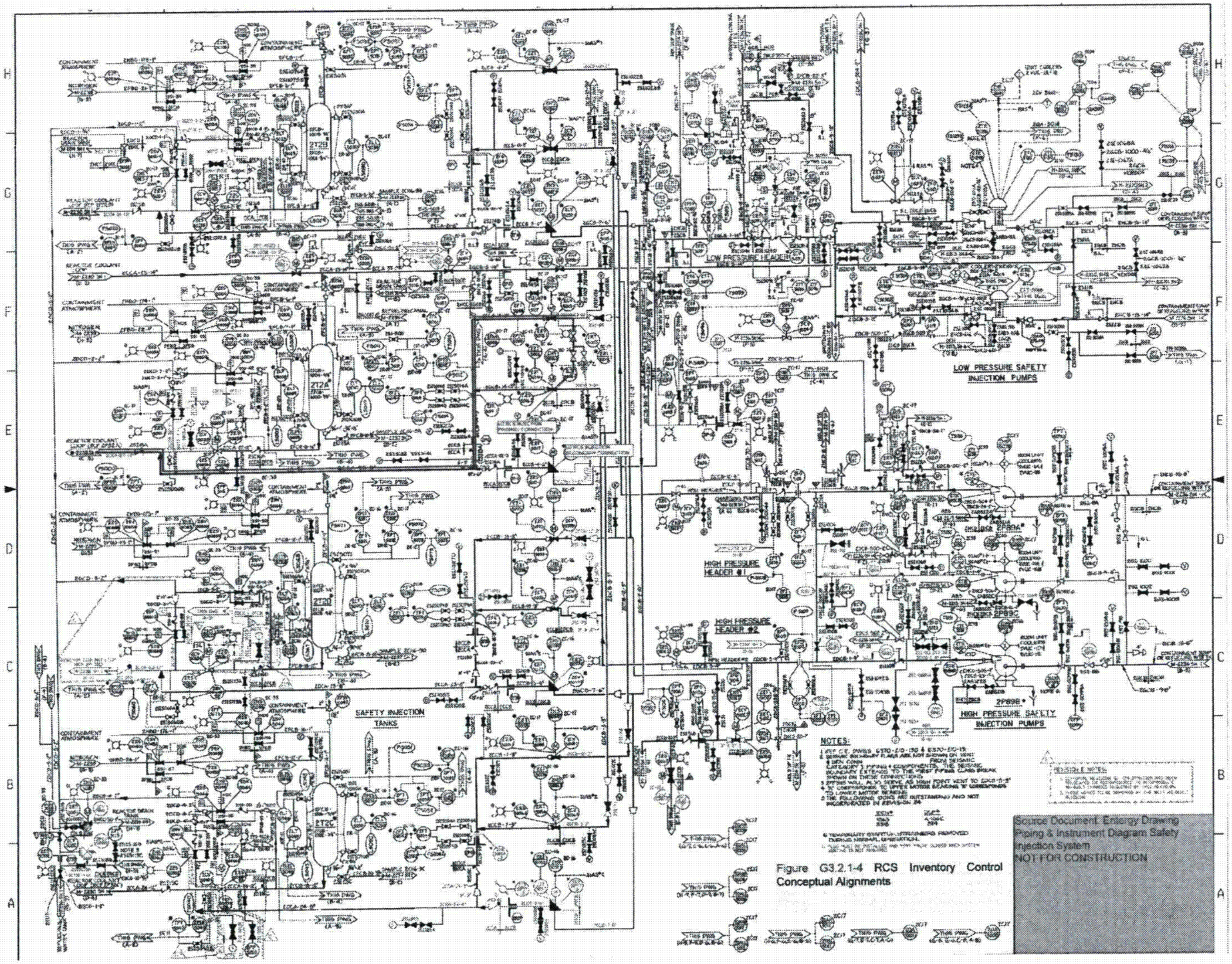


Figure G3.2.1-4 RCS Inventory Control Conceptual Alignments

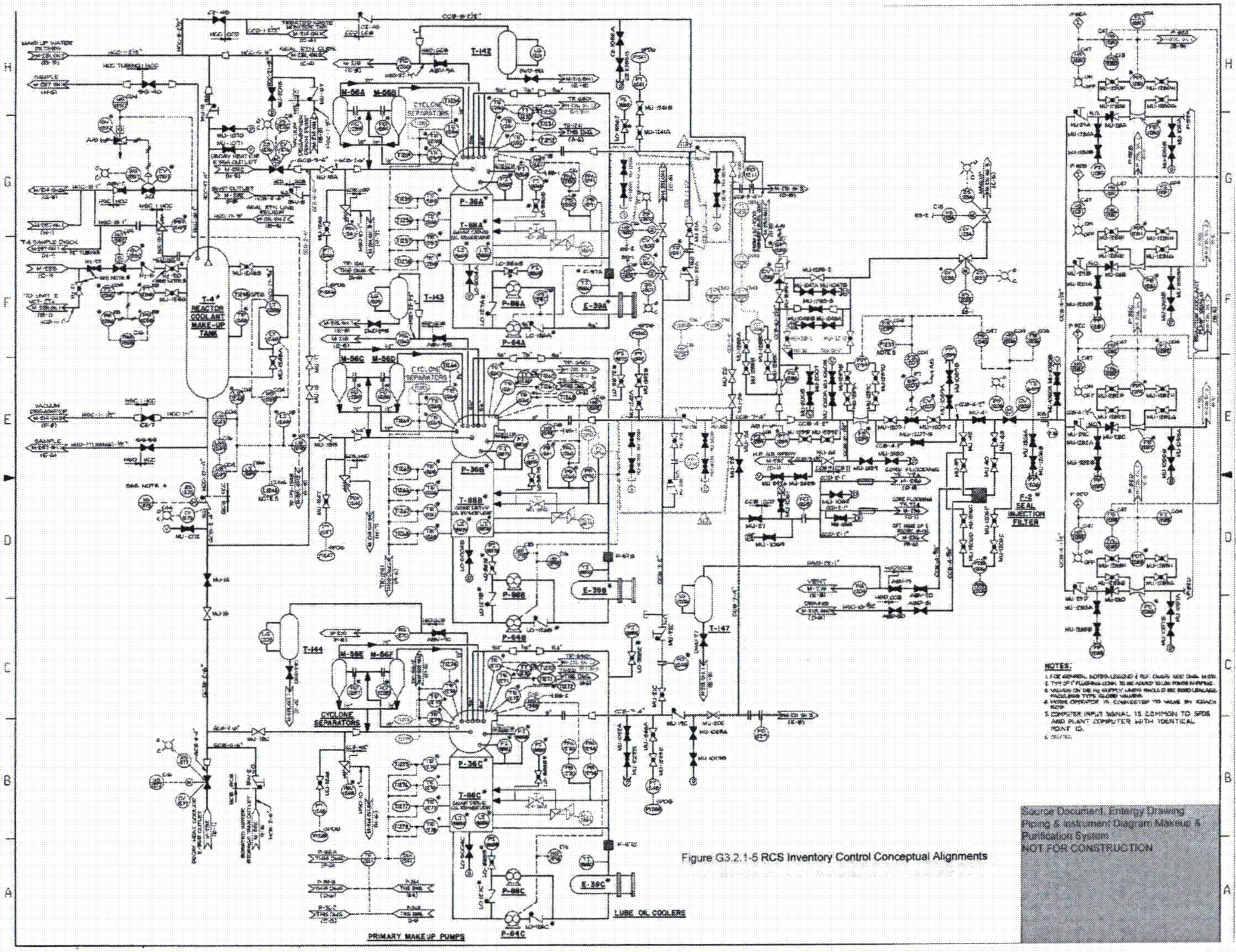


Figure G3.2.1-5 RCS Inventory Control Conceptual Alignments

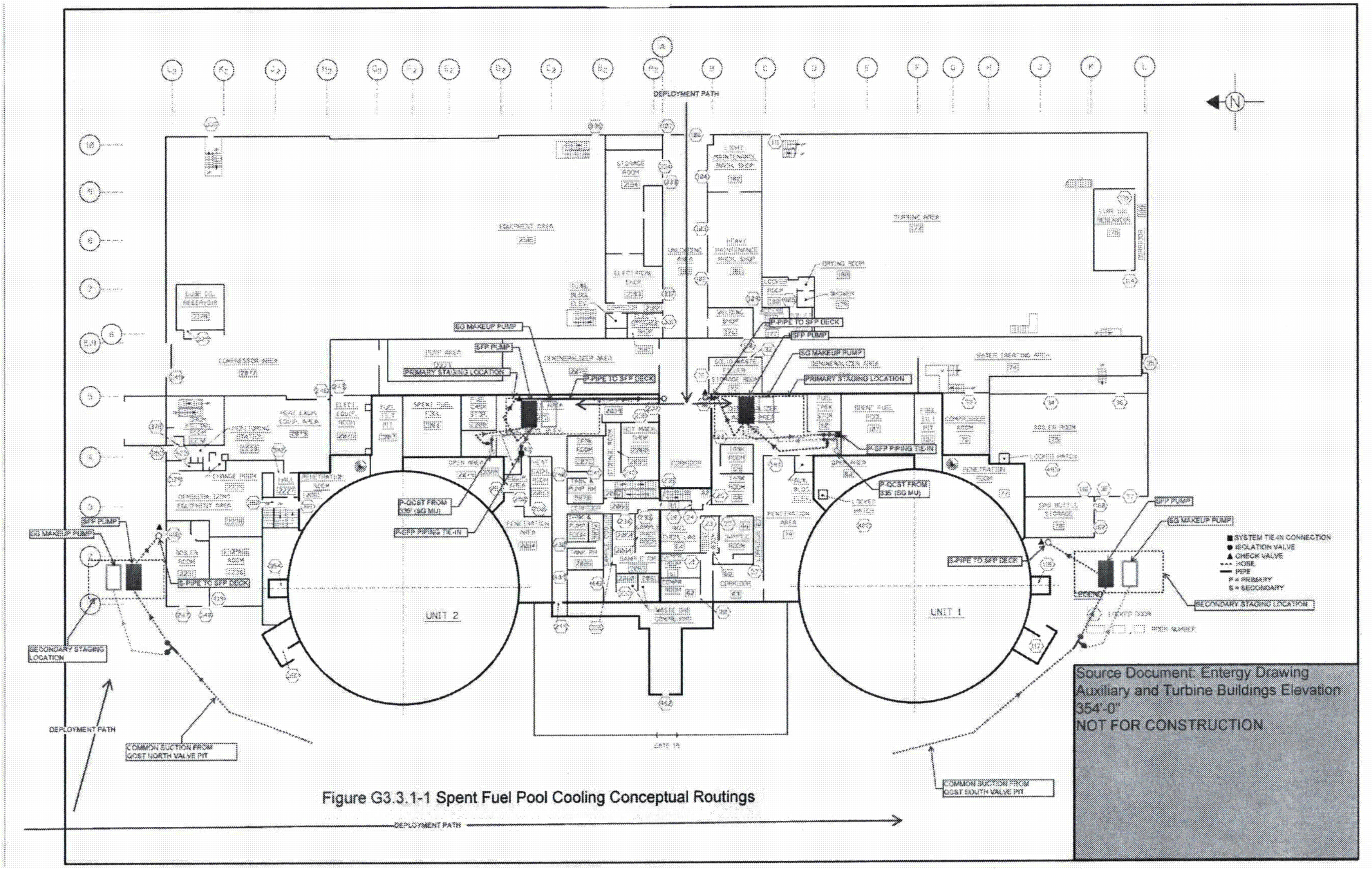


Figure G3.3.1-1 Spent Fuel Pool Cooling Conceptual Routings

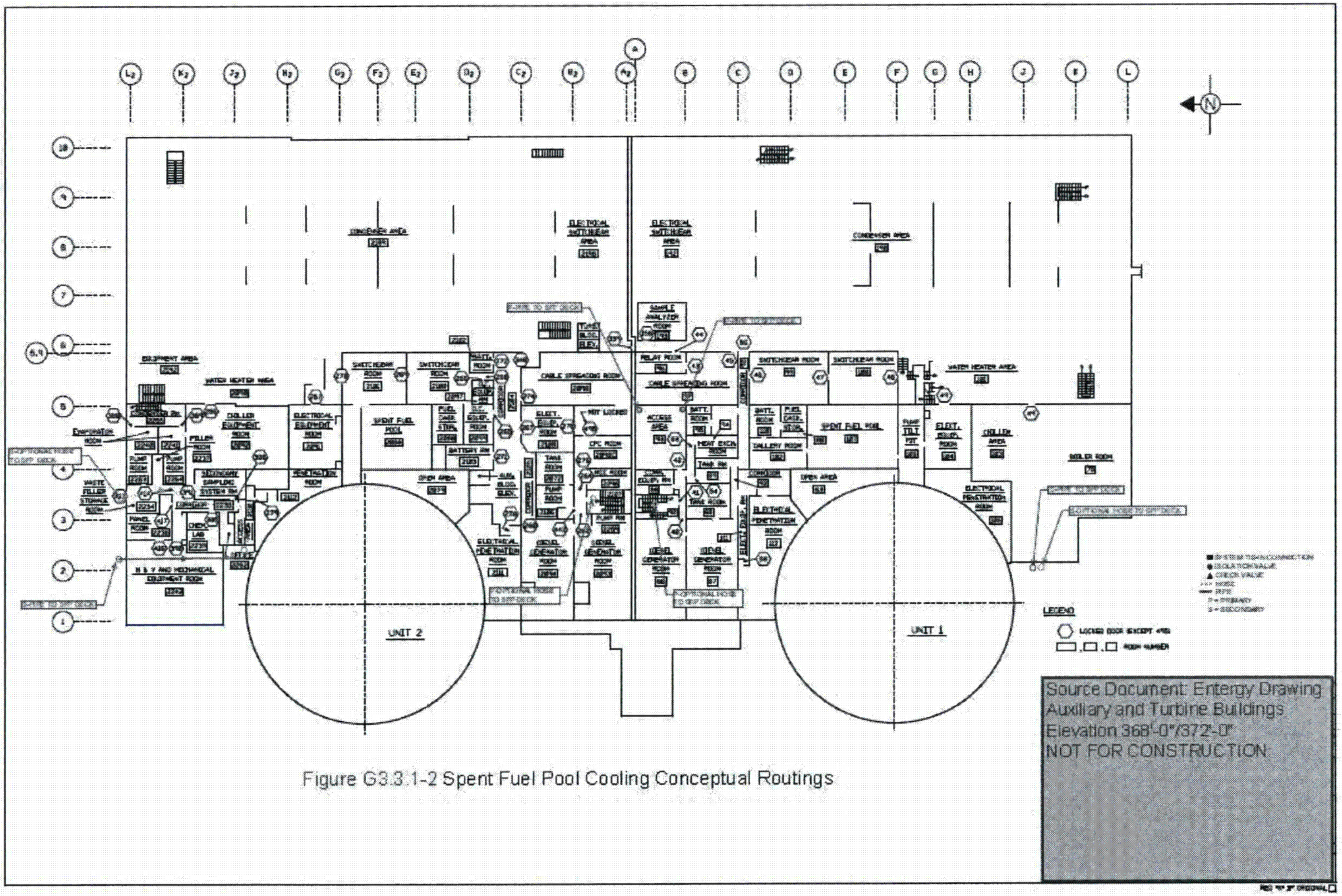


Figure G3.3.1-2 Spent Fuel Pool Cooling Conceptual Routings

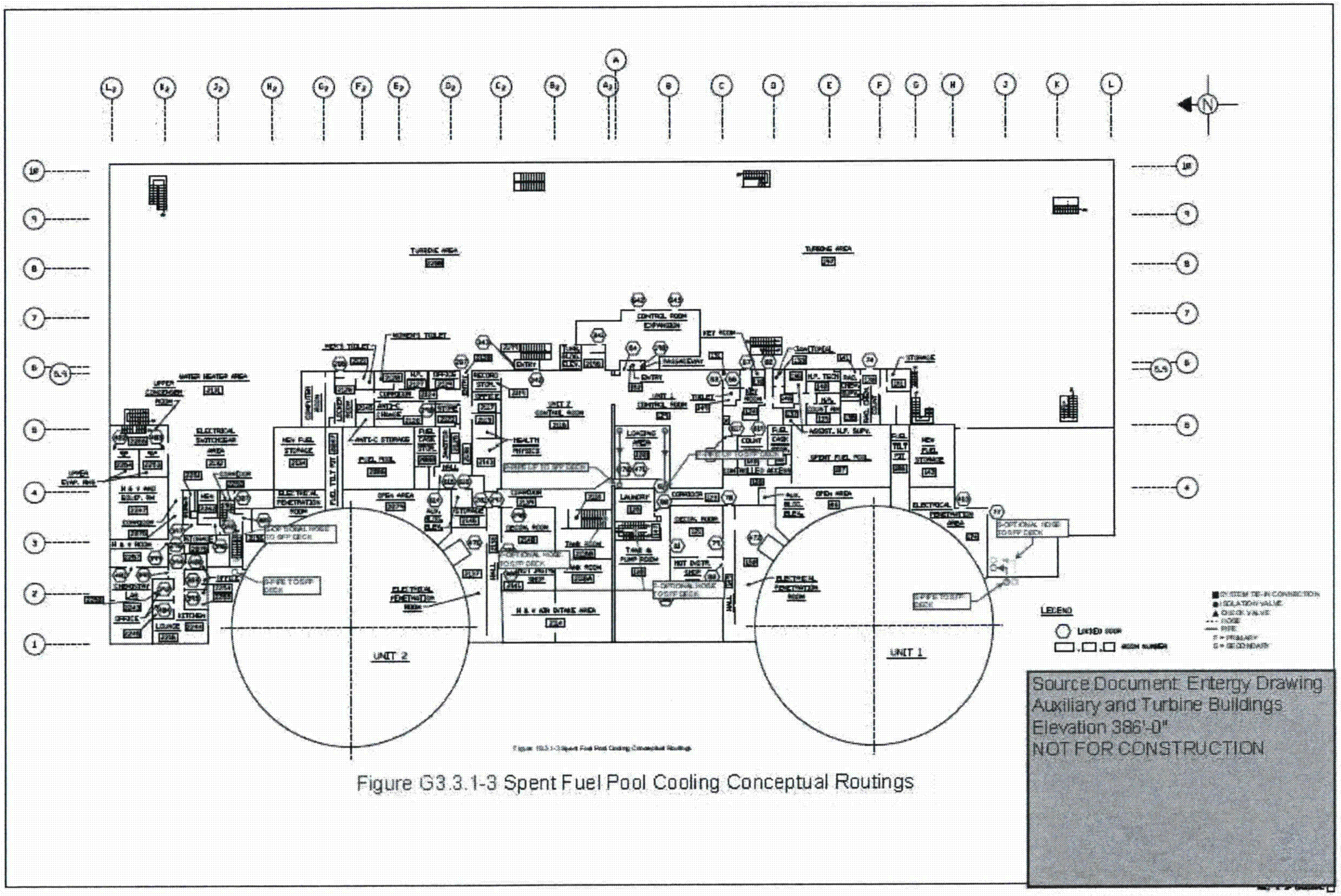


Figure G3.3.1-3 Spent Fuel Pool Cooling Conceptual Routings

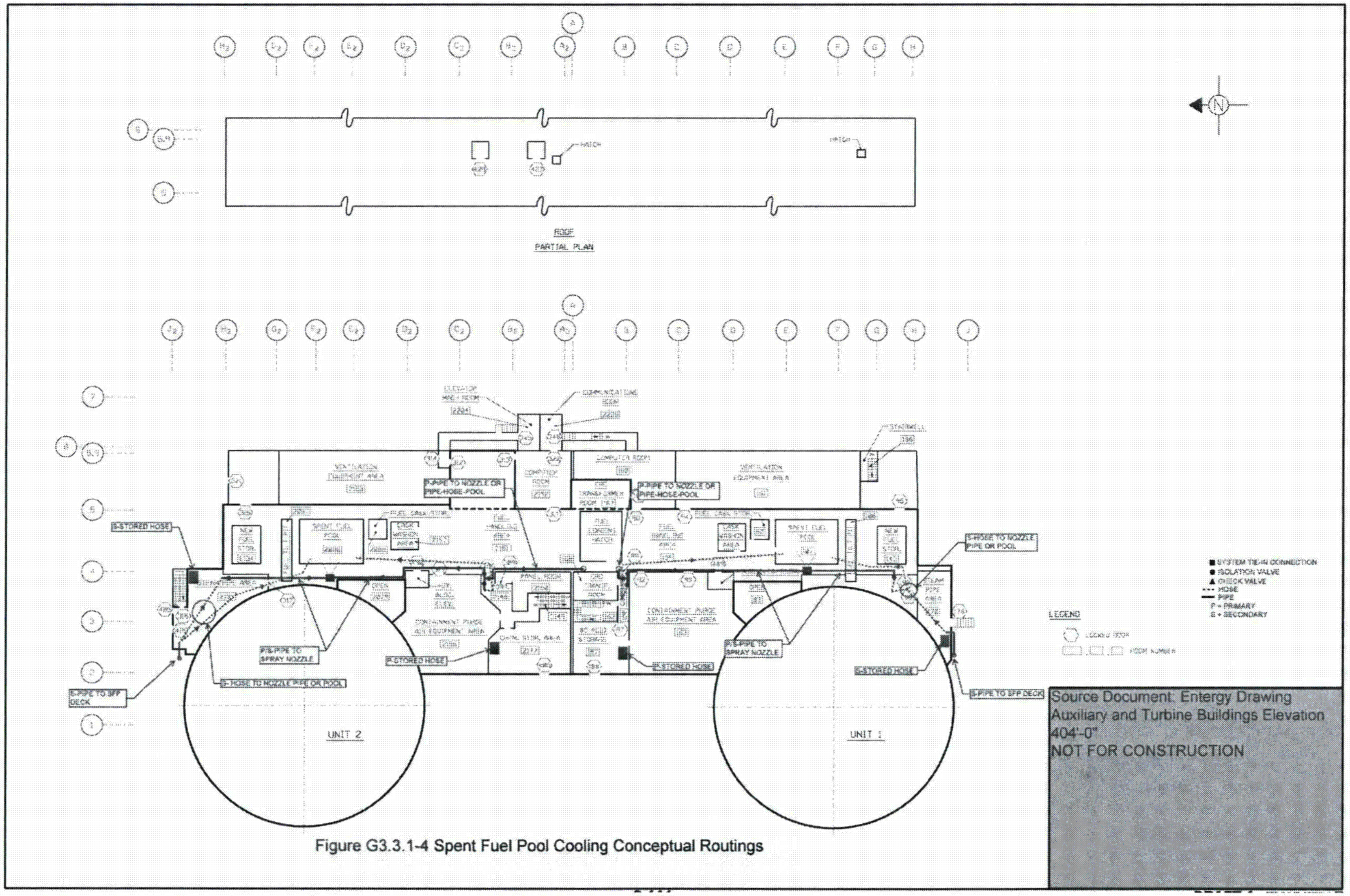


