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Minidoka Memorial Hospital Expansion

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MINIDOKA MEMORIAL HOSPITAL EXPANSION

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College of Engineering

Boise State University Senior Design Team



Intermountain Design

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MINIDOKA MEMORIAL HOSPITAL
EMERGENCY ENTRANCE

ABSTRACT

The Minidoka Memorial Hospital is the main hospital serving Minidoka County. Due to an increase in farming and traffic accidents, the emergency facilities are no longer adequate and require expansion.

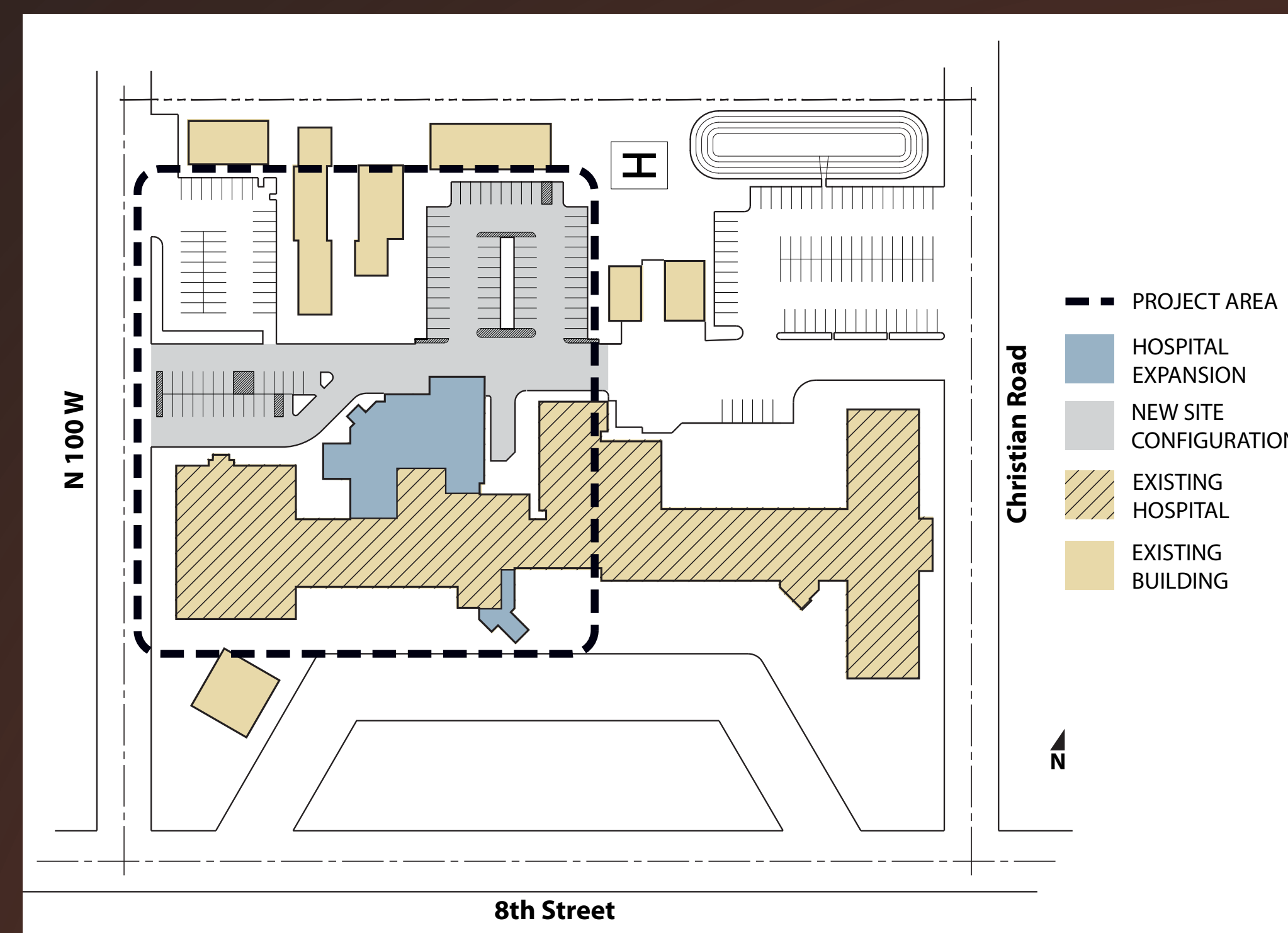


Minidoka Memorial Hospital

The scope of this project includes the emergency room expansion and a new south entrance to the hospital. The project includes the design and consideration of the following items:

- Code Compliance and Permitting
- Selection and Design of Gravity and Lateral Systems
- Selection and Design of Foundation System
- Stormwater Management
- New Parking Lot Configuration
- Site Contamination Containment
- Sustainable Site Design (LEED)

The scope of work is summarized in the site plan below.

