HOTEL PROJECT SONOMA

KENWOOD INVESTMENTS, LLC

BASIS OF DESIGN REPORT

Prepared for :
Kenwwod Investments, LLC
144 W Napa St, Sonoma, CA 95476-6614

May 2015

ARCHITECTURE
RossDrulisCusenbery

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ACKNOWLEDGMENTS

The Basis of Design Report was prepared by **RossDrulisCusenbery** Architecture, Inc. in collaboration with Kenwood Investments, LLC with input and assistance from the team members listed below.

Developer
Kenwood Investments LLC, Sonoma, CA

Architect
RossDrulisCusenbery Architecture, Inc. Sonoma, CA

Design Collaborator
Keith Wicks, Artist, Sonoma, CA

Civil Engineer
Huffman Engineering & Surveying, Santa Rosa, CA

Structural Engineer
Walter P. Moore and Associates, San Francisco, CA

Mechanical/Plumbing Engineer
15000 Inc., Santa Rosa, CA

Electrical Engineer
Silverman & Light Inc., Emeryville, CA

Building Enclosure Engineer
Simpson Gumpertz & Heger Inc., San Francisco, CA

Parking Consultants
AMPCO System Parking, San Francisco, CA

Water Conservation Consultants
J Crowley Group, Sacramento, CA

Geotechnical Engineer
PJC and Associates, Inc., Rohnert Park, CA

Preconstruction Services
Midstate Construction Corporation, Petaluma, CA

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EXECUTIVE SUMMARY

Hotel Project Sonoma Basis of Design Report
The Hotel Project Sonoma Basis of Design Report (BDR) updates, supplements and refines the Use Permit Application Drawings and Project Narrative previously submitted for environmental and planning review to the City of Sonoma in July of 2014. The BDR provides the following information.

Responds to City of Sonoma Requests for Information
The BDR responds in written and graphic format to the City of Sonoma's February 8, 2015 request for *Reports, Studies and Other Information to be Provided by Applicant,* submitted to Kenwood Investments LLC.

Provides Detailed Project Data in Support of the EIR
The BDR provides detailed information and design criteria in support of preparation of the Draft Environmental Impact Report (EIR) and for the City of Sonoma's project review process.

Defines Schematic Level Architectural, Structural, Civil, Mechanical & Electrical Engineering and Other Requirements
The BDR provides and coordinates architecture, engineering and technical information necessary for the design of the project and required for the EIR including, but not limited to:

- Site plan with the property boundaries and topography
- Public utility requirements and point of entry locations
- On and off site public utility requirements
- Identification of existing public utility features requiring modification or relocation
- Preliminary grading plan
- Sanitary sewer system requirements
- Domestic and fire water system requirements
- Storm water management and site drainage plan
- Rainwater catchment system
- Geotechnical Report
- Coordination of architectural plans and elevations with engineering requirements
- Building envelop waterproofing systems
- Basement garage plan designed to prevent floating and leaking
- Schematic basement garage and hotel structural system plans
- Schematic civil, mechanical, electrical and plumbing system plans
- Identification of all major equipment, quantity, size and noise when in operation
- Coordination of building structure with the building system infrastructure requirements
- Construction management plan

Update and Supplements the Schematic Design Drawing Set
Section 11 of this report provides updated schematic level architecture and engineering design drawings.

Confirmation of Project Constructability
In addition to providing the City of Sonoma information specific to the environmental and planning review process, the BDR indicates the project is constructible and identifies and "solves" many key engineering issues regarding the project. In so doing, the BDR becomes the benchmark for the design of the project and forms a quantifiable resource for construction cost estimation. Upon approval of the project, the A/E team can immediately begin the construction document process based on the approved BDR design criteria.

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INTRODUCTION

Hotel Project Sonoma Basis of Design Report
The Hotel Project Sonoma Basis of Design Report (BDR) updates, supplements and refines the Use Permit Application Drawings and Project Narrative previously submitted for environmental and planning review to the City of Sonoma in July of 2014. The BDR responds to the City of Sonoma's, February 8, 2015 request for *Reports, Studies and Other Information*, submitted to the project applicant, Kenwood Investments LLC. The BDR also provides other detailed information in support of the Draft Environmental Impact Report (EIR) and the City of Sonoma's project review process.

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- Identification of existing public utility features requiring modification or relocation
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- Domestic and fire water system requirements
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City of Sonoma's Request for Reports, Studies and Other Information
The following summary table lists the City's requested information and provides a specific response reference within the BDR document.

Table 1: City of Sonoma Request for Information

Reports/Studies/Other Information to be Provided by Applicant	Applicant Response
1. Storm water Management Plan: Showing compliance with any City Standard Urban Storm water Management Plan (NPDES MS4 Permit) requirements, including water catchment and reuse system, if proposed. ***Response Summary:*** *See Storm Water Management Plan section of Design Basis. Calculations provided for volume capture requirements. Sheet CSK1 shows detention and treatment facilities.*	**Refer to Section 05** Response prepared by Huffman Engineering.