Figure G3.3.1-4 Spent Fuel Pool Cooling Conceptual Routings

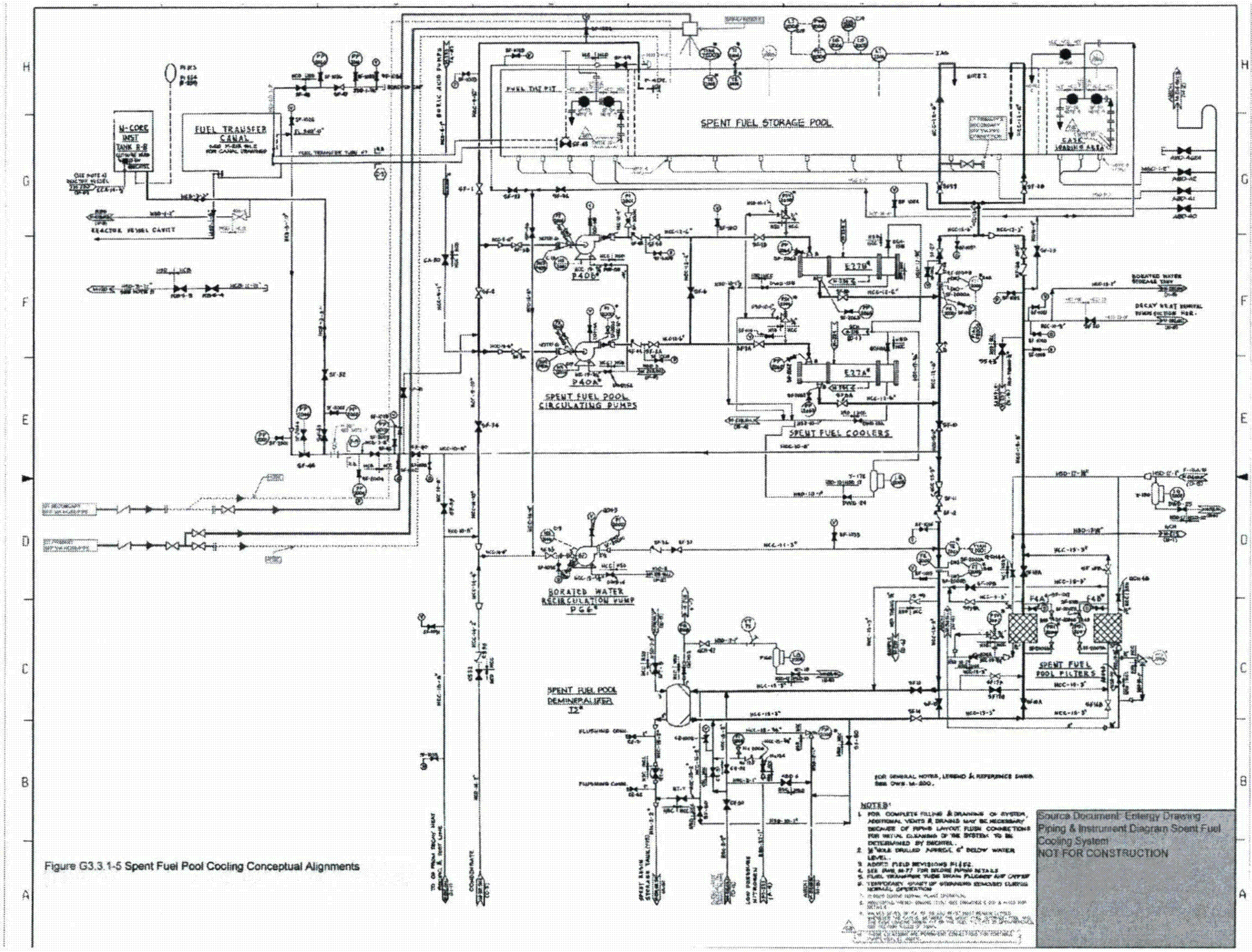


Figure G3.3.1-5 Spent Fuel Pool Cooling Conceptual Alignments

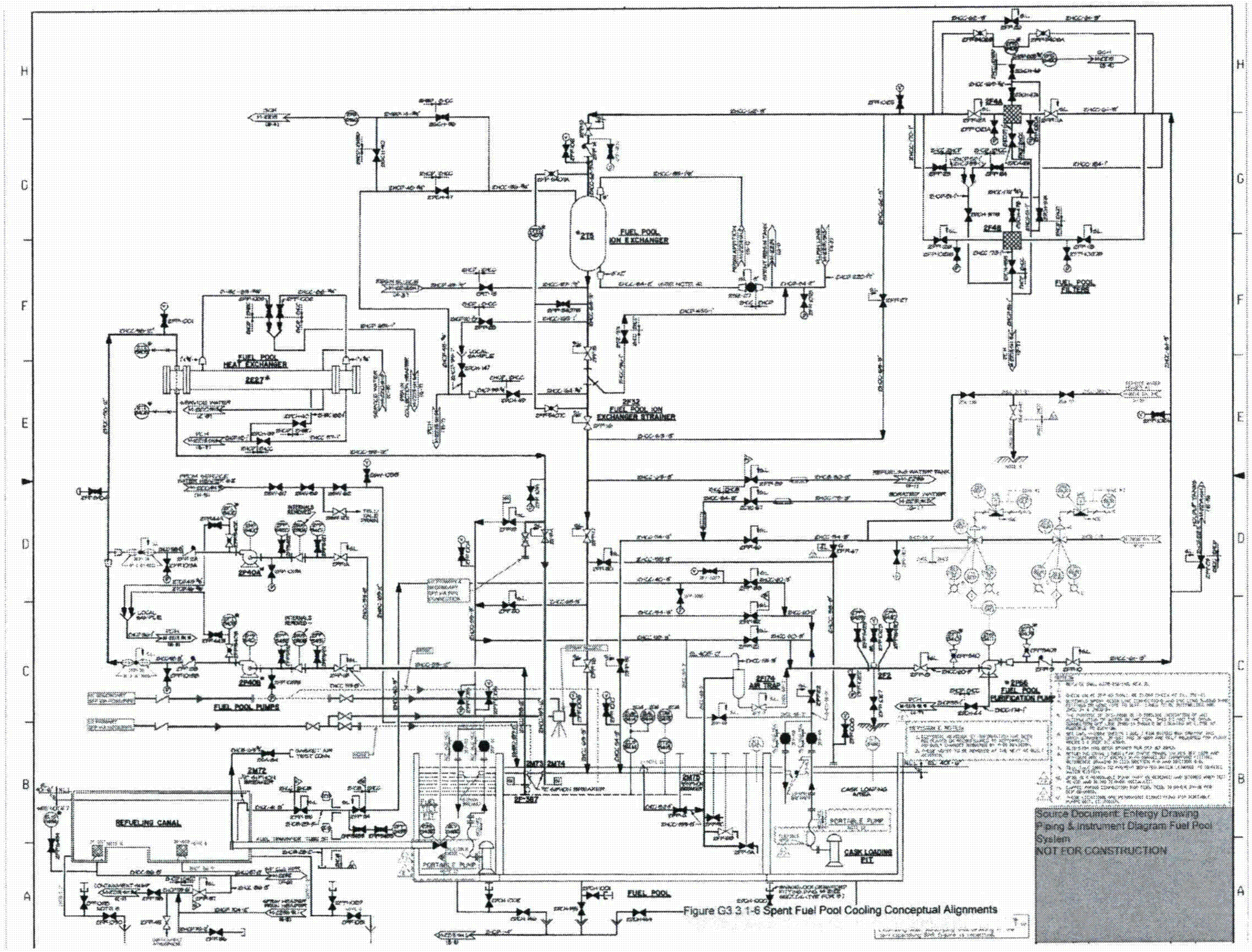


Figure G3.3.1-6 Spent Fuel Pool Cooling Conceptual Alignments

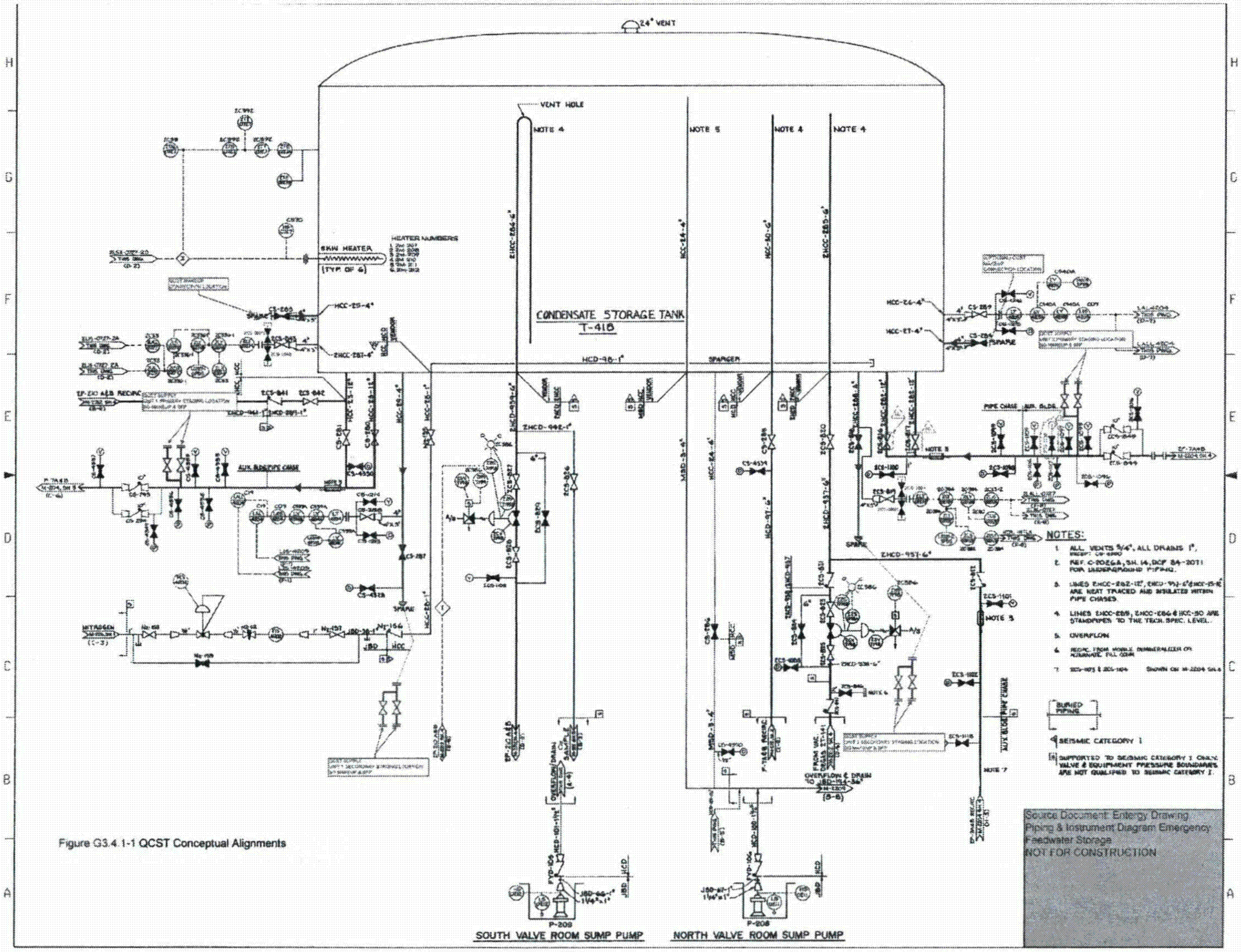


Figure G3.4.1-1 QCST Conceptual Alignments

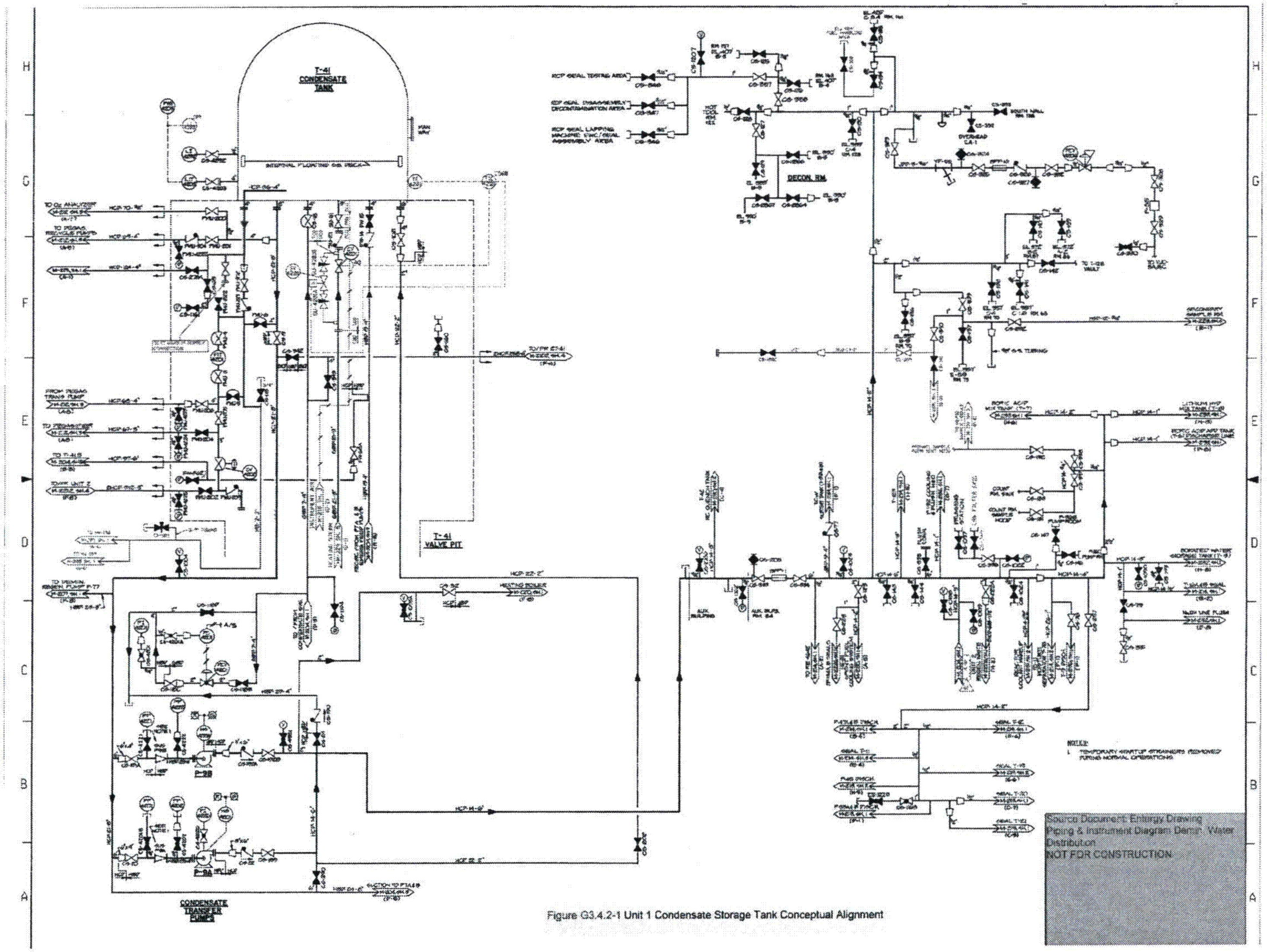


Figure G3.4.2-1 Unit 1 Condensate Storage Tank Conceptual Alignment

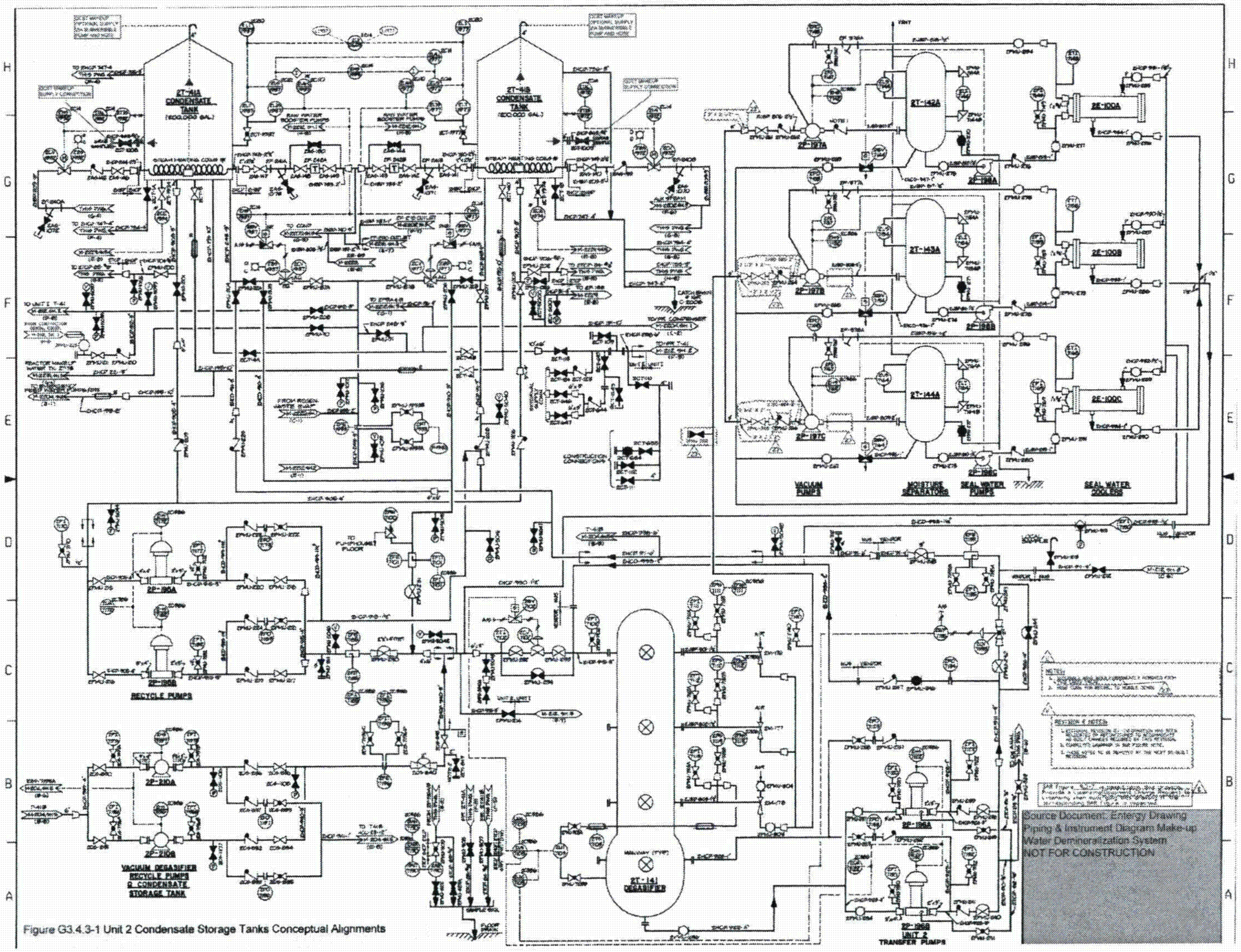


Figure G3.4.3-1 Unit 2 Condensate Storage Tanks Conceptual Alignments