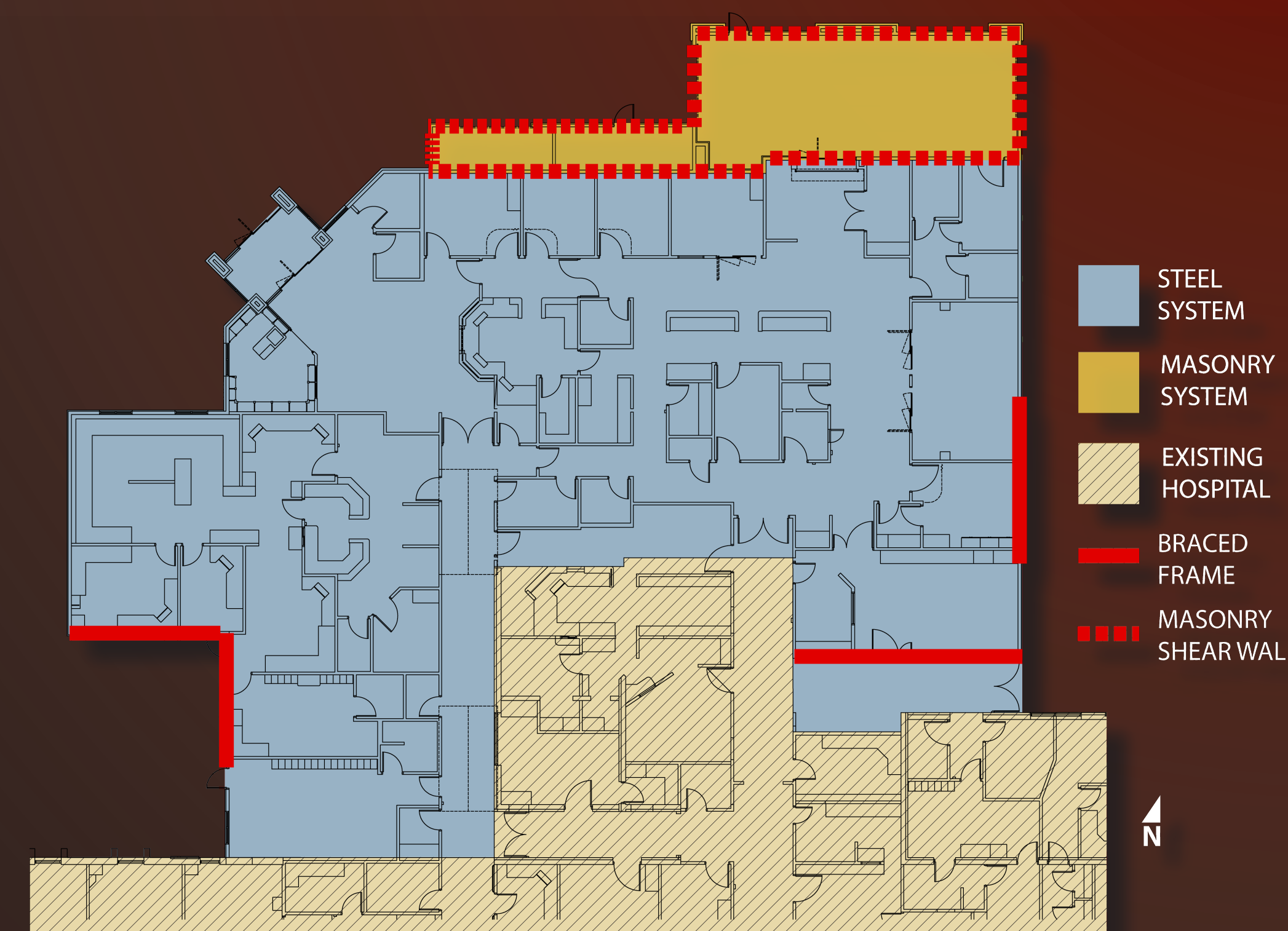


Minidoka Memorial Hospital - 1224 8th Street Rupert, Idaho

Site Plan showing project area, emergency room expansion, new south entry, and new site configuration

STRUCTURAL

The hospital expansion consists of two adjoining structural systems; a steel frame system for the emergency expansion and south entrance, and a masonry system for the ambulance bay and medical gas storage. Both systems share the same shallow foundation system, with concrete strip footings along the perimeter and isolated pad footings at interior columns.