Reports/Studies/Other Information to be Provided by Applicant	Applicant Response
2. Preliminary Grading and Drainage Plan: Prepared by a registered civil engineer. ***Response Summary:*** *See Grading Plan section of Design Basin for discussion of drainage patterns and finished floors.*	**Refer to Section 05** Response prepared by Huffman Engineering.
3. Water Demand Calculations: Prepared by a registered civil engineer or qualified specialist (please verify with the City Engineer). Needs to address instantaneous peak use and volume per month. Should be a net analysis that accounts for buildings to be removed. ***Response Summary:*** *See Section 06 Mechanical for fixture counts and water demand. See Domestic & Landscape Water portion of Section 05 for discussion of existing use.*	**Refer to Section 05 & 06** Response prepared by Huffman Engineering.
4. Updated water conservation program. ***Response Summary:*** *Not included in this Basis of Design Report. Provided by Kenwood Investment in a separate document.*	Refer to updated report by Crowley Associates through Kenwood Investments
5. Data to support Sewer Capacity Analysis. ***Response Summary:*** *Spreadsheet of Equivalent Single Family Dwelling Units by parcel provided in Section 05.*	**Refer to Section 05** Response prepared by Huffman Engineering.

Reports/Studies/Other Information to be Provided by Applicant	Applicant Response
6. Energy Use Data: existing energy usage, energy use during construction, and anticipated energy use during operation. (To be used in the greenhouse gas portion of the environmental review.) ***Response Summary:*** *Existing Energy Usage -* *Energy Use During Construction - Average 3,000 KWH per month. The total use for the project construction phase will be 60,000 KWH.* *Energy Use During Operation - The estimated total electrical load requirement is 1201 KVA. This service size will be 2500 amps at 480 volts, three phase, 4 wire.*	**Refer to Sections 7 & 10** Response prepared by RDC, Silverman and Light, 15000 Inc, & Midstate Construction.
7. Construction Management Plan: how will dewatering during construction be handled, what are the construction phases (demolition, grading, etc.) and timing of each phase, what is the type of equipment to be used, where will staging occur, how will construction traffic be handled, how will construction noise, dust, and exhaust be handled, etc. ***Response Summary:*** *Refer to Section 10 statement on construction mitigation measures.*	**Refer to Section 10** Response prepared by RDC & Midstate Construction.

Reports/Studies/Other Information to be Provided by Applicant	Applicant Response
8. Parking Plan: What activities will qualify for valet service? How will visitors to uses within the Lynch building be accommodated? Restaurant patrons? How will designated spaces for the apartments be kept available vis-à-vis stacked valet parking? ***Response Summary:*** *The Hotel will provide 100% off street parking based on a shared parking plan. Parking plan responses to the above questions are contained in Section 3 following Table 3.*	**Refer to Section 03** Response prepared by RDC & Kenwood Investments.
9. Visual Simulation(s): As needed for the visual impact section of the EIR. The EIR consultant will provide needed vantage points. ***Response Summary:*** *Five vantage points are provided showing before and after images. Refer to Section 12.*	**Refer to Section 12** Response prepared by RDC.
10. Hazardous Materials documentation: how will project affect, or be affected by, by the nearby remediation or any other potential hazardous materials in the vicinity. To be prepared by a qualified consultant. ***Response Summary:*** *Not included in this Basis of Design Report. Provided by Kenwood Investment in a separate document.*	Provided by Kenwood Investments
11. Soils and Geotechnical Report: Including evaluation of groundwater conditions (i.e., depth, gradient). ***Response Summary:*** *Geotechnical Report by PJC and Associates Inc. addresses the groundwater conditions and the mitigation measures, both during construction excavation and in the completed construction.*	**Refer to Section 09 Geotechnical Report** Prepared by PJC Associates

Reports/Studies/Other Information to be Provided by Applicant	Applicant Response
12. Underground Garage Design Coordinated with Overhead Hotel Building Design: Show how the garage will be designed to prevent floating and leaking. How would groundwater intrusion be handled? How will garage effect groundwater levels and flow in the area? ***Response Summary:*** *A permanent underslab dewatering system will be provided under the garage slab on grade and behind the basement walls to relieve hydrostatic pressure from groundwater to prevent floating. The groundwater will be drained to sump pumps, with backup pumps installed in the basement in case of primary sump pump failure. The project is equipped with an emergency generator to operate pumps during a power outage. See Basement Plan of Civil Drawings for Underslab Drain Layout in Section 11.*	**Refer to Sections 4, 5, 6, 8, 11** Responses prepared by RDC, Huffman Engineering, Walter P Moore Structural Engineers, 15000 Inc. Mechanical Engineers, SGH Building Enclosure Engineers.
13. Baseline parking requirement (using City standards) for Lynch Building and IT Building (net). ***Response Summary:*** *The Hotel will provide 100% off street parking based on a baseline parking plan. The baseline parking requirements, in Section 3, Table 3, is based on the Urban Land Institute shared parking analysis prepared by the applicant for the Hotel, Lynch Building and IT Building.*	**Refer to Section 03** Response prepared by RDC & Kenwood Investments