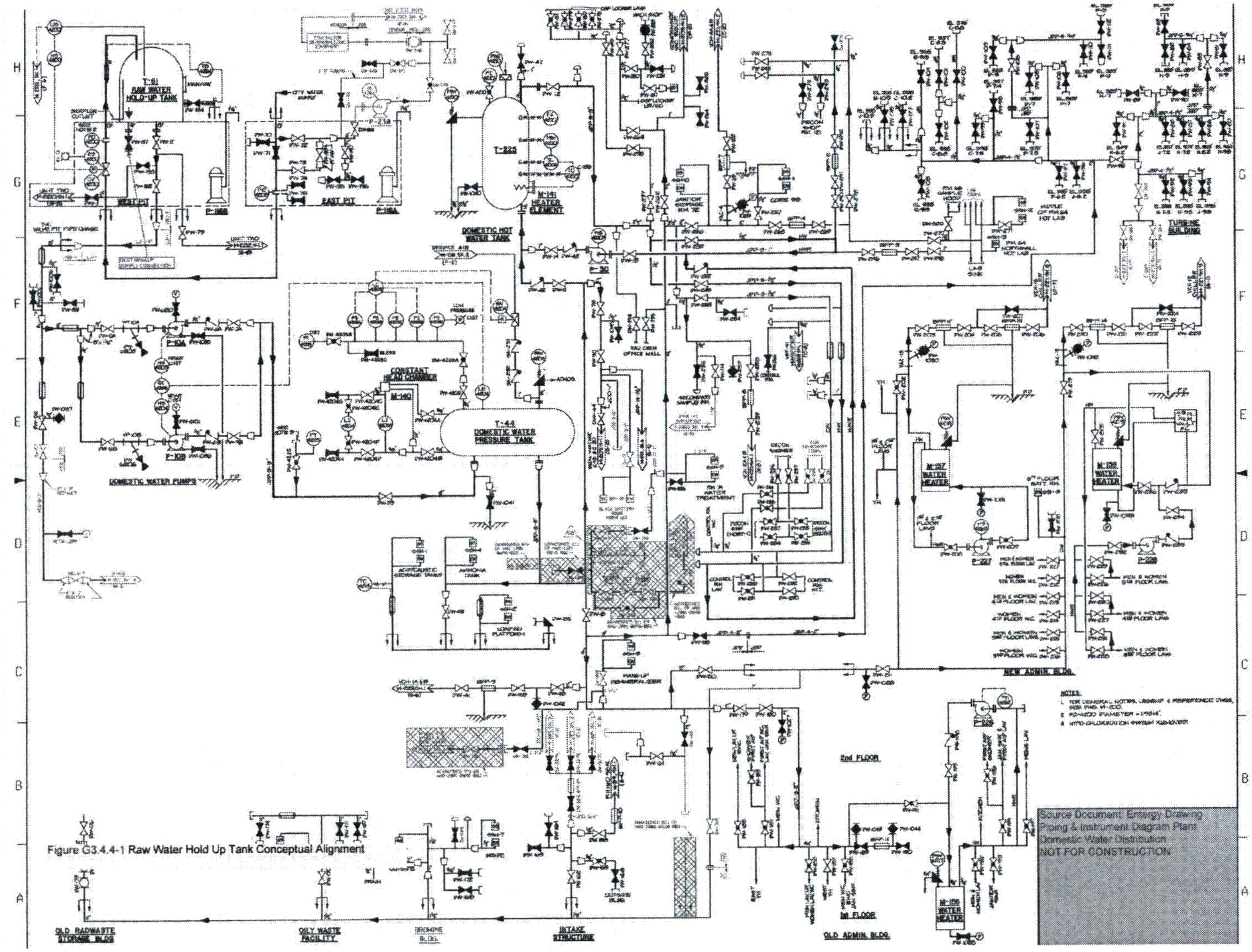


Figure G3.4.4-1 Raw Water Hold Up Tank Conceptual Alignment

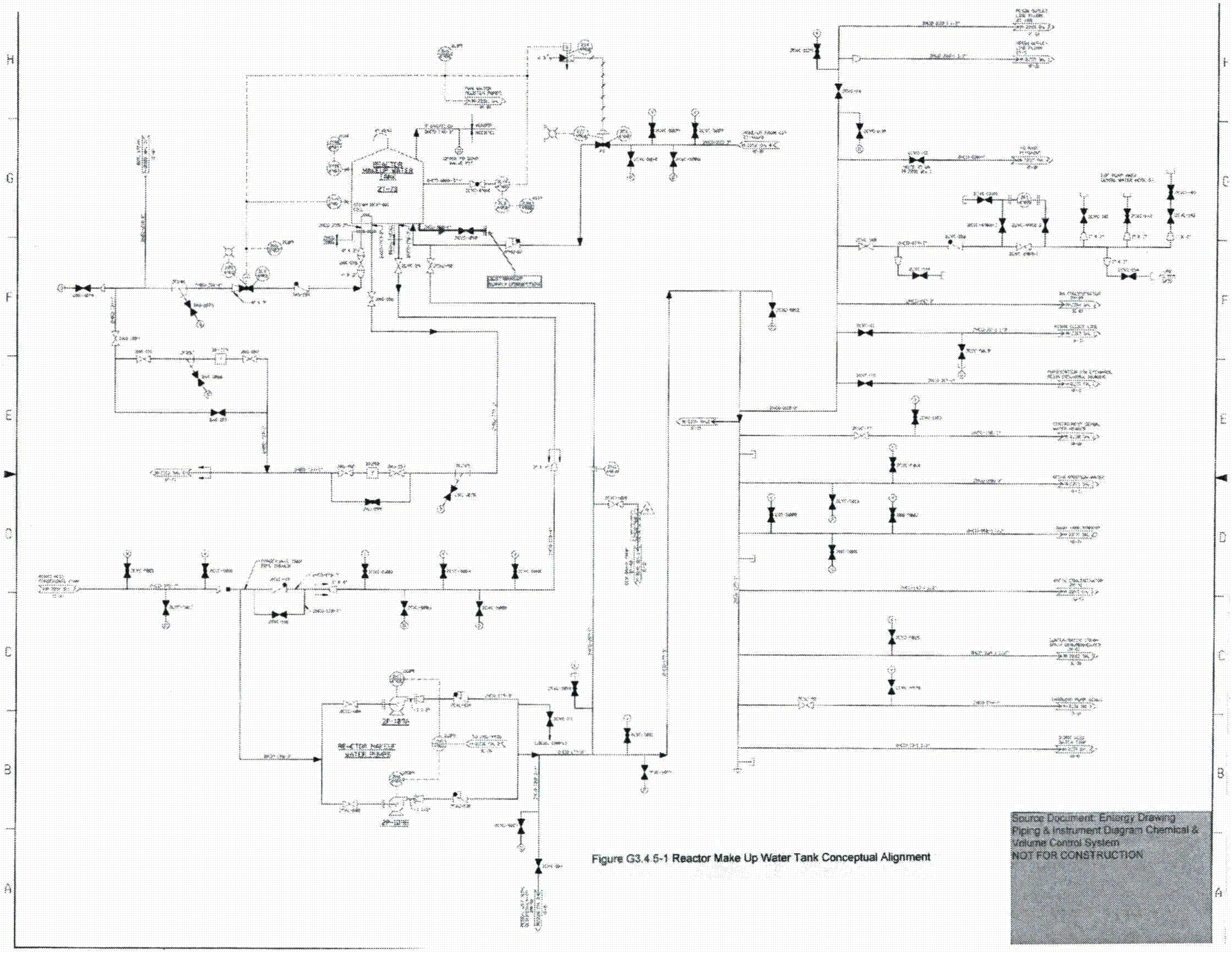


Figure G3.4.5-1 Reactor Make Up Water Tank Conceptual Alignment

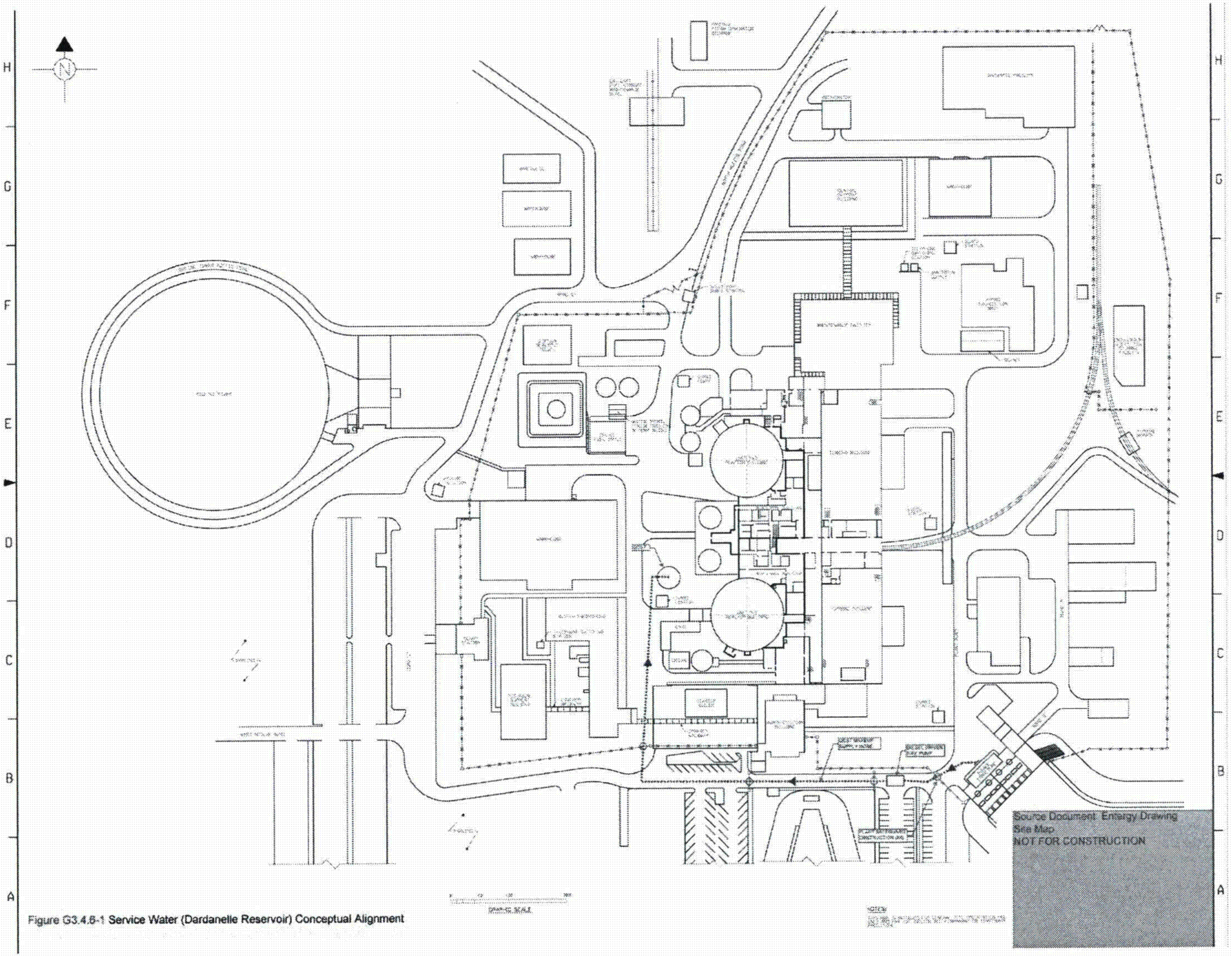


Figure G3.4.6-1 Service Water (Dardanelle Reservoir) Conceptual Alignment

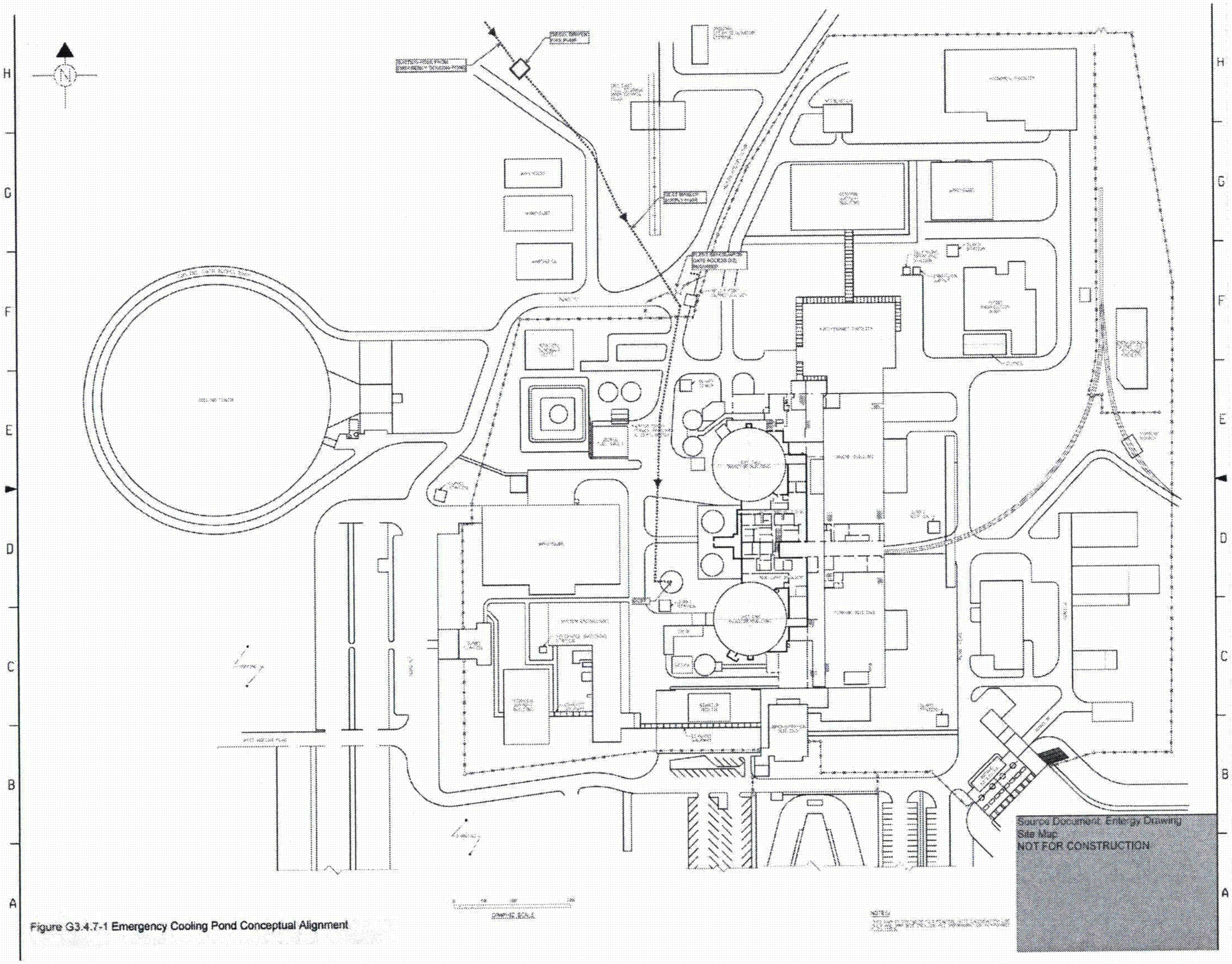


Figure G3.4.7-1 Emergency Cooling Pond Conceptual Alignment

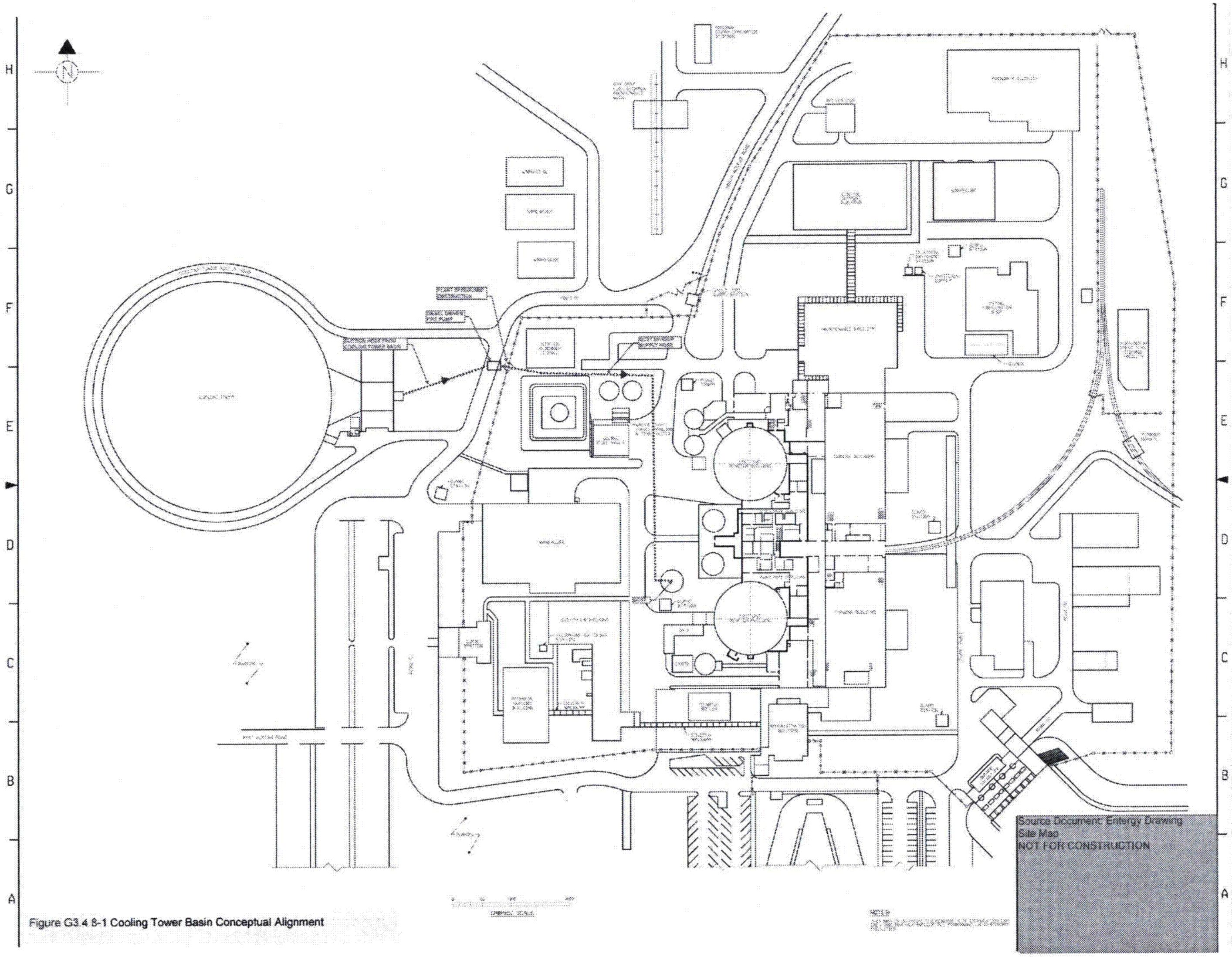


Figure G3.4 8-1 Cooling Tower Basin Conceptual Alignment