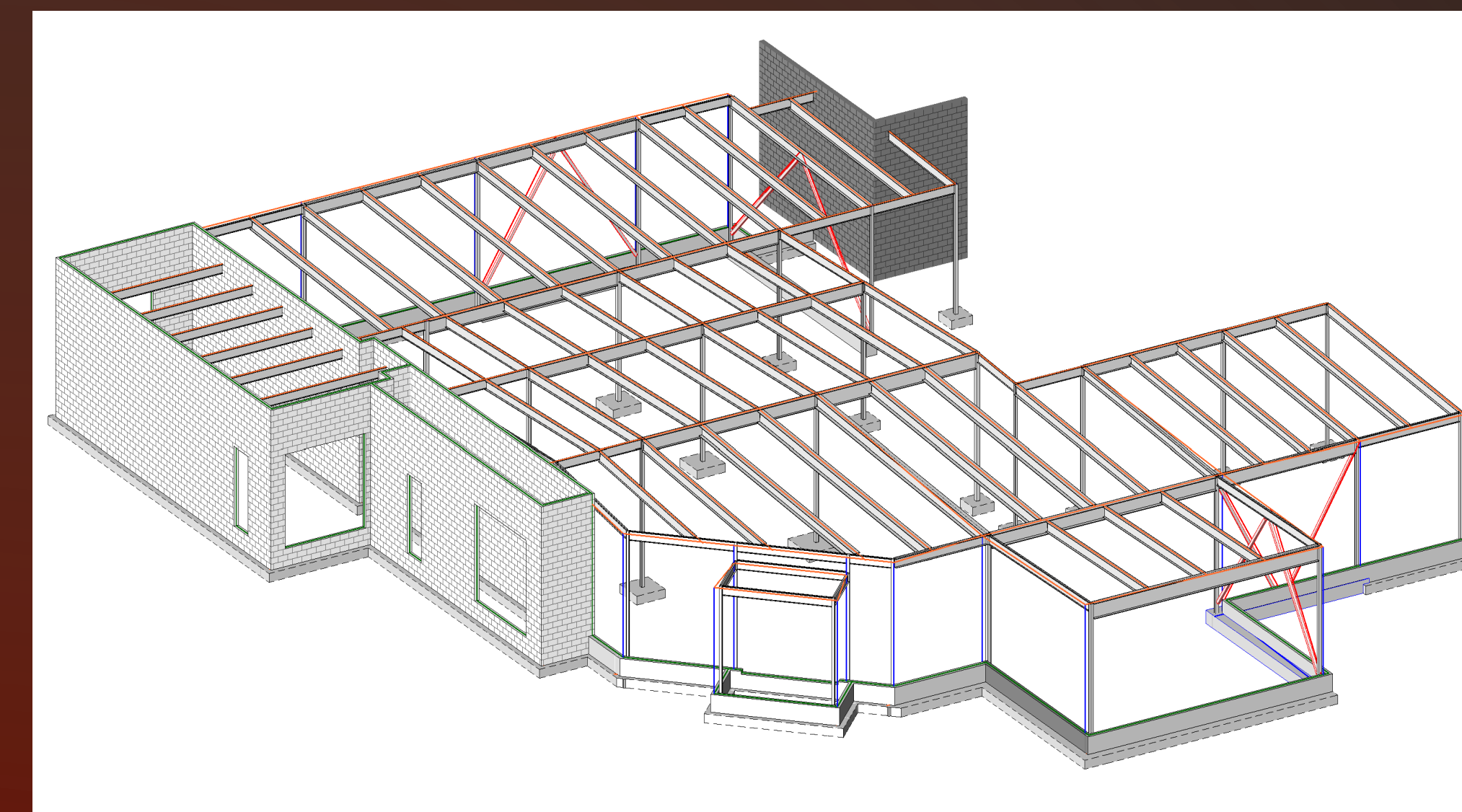
Schematic Structural Systems Plan

Steel & masonry systems for new ER layout and the location of lateral resisting elements.

The steel system consists of 1-1/2 inch, 20 gauge metal roof deck, wide flange beams and girders with HSS columns. The lateral system consists of four eccentrically braced steel frames.

The masonry system consists of 8-inch concrete masonry unit (CMU), load bearing, intermediately reinforced masonry shear walls.

Steel elements were designed in accordance with the 13th edition of the AISC Steel Construction Manual (ASD). Masonry elements were designed in accordance with the MSJC/ACI 530-02 (ASD). ASD design loads were derived using the ASCE 7-05. A Revit structural model is shown below.



