

East Palo Alto Library

To:	Gregory Fisher	Project:	19200.10
Company:	wHY Architecture	Revision:	-
From:	Nina Mahjoub		
Date:	May 28 th , 2019		
Subject:	RE: Conceptual Structural Narrative		

The following narrative is a brief description of the structural systems as discussed with wHY Architecture following our meeting on 05/21/2019. Note that no numerical analysis was done to date and this should be used primarily to determine a very rough order of magnitude cost estimate.

1 GENERAL DESCRIPTION

The East Palo Alto Library project will include a new +/- 25,000 square feet building public library for the City of East Palo Alto. The new Library building will consist of a two-story structure with offices and community spaces on the ground floor and additional library space, stacks, and exterior decks on the upper floor. A grand, open stair will be located towards the center of the building with a skylight above providing natural light to the building.

2 STRUCTURAL SYSTEMS

2.1 Foundation

No geotechnical report was available for review, but based on discussions with wHY Architecture, we anticipate the foundation system will most likely consist of a mat foundation. We recommend allowing for 18" to 24" deep mat foundation.

2.2 Lateral Force-Resisting Systems

The lateral force-resisting system (LRFS) will consist of steel moment resisting frames (MRF) given the preference to maximize space planning flexibility. Refer to section 3 for quantity estimates.

2.3 Gravity System

2.3.1 Option 1: CLT Floor with Steel Beams & Steel Columns

The gravity system for Option 1 will consist of a cross laminated timber (CLT) floor and roof with steel support beams and steel columns.

- At Level 2, allow for 5-Ply CLT Panels with 3 inches of lightweight concrete topping slab typical. Areas of deck with heavier loads (i.e. planting) may require additional structural support.

- At the roof, allow for 3-Ply CLT Panels (max. cantilever overhand 6 to 7 ft depending on back span dimension). ALTERNATE: Allow for 2” of concrete topping to allow for heavier superimposed dead loads at roof.
- Refer to section 3 for quantity estimates for the gravity steel beams and columns
- Allow for additional beams between main grid beams.

2.3.2 Option 2: Concrete over Metal Deck with Steel Beams & Columns

The gravity system for Option 2 will consist of a steel frame system with a composite concrete over metal deck floor and a metal deck roof.

- At Level 2, allow for 5” total composite slab thickness (3-inch metal deck with 2 inches of concrete over deck). See Section 3 for material and quantities estimate.
- At the roof, allow for 3-inch metal deck with no concrete topping typical (this does not include allowance for PV/Solar Panels support). ALTERNATE: Allow for 2” of concrete topping to allow for heavier superimposed dead loads at roof.
- Refer to section 3 for quantity estimates for the gravity steel beams and columns.
- Allow for additional beams between main grid beams.

2.4 Miscellaneous

Suitable allowances should be made for the following items:

- New elevator: we recommend allowing for 10PSF per floor (over the footprint of the elevator only) for guiderails, supporting steel work, machine supports, hoist beam and some allowance for an elevator pit and sump pit if required.
- Stairs and secondary steelwork supporting stairs and associated slab openings
- Cladding/glazing and corresponding connections to the structure
- Bracing and anchorage of nonstructural components, including partitions, ceilings, solar panels, and MEP equipment
- Cleaning davits, tie backs, and support structures for building maintenance units, if any (S.A.D.)
- Rooftop enclosures and screens for mechanical units if needed

3 MATERIAL & QUANTITIES ESTIMATES

3.1 Concrete

Element	Properties	Concrete Strength (psi)	Estimated Reinforcement ¹
Mat Foundation	18-24” thick	4000	150 lb/yd ³



Element	Properties	Concrete Strength (psi)	Estimated Reinforcement ¹
Concrete over metal deck (with option 2)	2" concrete over Verco W3 Formlok (total of 5")	4000	2 lb/yd ³

¹Reinforcing Steel to be ASTM A615 Grade 60

3.2 Steel Frame

Allow for structural column grids of 20ft to 30ft o.c. each way. Total of approximately +/- 25-30 columns per floor.

Element	Estimated Steel Sizes ¹	Additional Comments
Moment Frame Steel Columns	Allow for 100 to 115 lb/ft ²	Allow for 60-70% of columns to be moment frame columns.
Moment Frame Steel Beams	Allow for 70 to 90 lb/ft ²	
Gravity Steel Columns	Allow for 30 to 50 lb/ft ²	Balance of columns that are not moment frame columns should be gravity columns.
Gravity Steel Beams	Allow for 40 to 70 lb/ft ²	

¹Steel to be ASTM A992 Grade 50