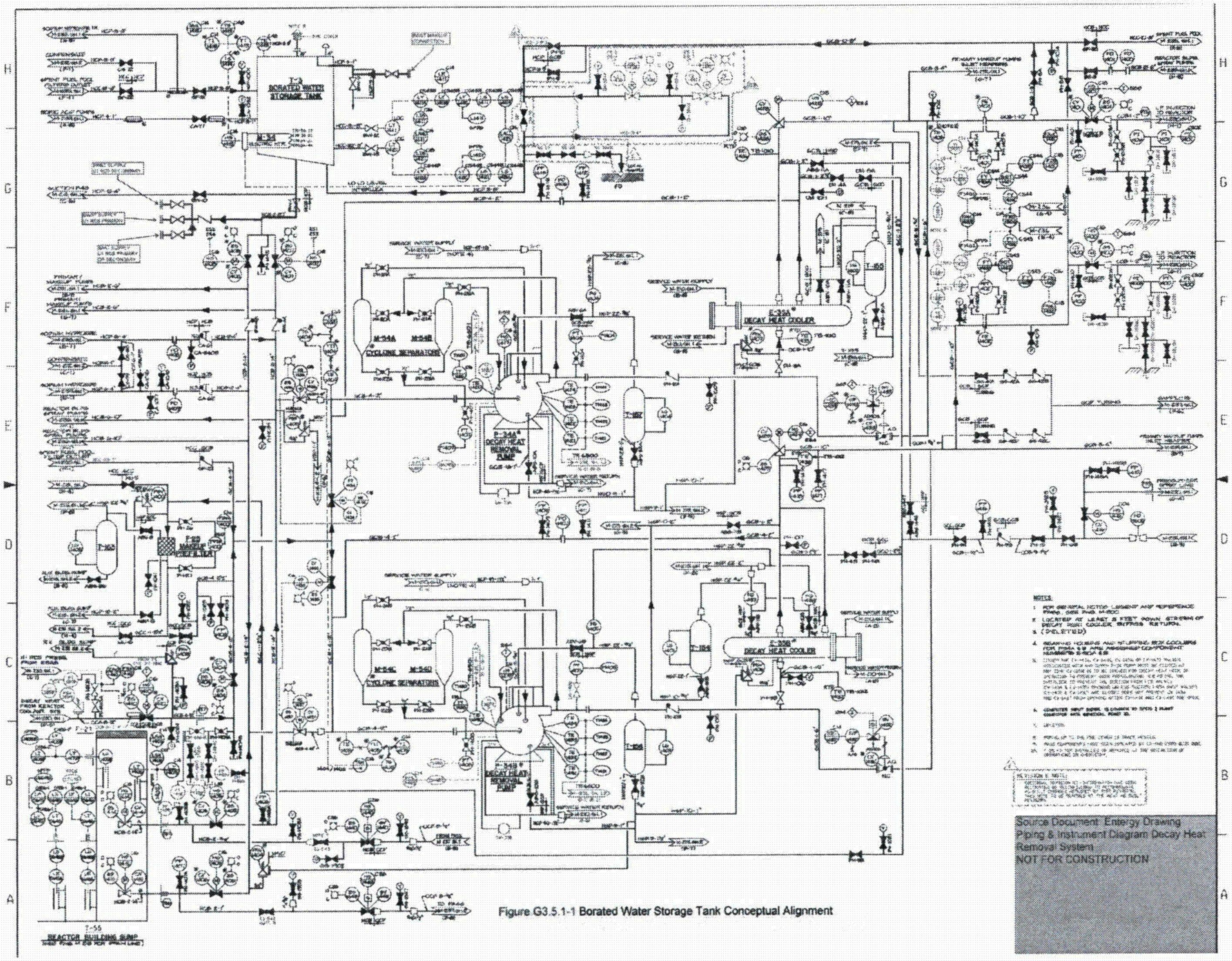


Figure G3.5.1-1 Borated Water Storage Tank Conceptual Alignment

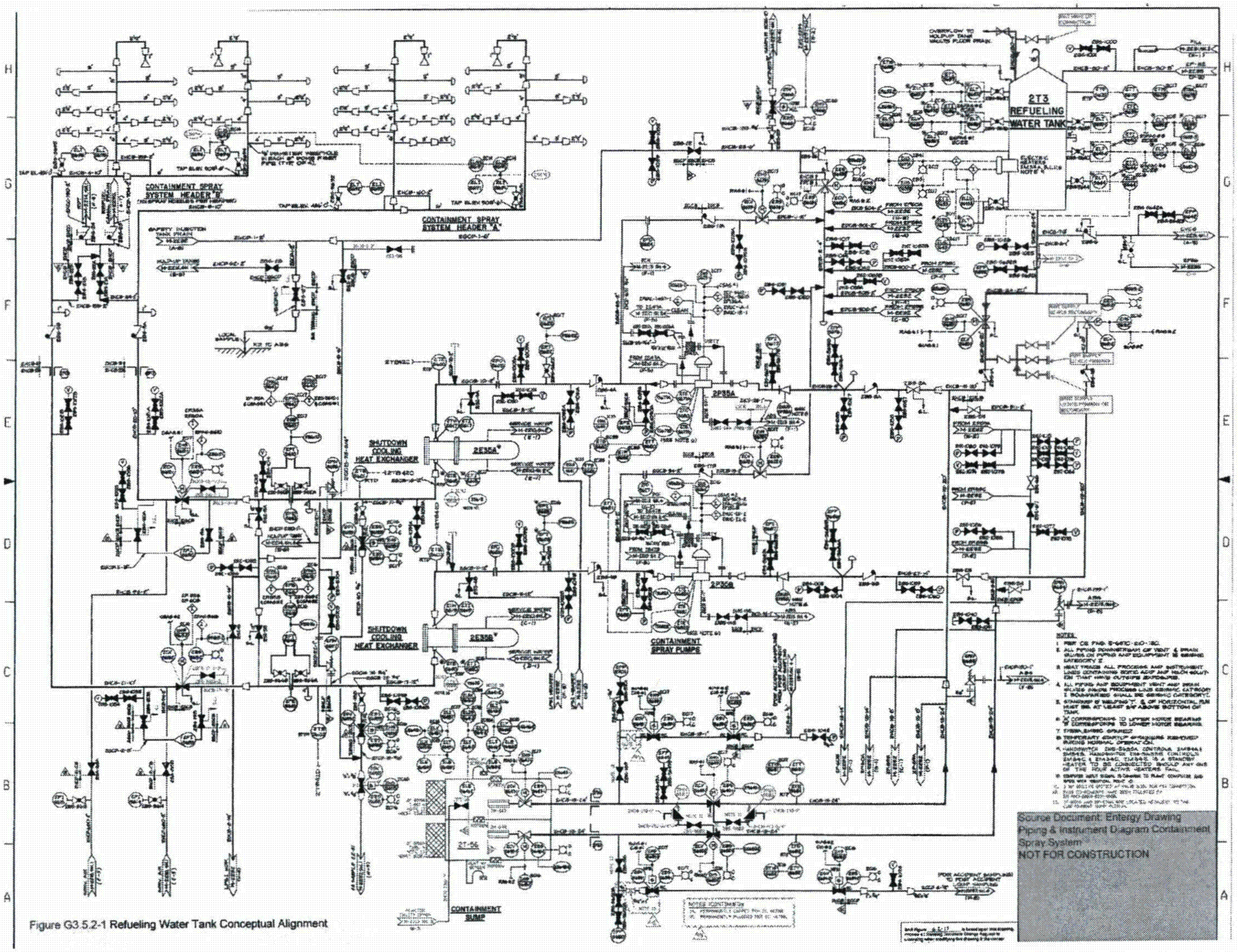


Figure G3.5.2-1 Refueling Water Tank Conceptual Alignment

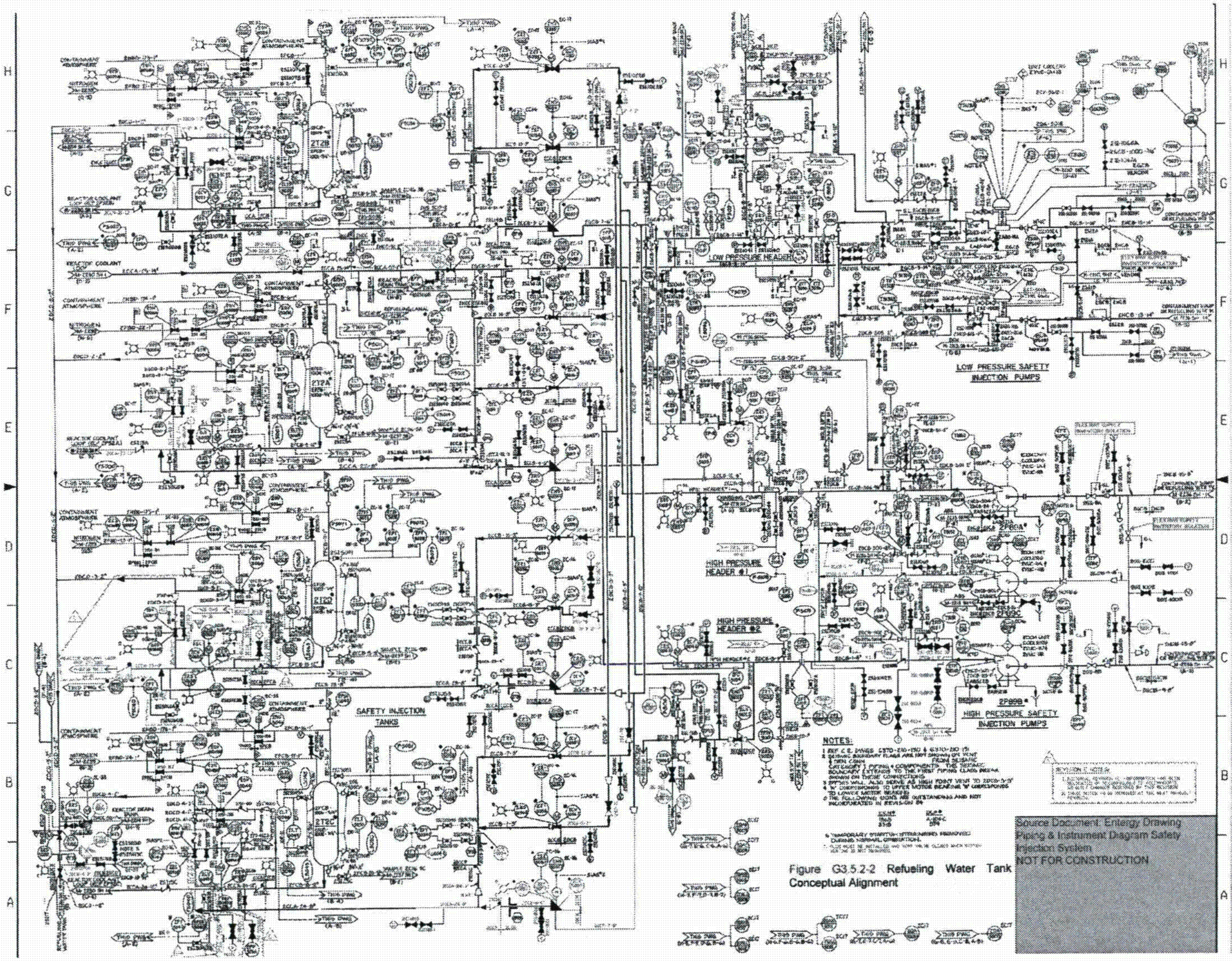


Figure G3.5.2-2 Refueling Water Tank Conceptual Alignment

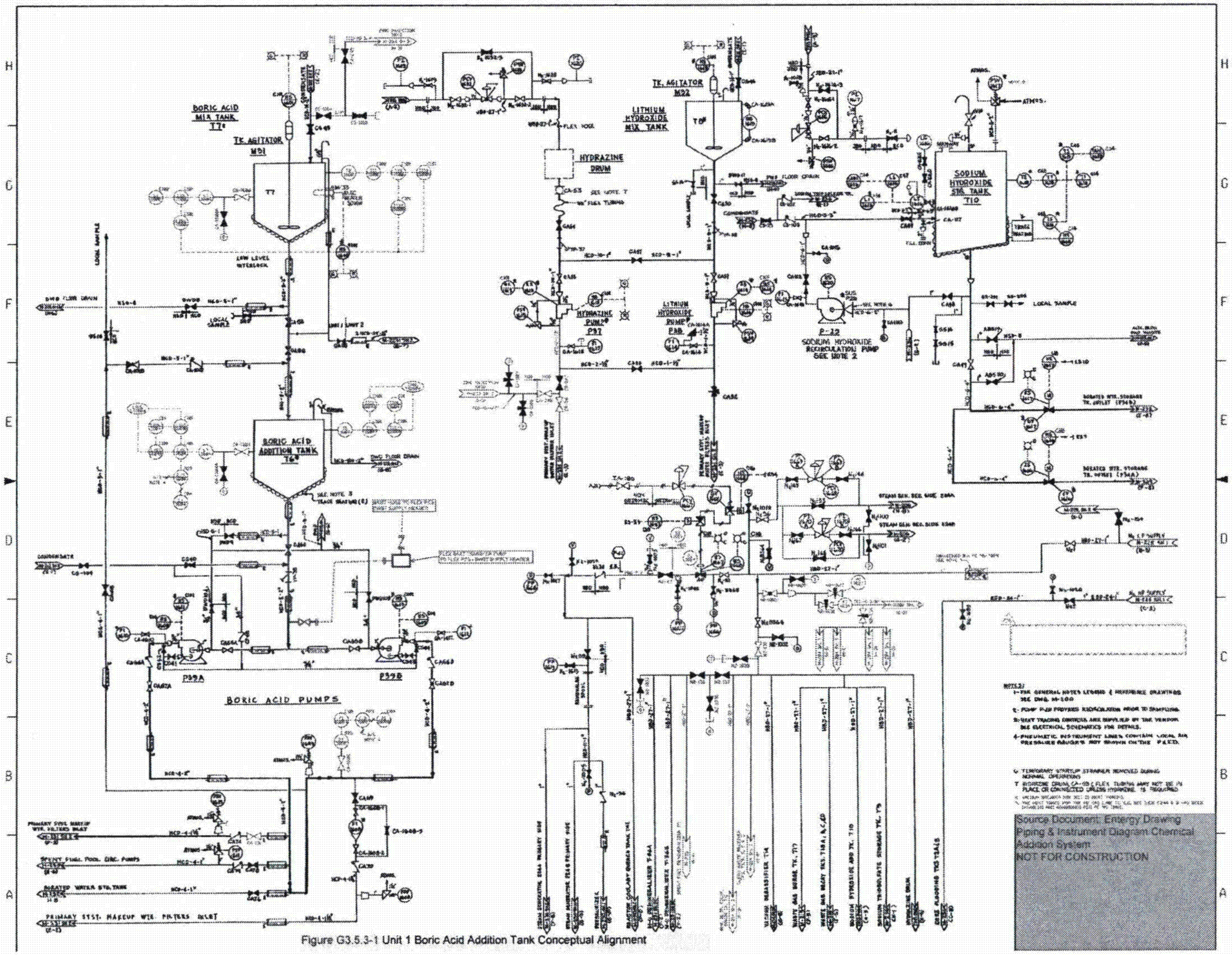


Figure G3.5.3-1 Unit 1 Boric Acid Addition Tank Conceptual Alignment

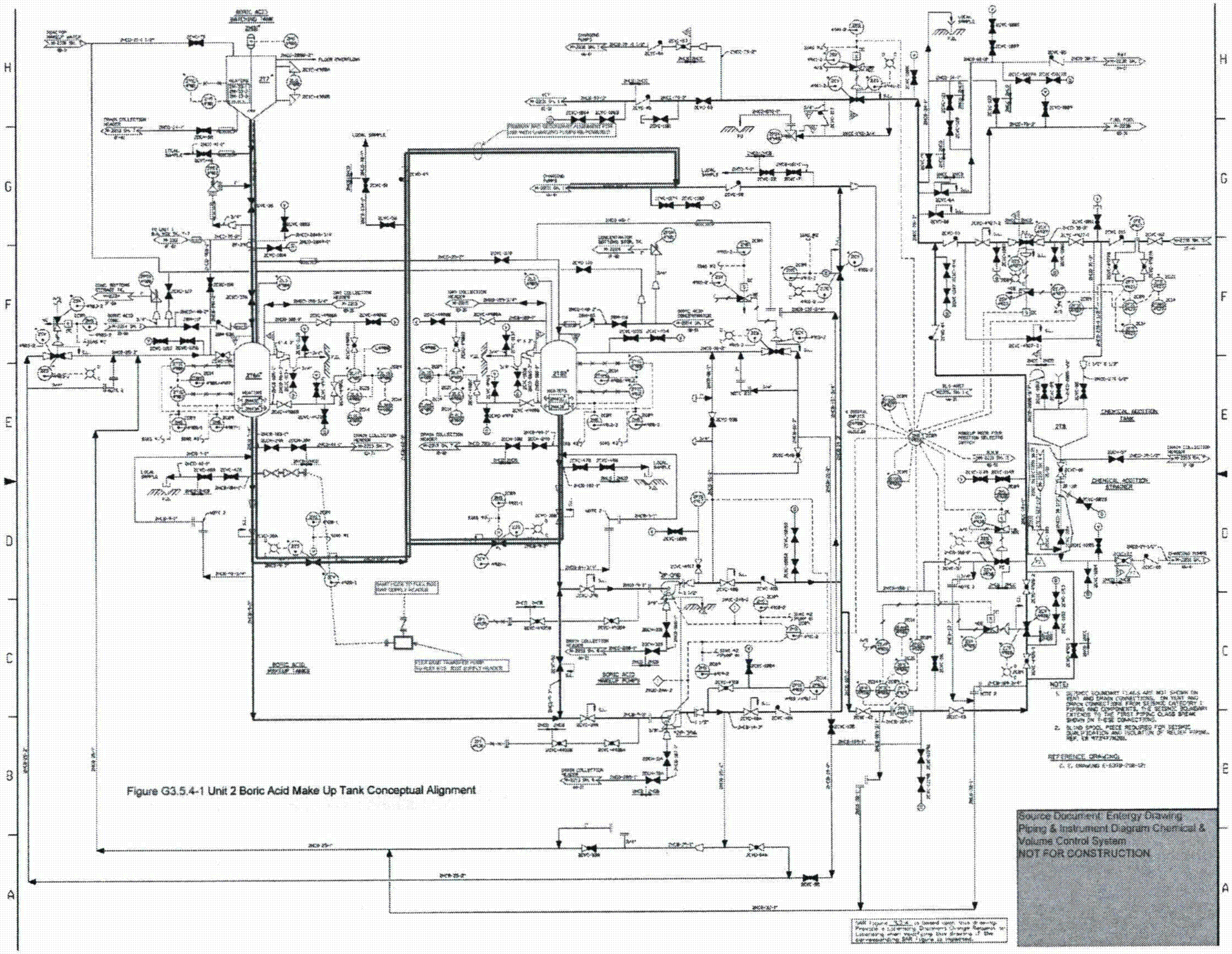


Figure G3.5.4-1 Unit 2 Boric Acid Make Up Tank Conceptual Alignment