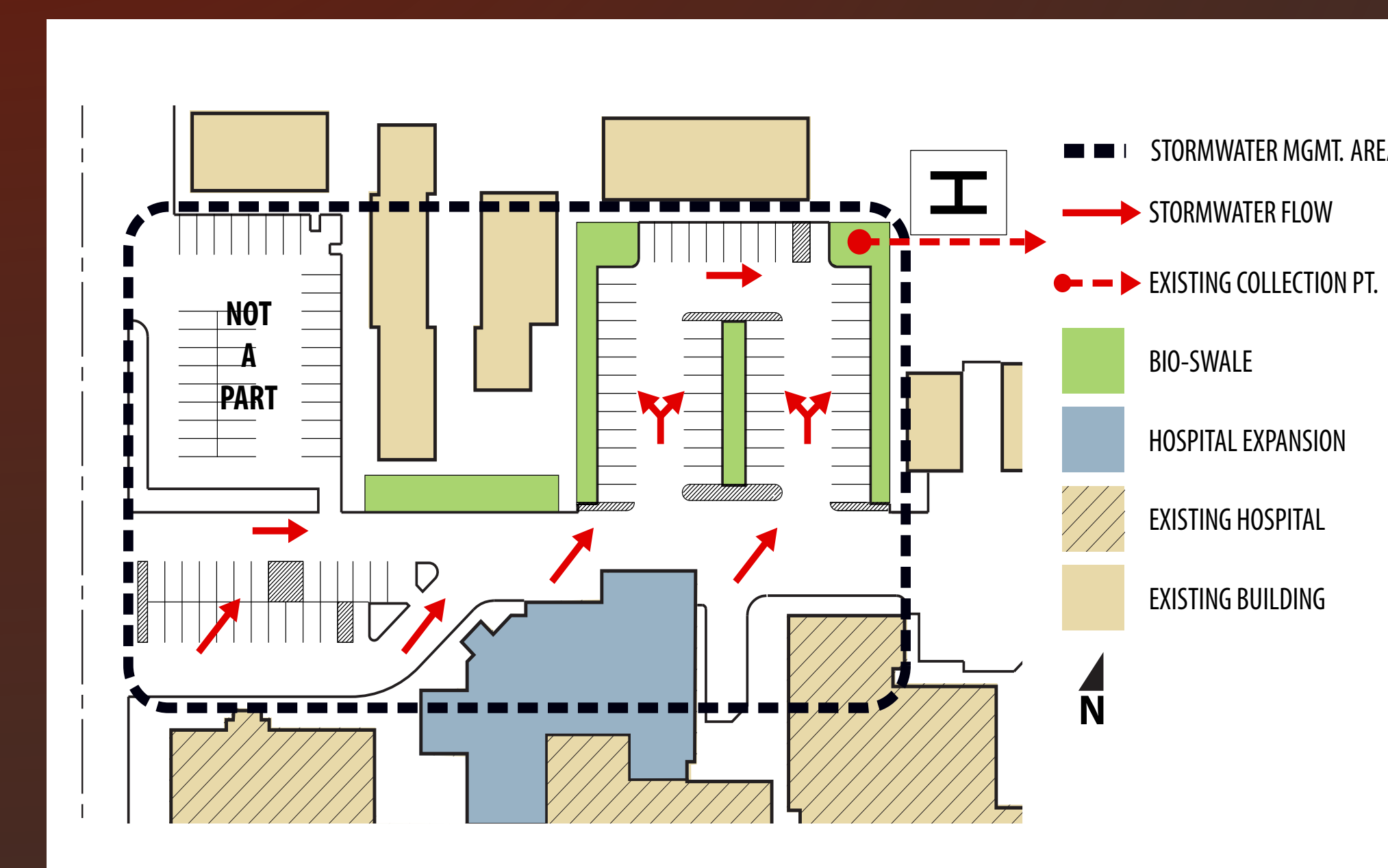
Structural Model

Assembled structural components including beams, girders, columns, foundations, masonry walls, and eccentrically braced steel frames.

TRANSPORTATION & SITE

The existing north and west parking areas were reconfigured to provide better traffic flow, particularly within the north lot. The new configuration reduced the drive aisles from three-to-two while still providing the same number of stalls. Both flexible and rigid pavements were designed to meet AASHTO minimums.

A storm water management plan was prepared and is summarized in the image below.



Stormwater Management

Flow from roof and pavement surfaces to bio-swales & existing collection point.