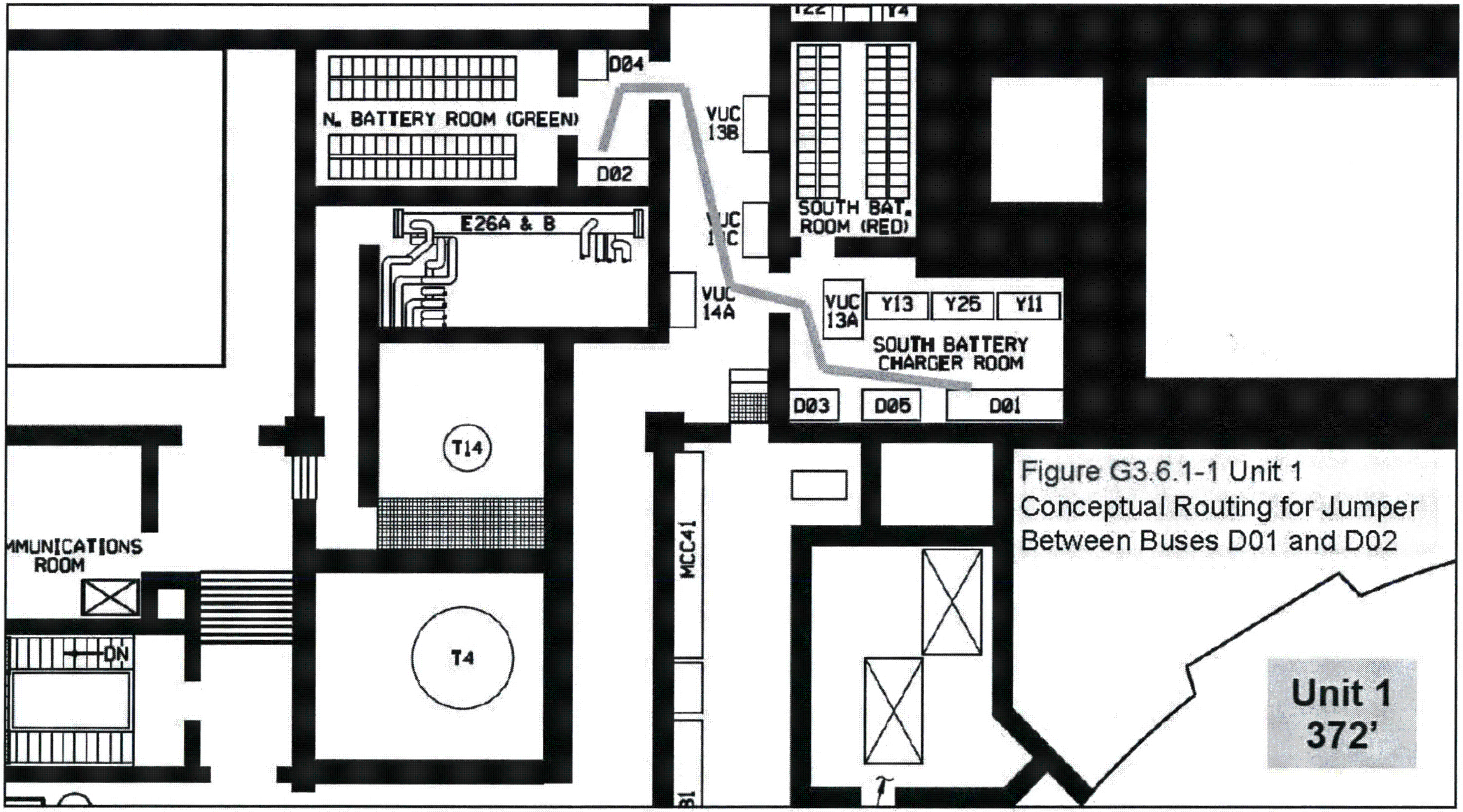


Figure G3.6.1-1 Unit 1 Conceptual Routing for Jumper Between Buses D01 and D02

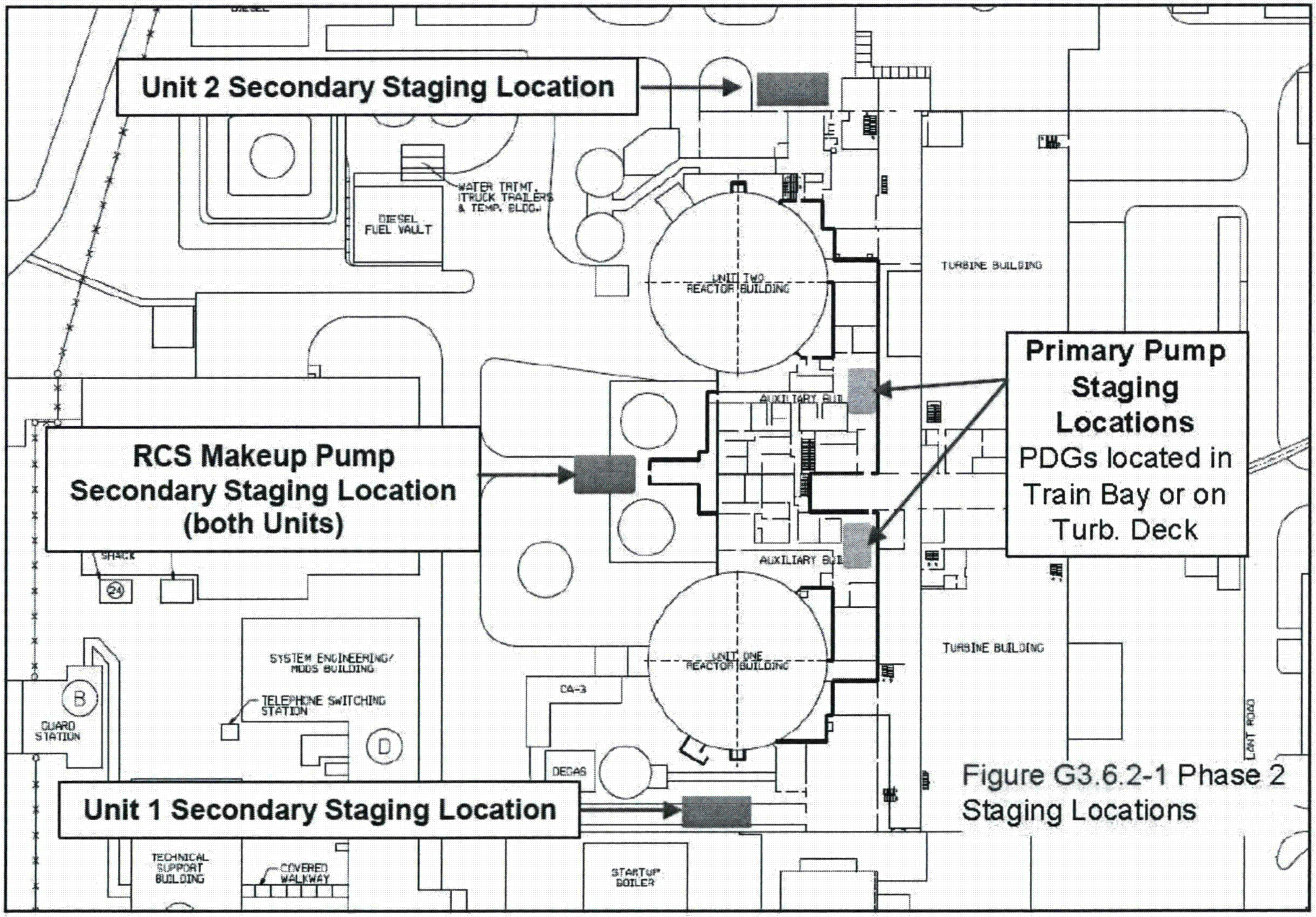


Figure G3.6.2-1 Phase 2 Staging Locations

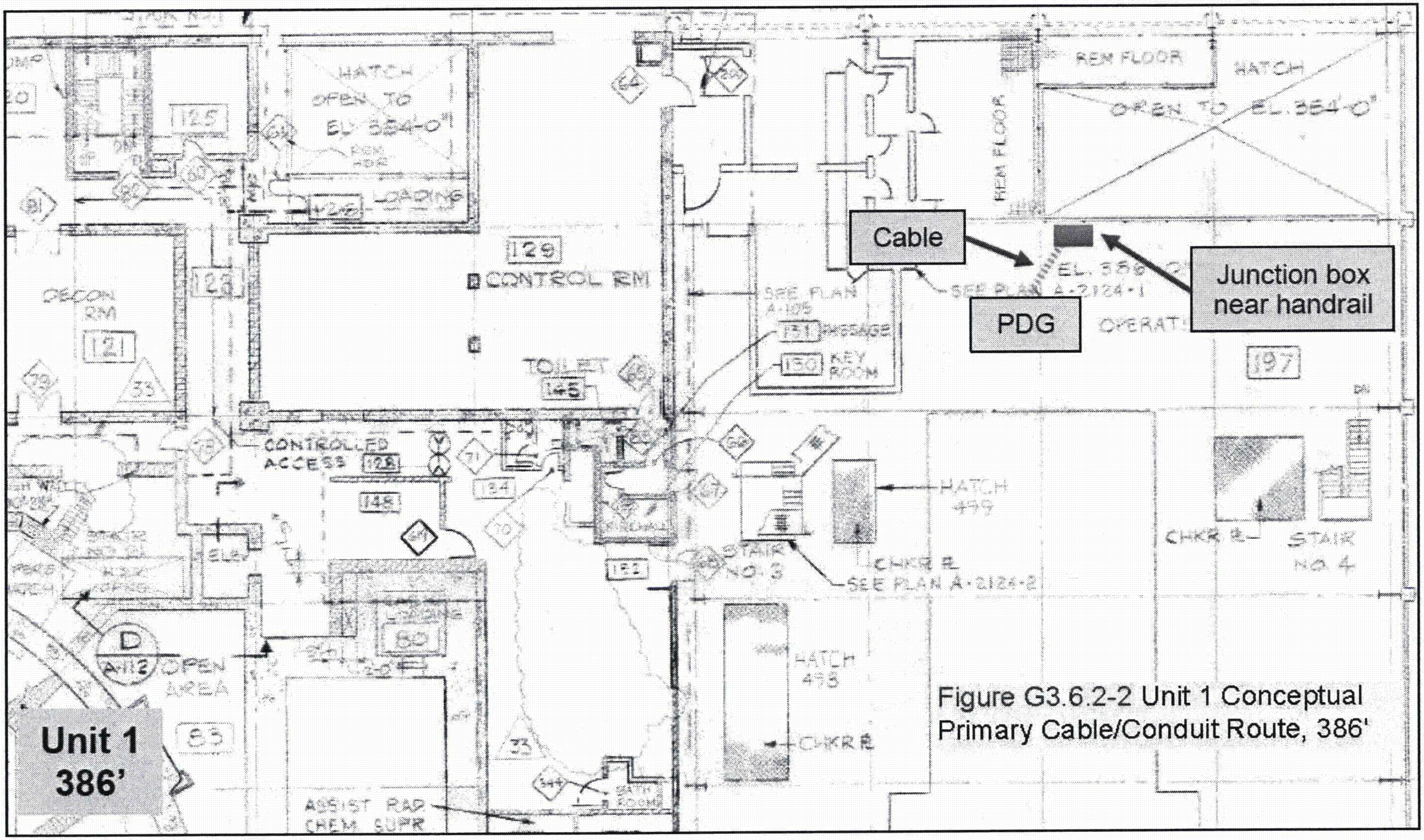


Figure G3.6.2-2 Unit 1 Conceptual Primary Cable/Conduit Route, 386'

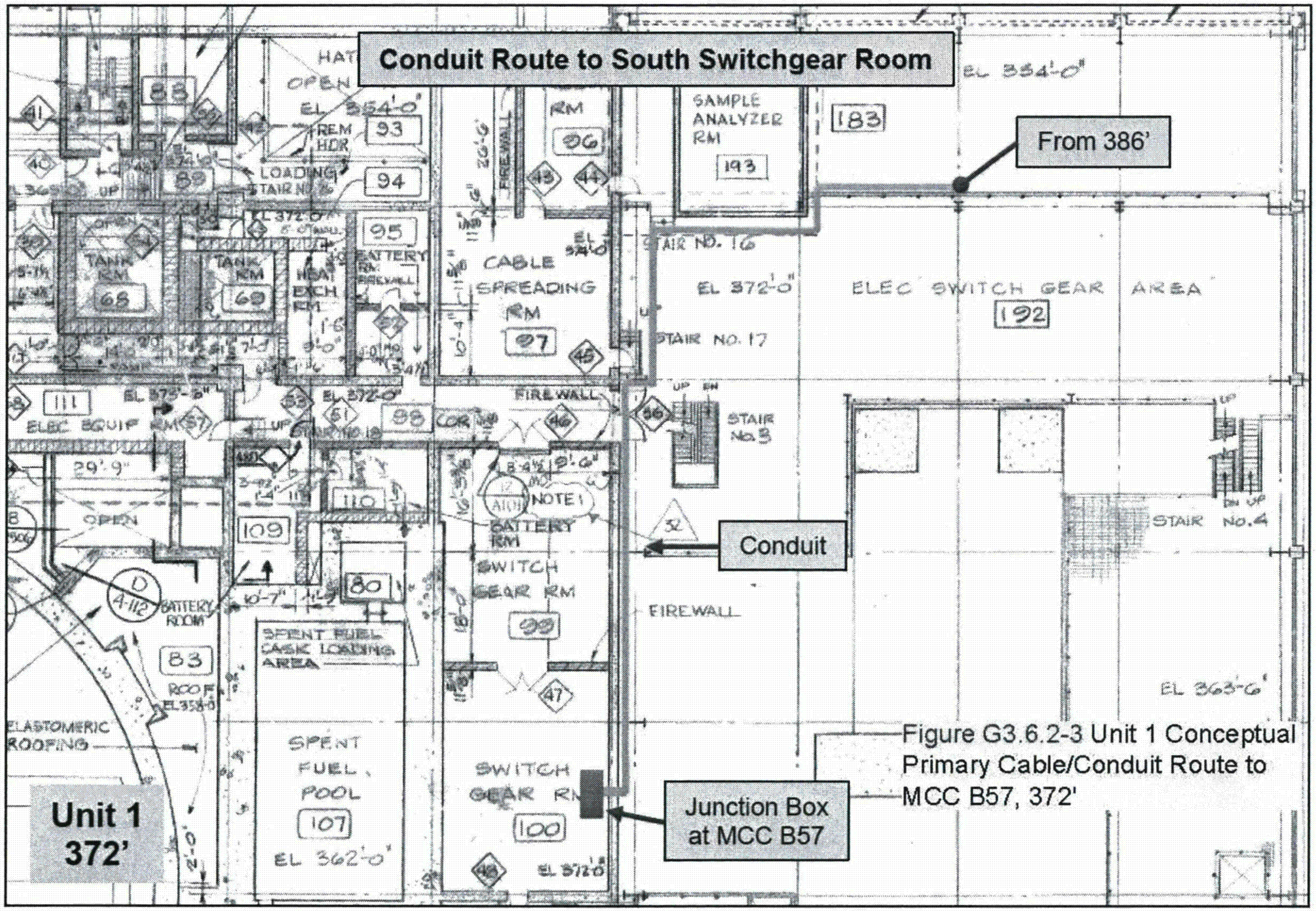


Figure G3.6.2-3 Unit 1 Conceptual Primary Cable/Conduit Route to MCC B57, 372'

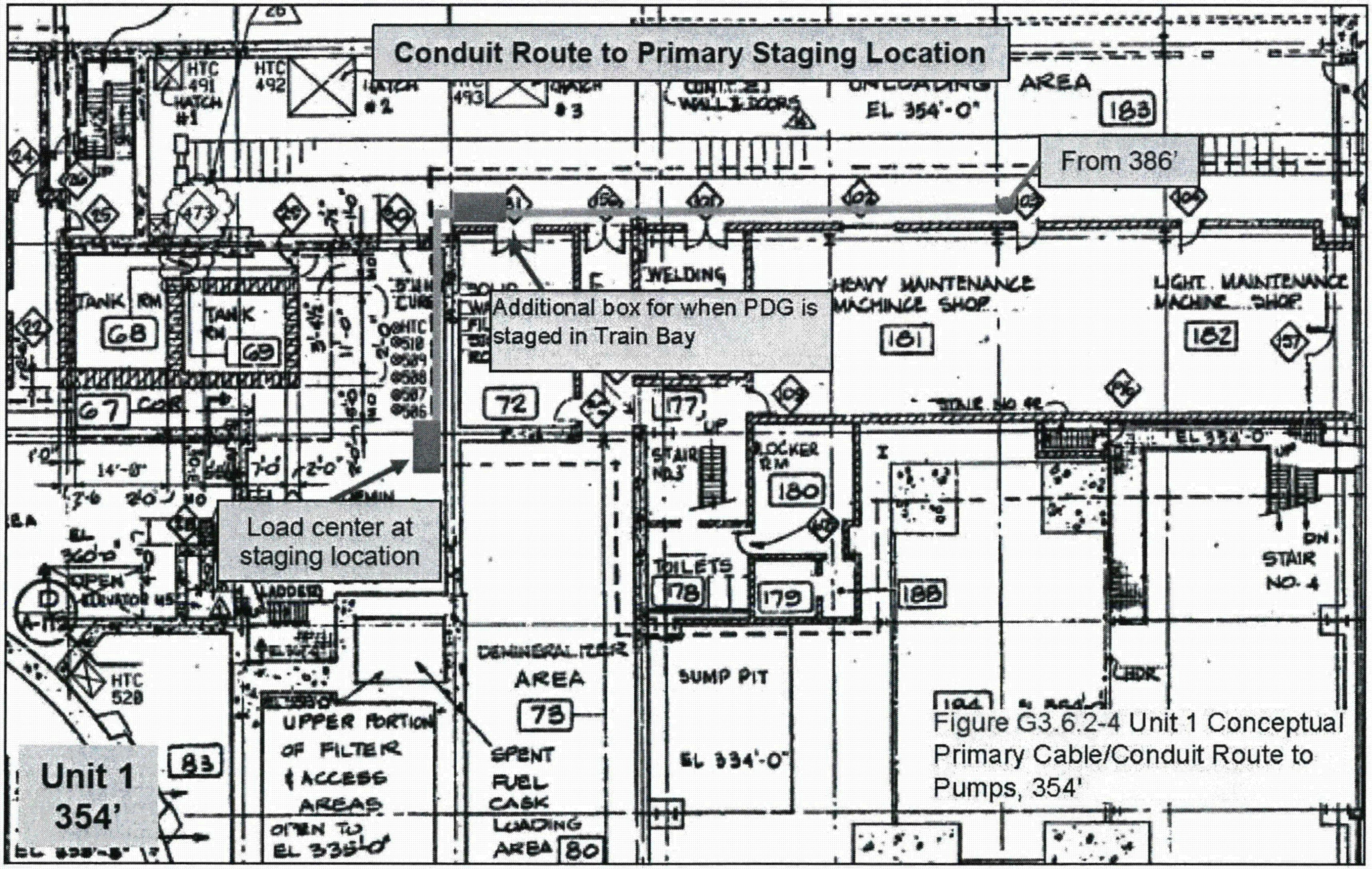


Figure G3.6.2-4 Unit 1 Conceptual Primary Cable/Conduit Route to Pumps, 354'

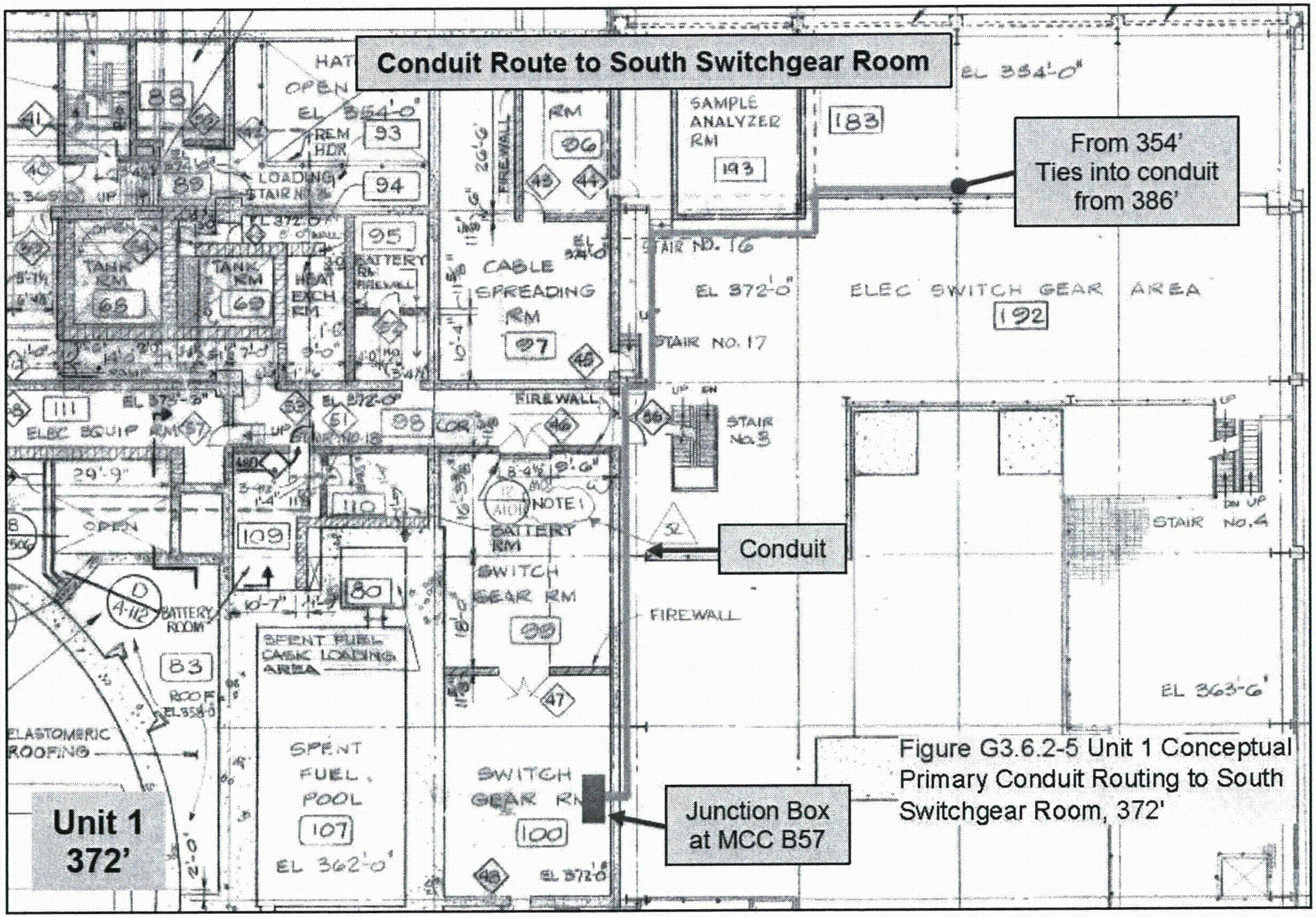
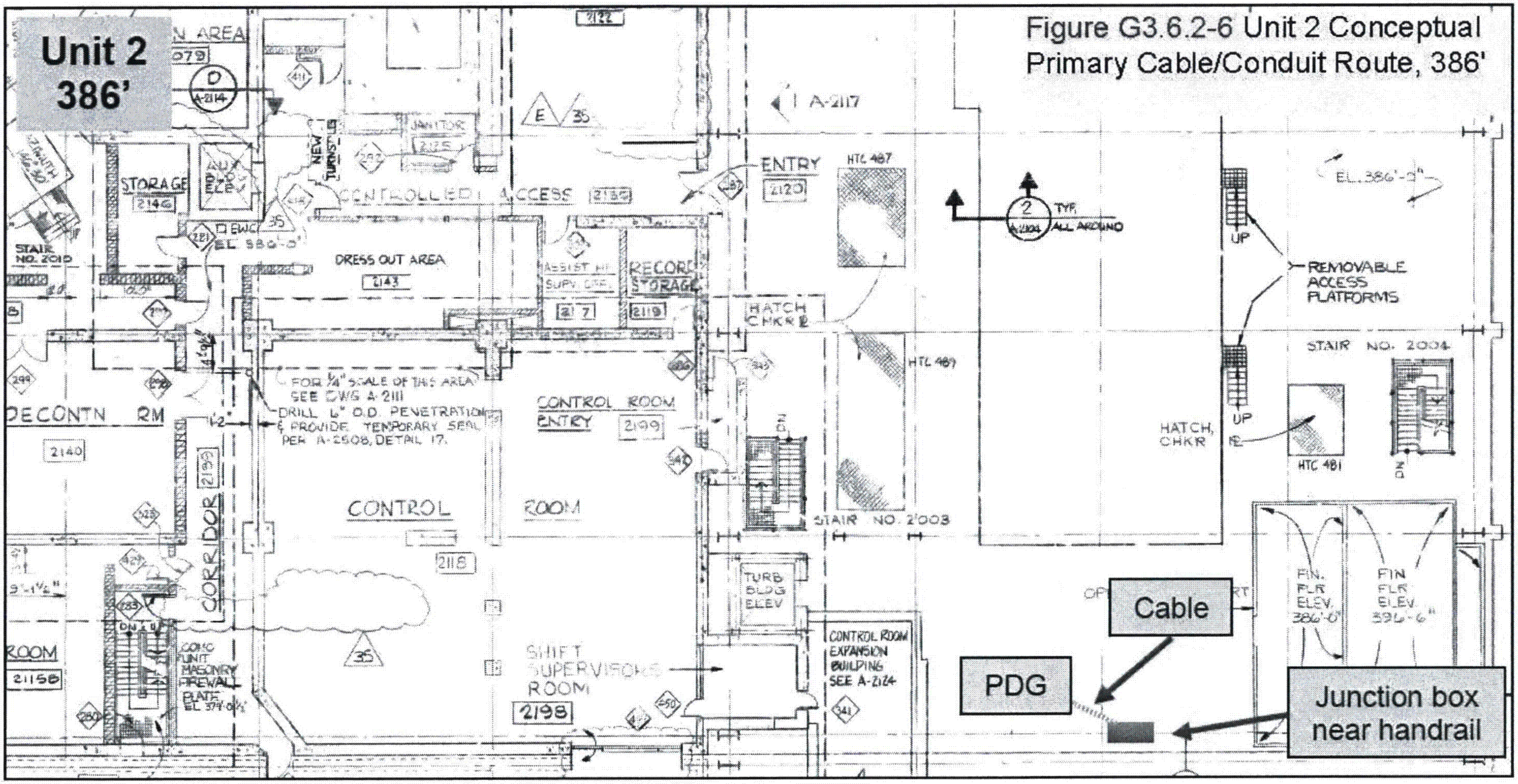


Figure G3.6.2-5 Unit 1 Conceptual Primary Conduit Routing to South Switchgear Room, 372'


Unit 2
386'
Figure G3.6.2-6 Unit 2 Conceptual Primary Cable/Conduit Route, 386'
Cable
PDG
Junction box near handrail
CONTROL ROOM
2118
SHIFT SUPERVISORS ROOM
2198
CONTROL ROOM ENTRY
2199
DRESS OUT AREA
2143
STORAGE
2146
DECONTN RM
2140
CORRIDOR
ENTRY
2120
STAIR NO. 2003
STAIR NO. 2004
REMOVABLE ACCESS PLATFORMS
HATCH CHKR
TURB BLDG ELEV
CONTROL ROOM EXPANSION BUILDING SEE A-2124
HTC 487
HTC 489
HTC 481

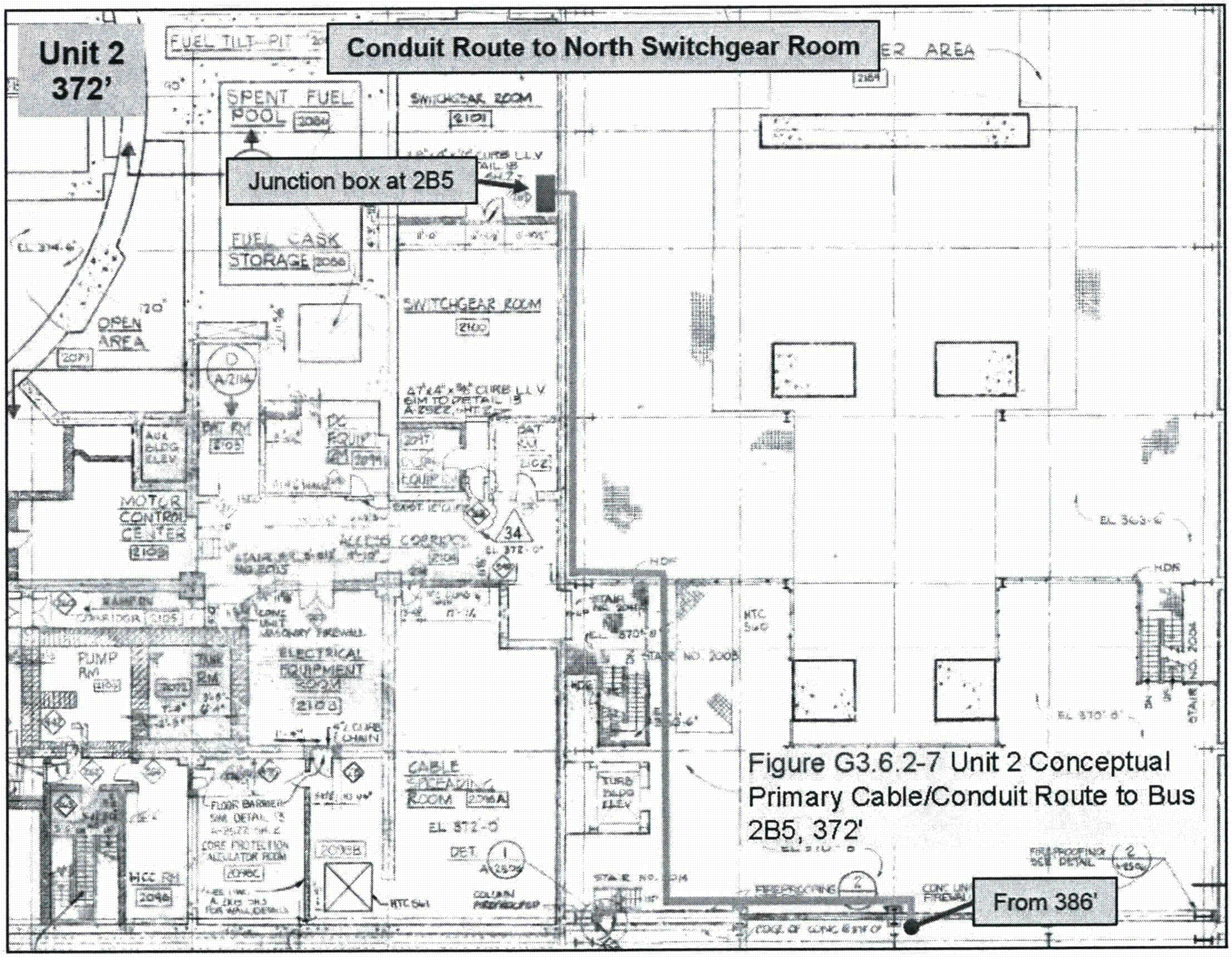


Figure G3.6.2-7 Unit 2 Conceptual Primary Cable/Conduit Route to Bus 2B5, 372'

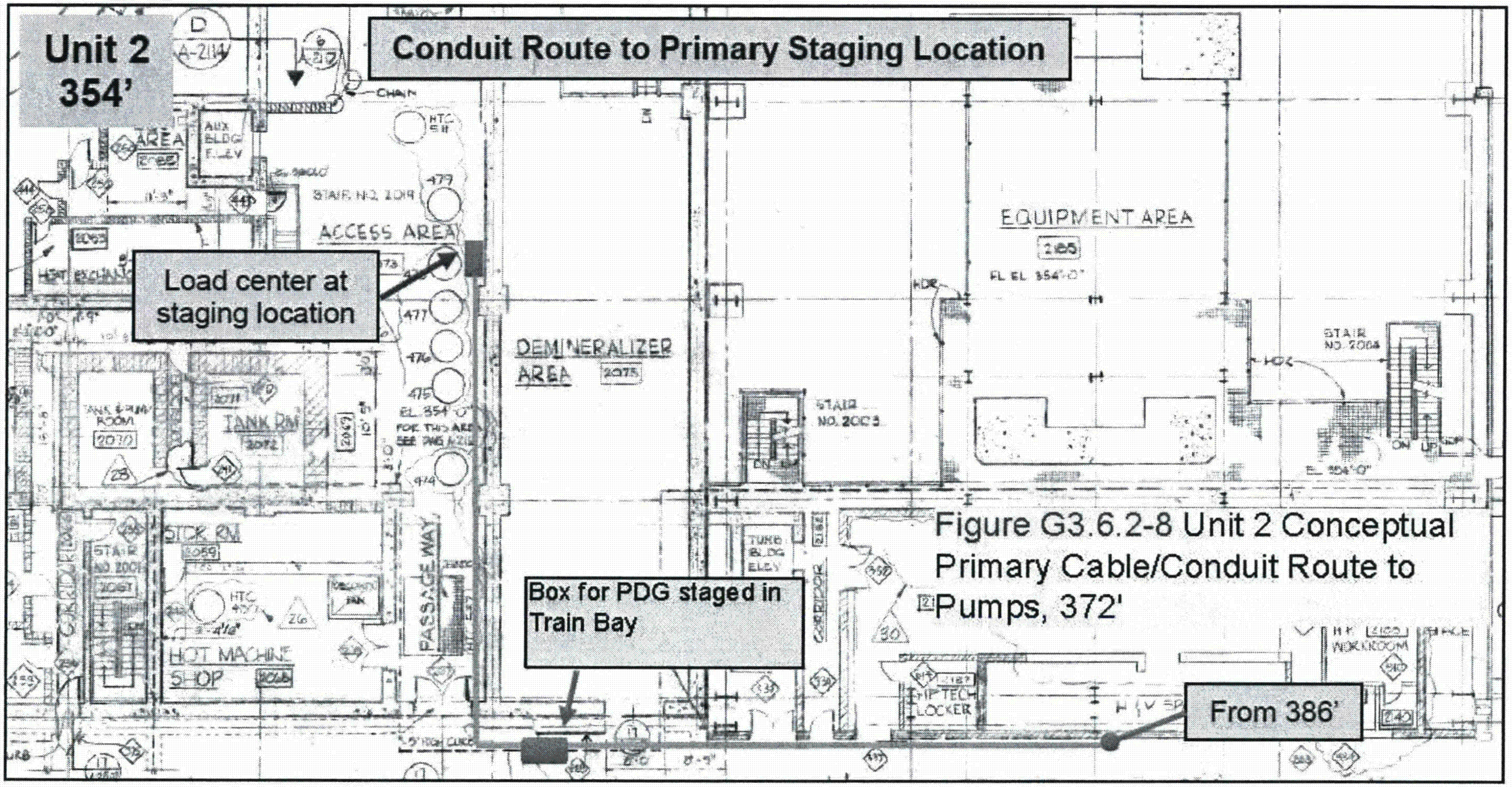


Figure G3.6.2-8 Unit 2 Conceptual Primary Cable/Conduit Route to Pumps, 372'

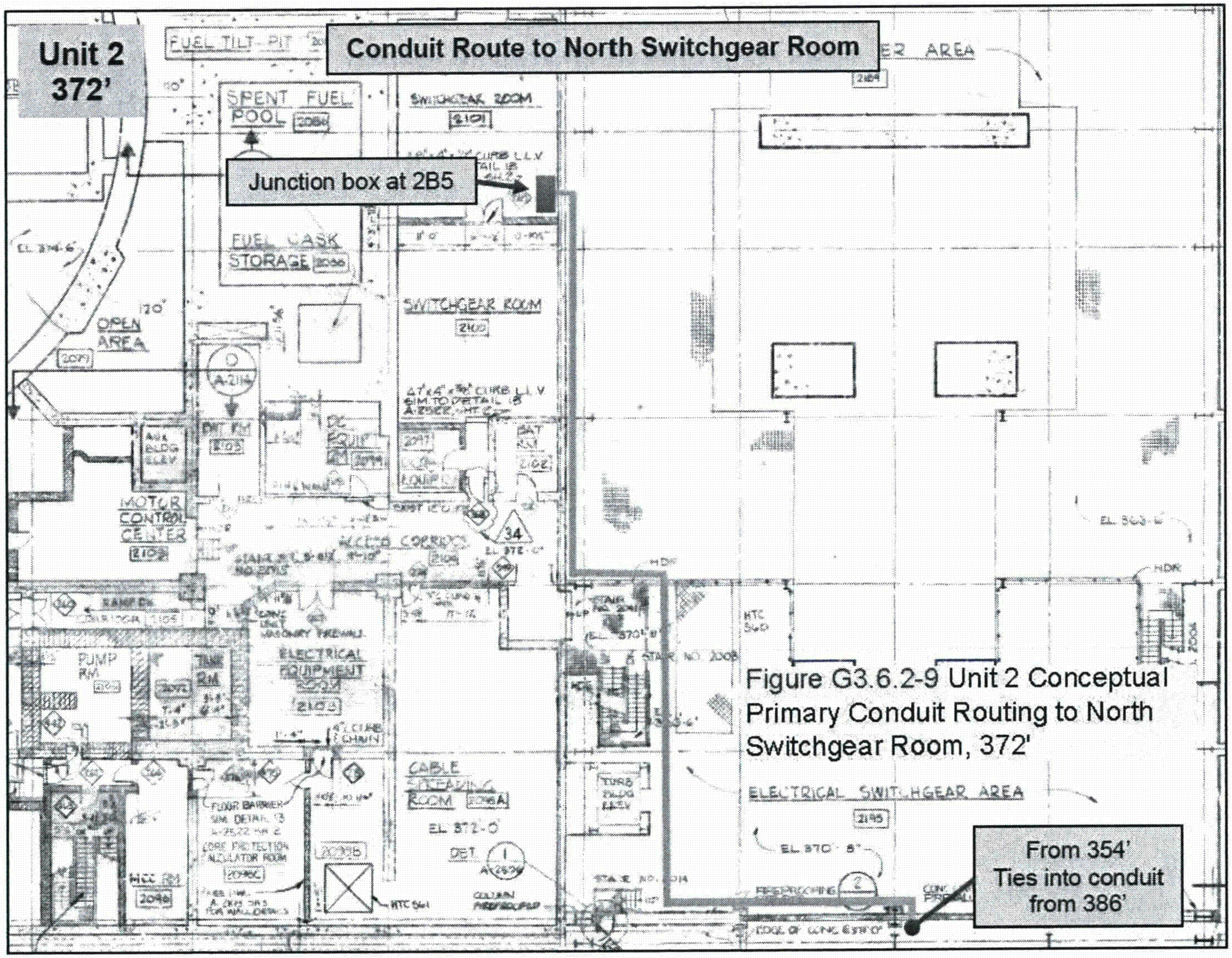


Figure G3.6.2-9 Unit 2 Conceptual Primary Conduit Routing to North Switchgear Room, 372'