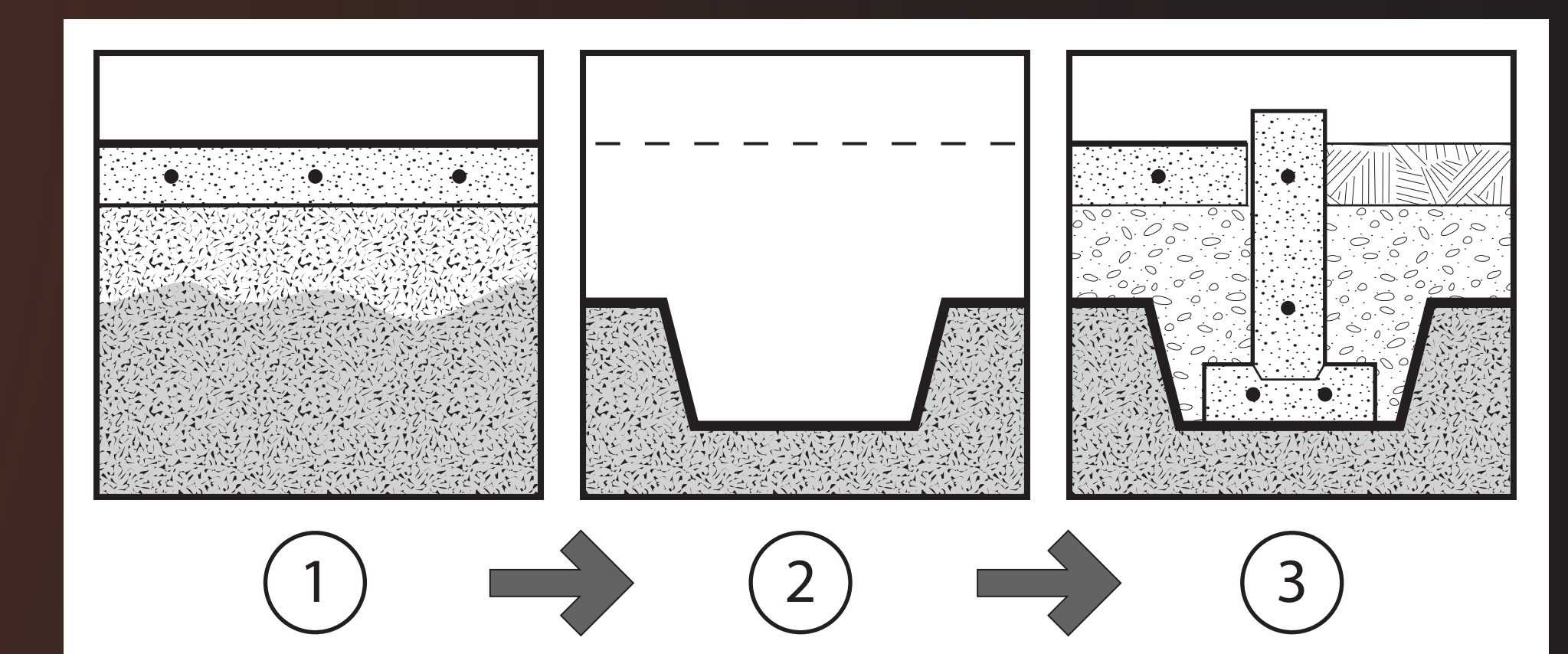
The influence of the hospital expansion and site layout did not compromise the existing 35,000 ft³ retention basin (northeast corner of site). The addition of the new bio-swales decreased the surface runoff volume by 2%. The collection point shown will serve as an overflow to the retention basin.

ENVIRONMENTAL

Minidoka County is listed 9th out of 25 on the National Priority List, also known as the Superfund list. This classification is based in part on high nitrate/ ammonia levels in the groundwater as well as other contaminants. Specific to the hospital site is the possibility of high concentrations of lead compounds in the soil. Currently, lead compounds exceed 400 ppm in open-soil conditions in some areas of the county. For this reason, a plan was drafted to handle contaminated soil conditions during demolition and construction.



The decontamination plan uses an excavation-fill method where the soil excavated for the foundations is collected per EPA standards and treated off-site. An estimated 130 yds³ of soil will need to be removed and treated. The exposed ground is then sealed with an EPA approved sealant before constructing the foundations. This sealant will also be used during the demolition and construction phases to minimize airborne exposure. A compacted coal and bottom ash fill was selected as a suitable soil replacement for its bearing capacity and improved drainage.



Soil Contamination Plan

Frame 1 - Suspected contamination under project site is exposed after demolition.

Frame 2 - Excavated section / sealant shown.

Frame 3 - Foundation work w/ coal and bottom ash back fill.

LEED

Intermountain Design is the civil/structural consultant for this project, and a part of a larger design team that includes the owner (MMH), architect and contractor. After a brief investigation and discussion of sustainable building practices, the design team has agreed to pursue certification for this project under the USGBC's Energy and Environmental Design (LEED) program.



The rating system chosen to track and verify sustainable strategies was LEED for Healthcare. The design team is seeking a LEED 'Certification' level, requiring a minimum of 40 credits. Of these 40 credits, Intermountain Design is responsible for 5 credits under the sustainable sites category, particularly in regards to storm water and the hospital as a brownfield development.