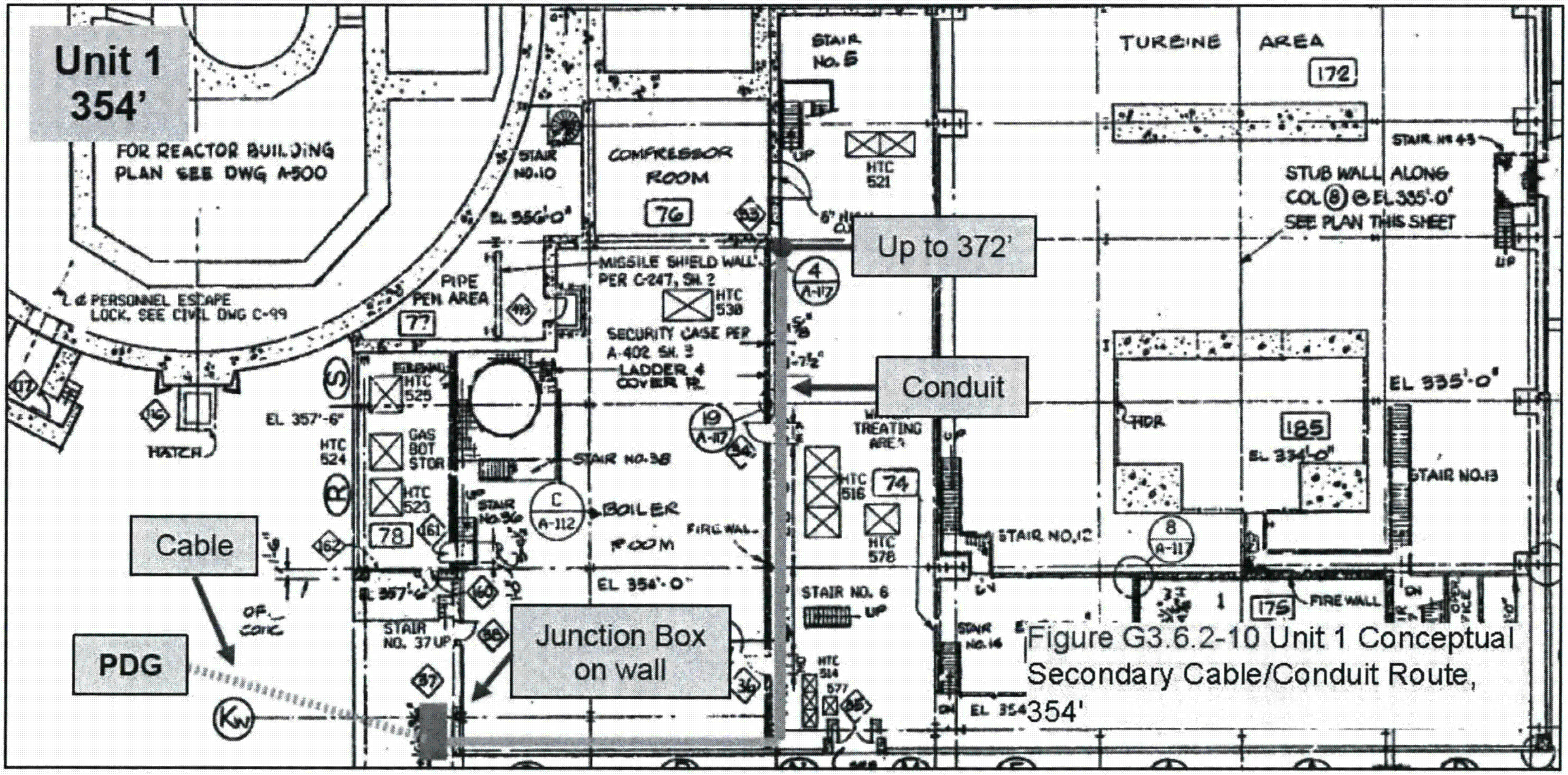


Figure G3.6.2-10 Unit 1 Conceptual Secondary Cable/Conduit Route, 354'

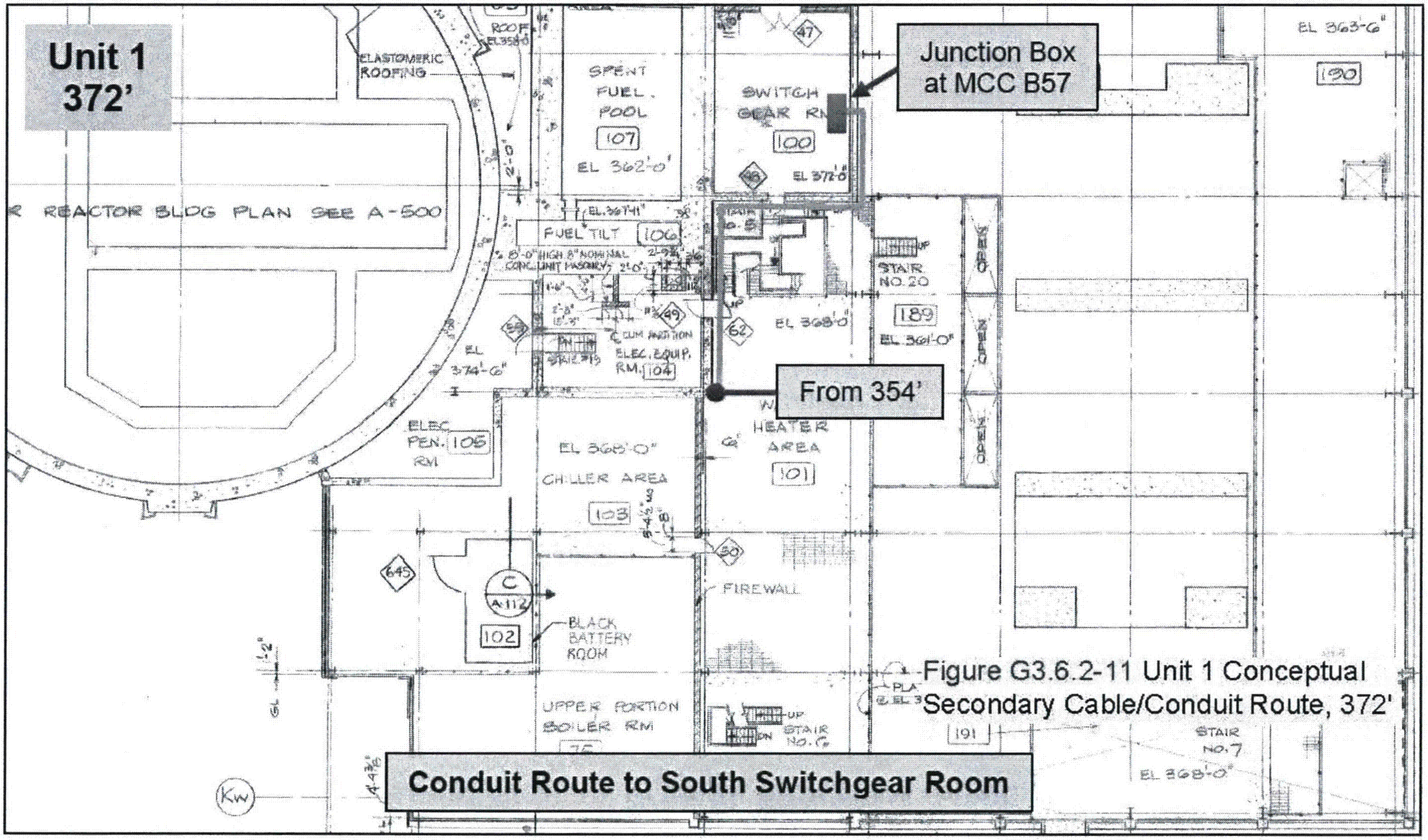


Figure G3.6.2-11 Unit 1 Conceptual Secondary Cable/Conduit Route, 372'

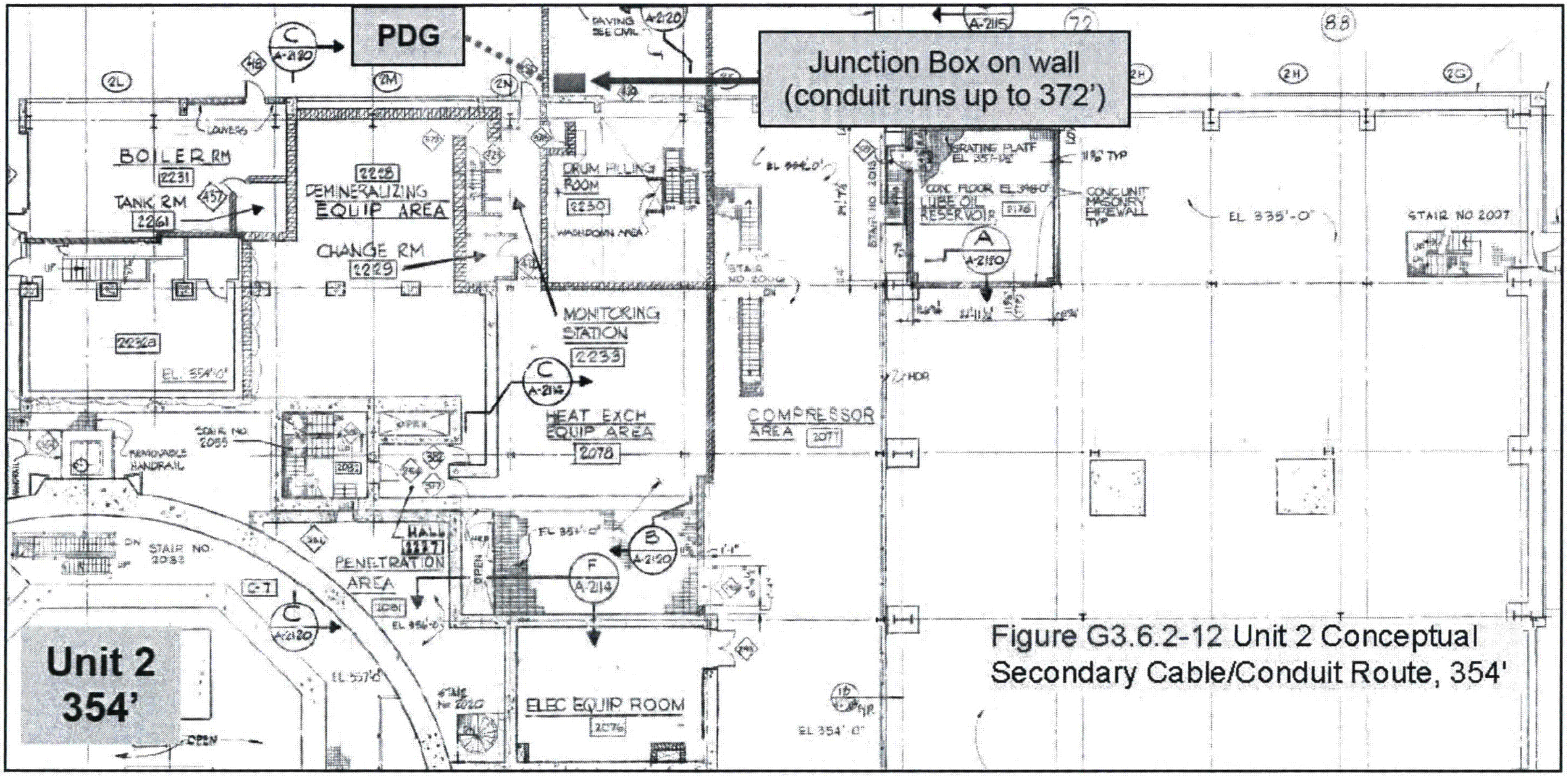


Figure G3.6.2-12 Unit 2 Conceptual Secondary Cable/Conduit Route, 354'

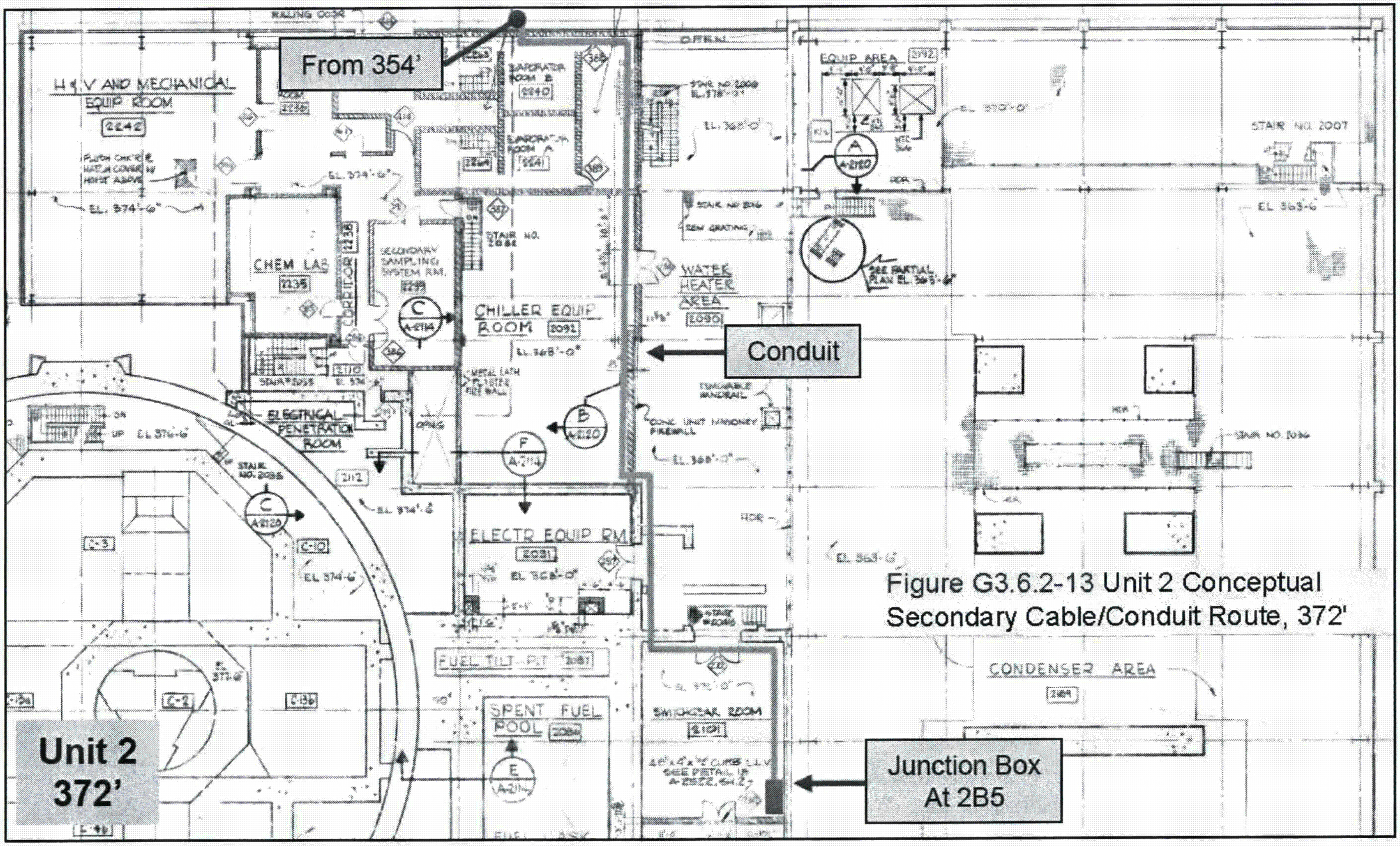


Figure G3.6.2-13 Unit 2 Conceptual Secondary Cable/Conduit Route, 372'

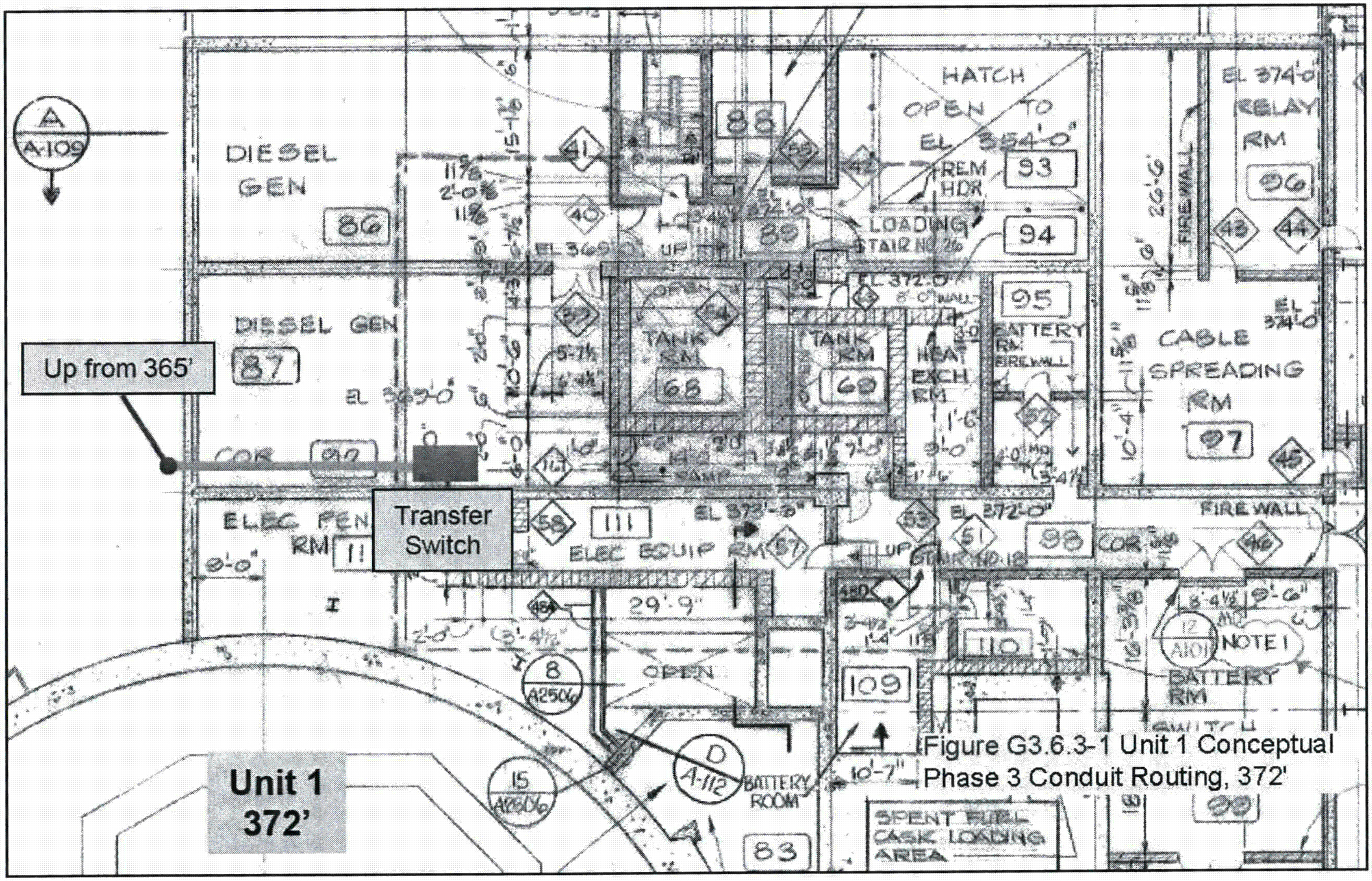


Figure G3.6.3-1 Unit 1 Conceptual Phase 3 Conduit Routing, 372'

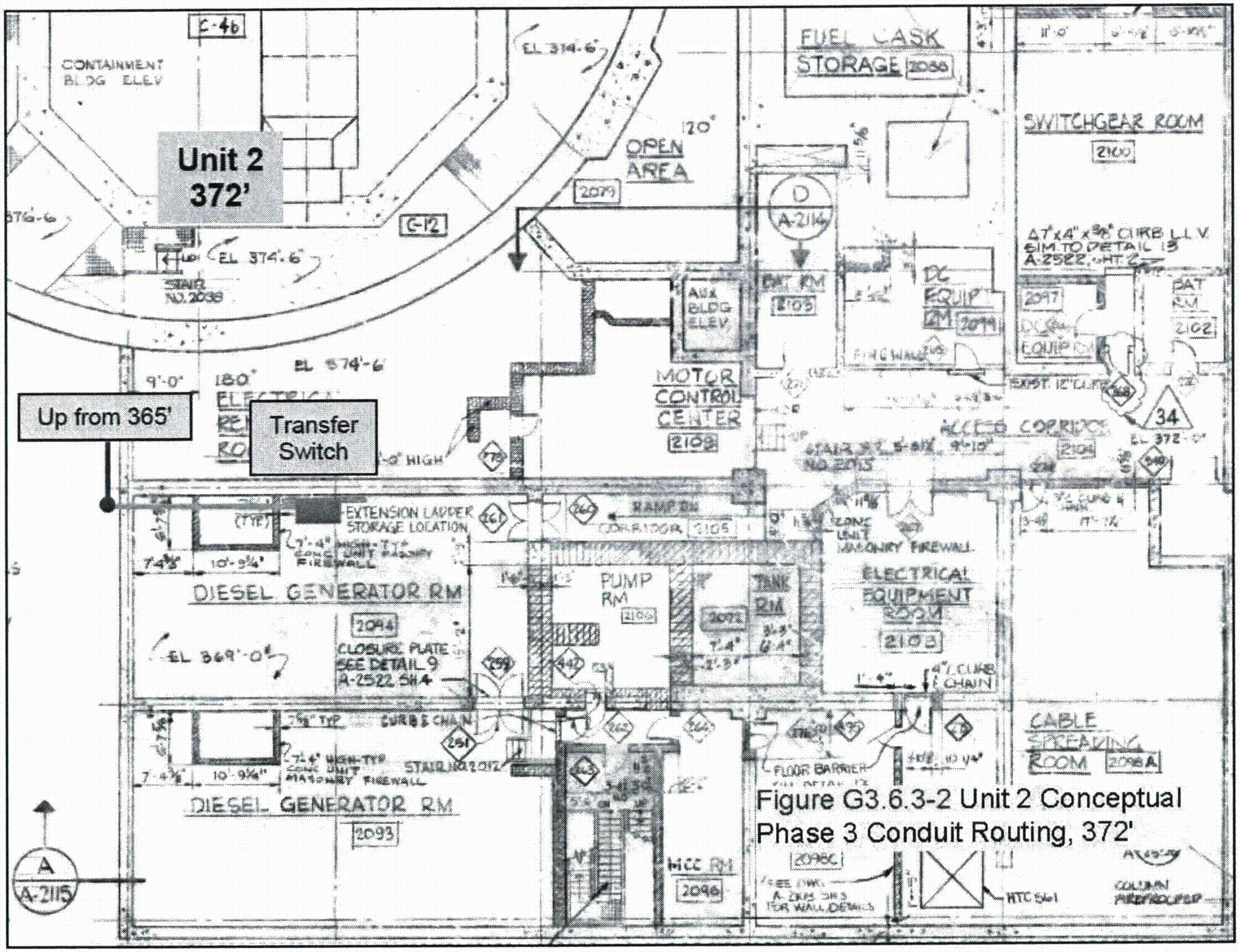


Figure G3.6.3-2 Unit 2 Conceptual Phase 3 Conduit Routing, 372'

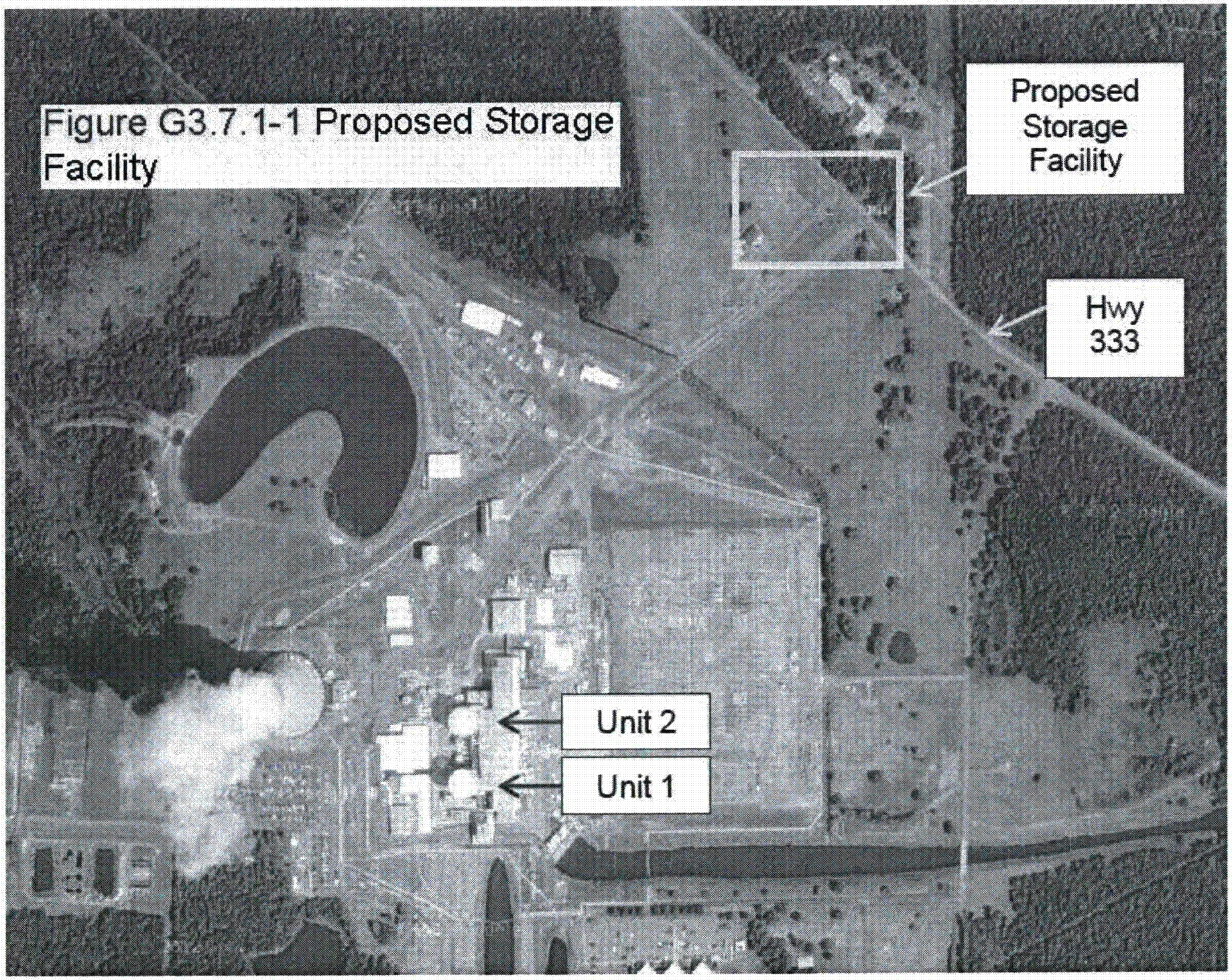


Figure G3.7.1-1 Proposed Storage Facility
Proposed Storage Facility
Hwy 333
Unit 2
Unit 1

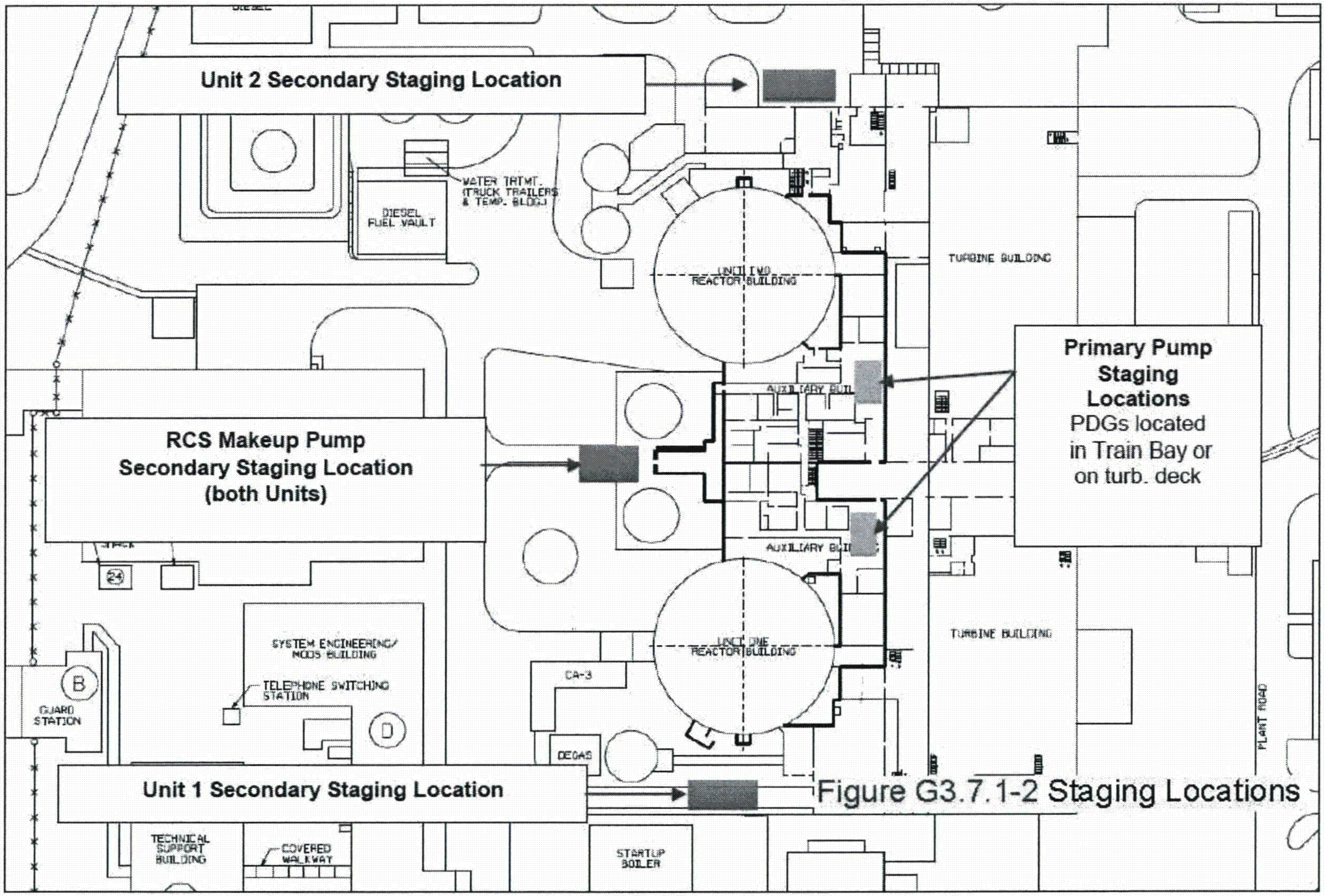


Figure G3.7.1-2 Staging Locations

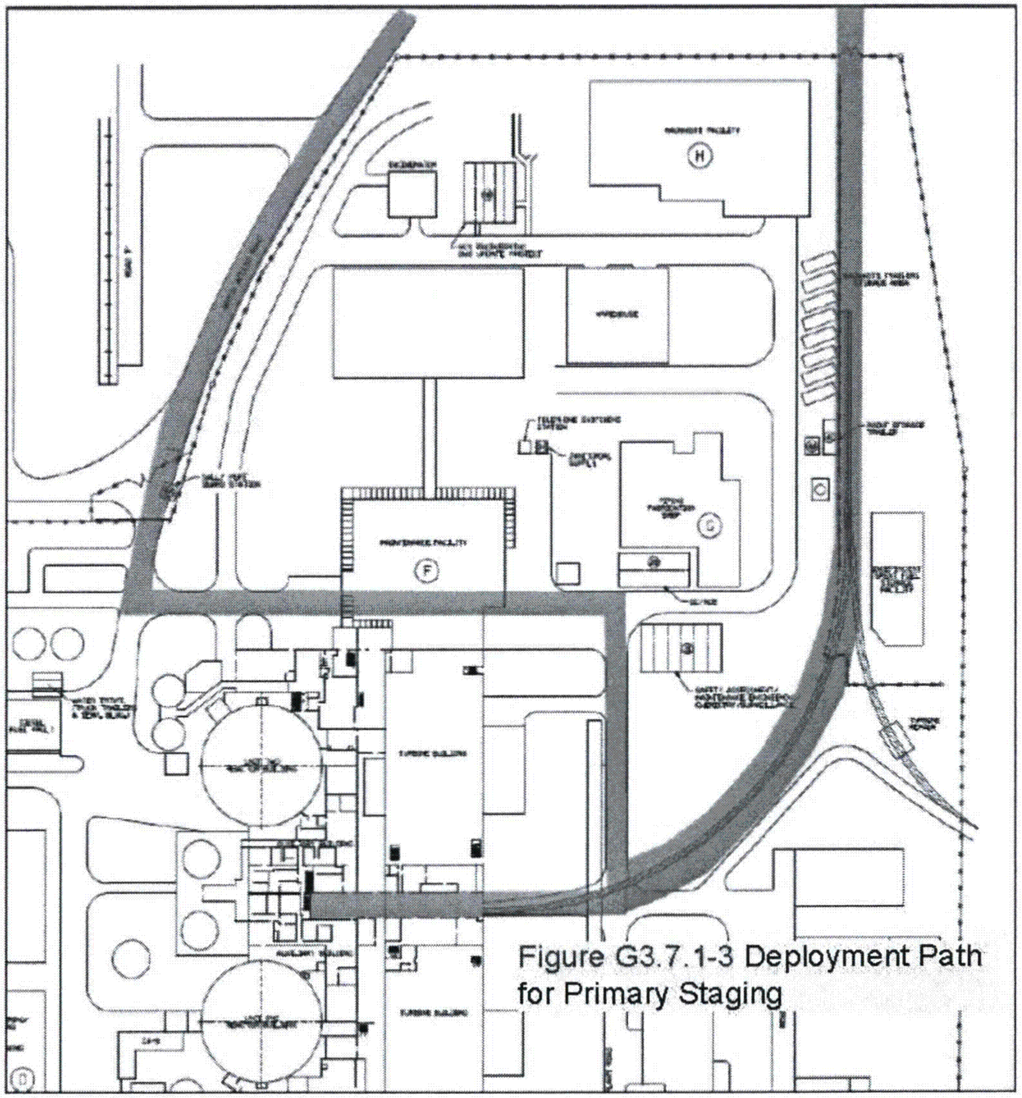


Figure G3.7.1-3 Deployment Path for Primary Staging

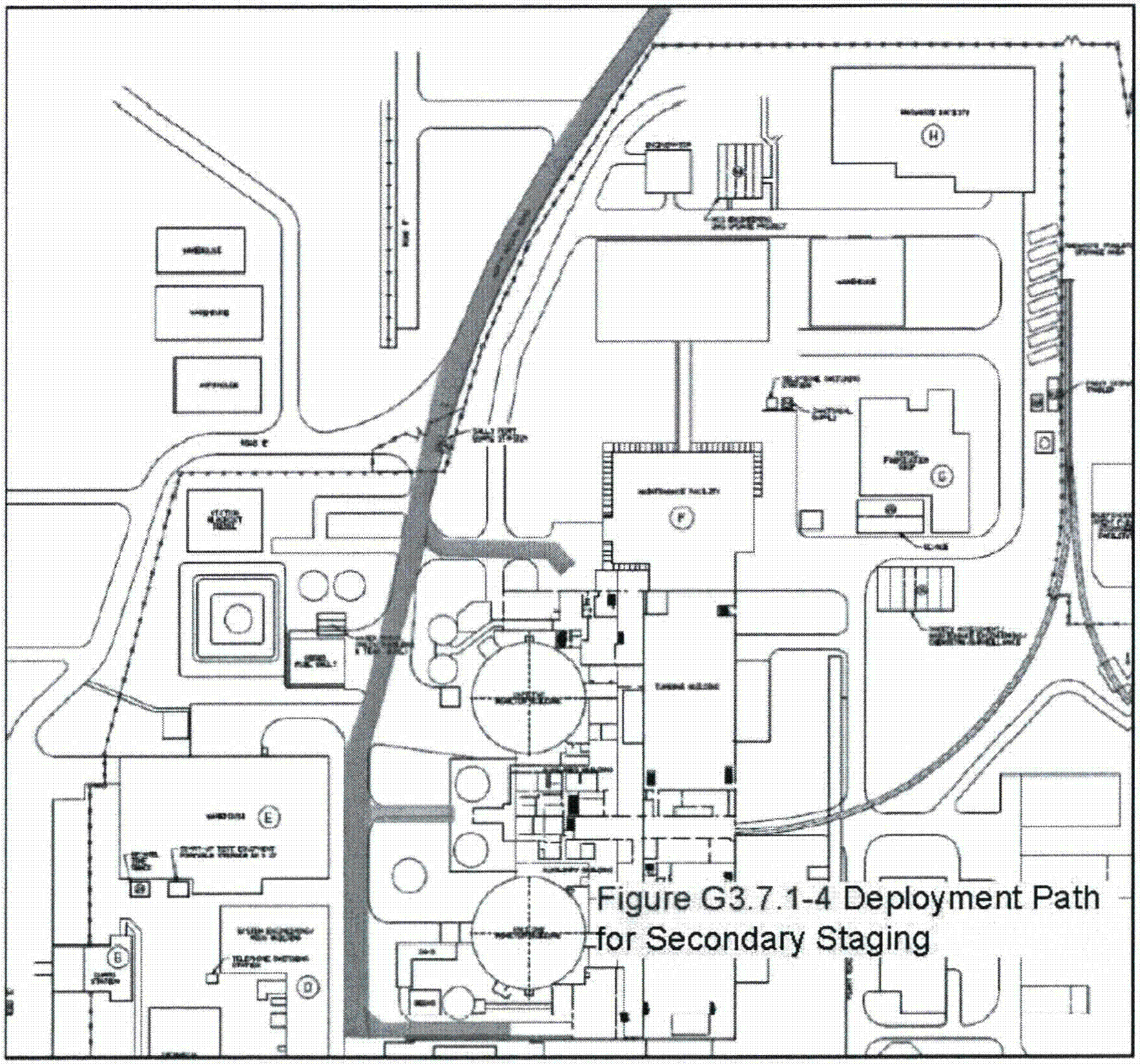


Figure G3.7.1-4 Deployment Path for Secondary Staging