Reports/Studies/Other Information to be Provided by Applicant	Applicant Response
14. Traffic: Daily Volumes for all roadways for all scenarios; preferably in an Excel file (intersection turning movements are NOT desired) - Existing, w/ and w/o project - Phase X, w/ and w/o project - Phase Y, w/ and w/o project - Phase Z, w/ and w/o project - Full build-out timeframe, w/ and w/o project ***Response Summary:*** *City Provided through W Trans & Placeworks*	City Provided through W Trans & Placeworks
15. Traffic: Fleet mix on the segments for existing and (above) future timeframes, if available. ***Response Summary:*** *City Provided through W Trans & Placeworks*	City Provided through W Trans & Placeworks
16. Traffic: Speed limits on the segments for existing and (above) future timeframes, if available. ***Response Summary:*** *City Provided through W Trans & Placeworks*	City Provided through W Trans & Placeworks
17. Traffic: Daytime/Evening/Nighttime splits on the segments for existing and (above) future timeframes, if available. ***Response Summary:*** *City Provided through W Trans & Placeworks*	City Provided through W Trans & Placeworks
18. Construction: Construction schedule, preferably showing monthly activities and worker-loading by month. ***Response Summary:*** *Construction activities are estimated to commence in May 2016 and complete in November 2017. Refer to Section 10 for detailed information.*	**Refer to Section 10** Response prepared by Midstate Construction

Reports/Studies/Other Information to be Provided by Applicant	Applicant Response
19. Construction: Fleet mix of all on-site construction equipment, preferably by month. ***Response Summary:*** *On-site equipment for demolition, site grading, excavation, trenching and paving will be required. An equipment list is provided in Section10.*	**Refer to Section 10** Response prepared by Midstate Construction
20. Construction: Fleet mix and number of trips for all off-site construction traffic, preferably by month (including workers, haul-in, haul-off, and deliveries) ***Response Summary:*** *Information on demolition off haul, soil off haul and vehicle activity is provided in Section 10. Deliveries are estimated at 100 deliveries per month, Monday through Friday, during construction*	**Refer to Section 10** Response prepared by Midstate Construction
21. Identify all major equipment, quantity, size and noise levels when in operation ***Response Summary:*** *An equipment matrix identifying all major equipment, quantity, size and noise levels is provided in Section 6.*	**Refer to Section 6**

End of City of Sonoma Request for Information Summary Table

Report Format
The BDR is organized into 12 Sections. Each section provides general and specific information for the project. Section topics include:
Section 00 - Executive Summary
Section 01 - Introduction
Section 02 - Project Overview
Section 03 - Architecture and Planning Schematic Design Report
Section 04 - Structural Schematic Design Report
Section 05 - Site Civil Design and Storm Water Management Plan
Section 06 - Mechanical, Heating, Ventilation and Cooling System Requirements
Section 07 - Electrical and Lighting Systems Requirements
Section 08 - Building Envelope and Waterproofing System Requirements
Section 09 - Geotechnical Report
Section 10 - Construction Management Plan
Section 11 - Schematic Design Drawings
Section 12 - Visual Simulations

Listed Products or Assemblies
This report references specific recommended building products or assemblies. These product references are examples of materials or assemblies and may be substituted with approved equals by the architects at a later date.

Revisions to Prior Use Permit Project Description
The project previously submitted an application for a Conditional Use Permit to the City of Sonoma in July of 2014 for a 59 guestroom hotel, restaurant and spa facility. The Use Permit Application included drawings, and a written Project Narrative. The project described herein is largely unchanged from the original proposal however the BDR provides updated design drawings and detailed information beyond that originally submitted to the City in July 2014.

The BDR modifies the prior project per the following:

- Revises the guest room count from 59 to 62 rooms. Added rooms provide ground floor accessible guest accommodations.
- Deletes the large Guest Meeting Room
- Removes/relocates a majority of the below grade hotel support and utility rooms from under the overhead road bed to the basement of the restaurant building
- Adds an emergency generator to the pool mechanical building
- Total Building Area is revised from 103,292 SF to 105,133 SF

02
PROJECT OVERVIEW

SUMMARY DESCRIPTION
The proposed project is a 62 guest room hotel, restaurant, and spa with 115 off street parking spaces, located on West Napa Street in Sonoma, CA, one-half block from Sonoma's historic Plaza.

The project site is designated as Commercial in the Sonoma General Plan, and is zoned Commercial (C) with a Historic District Overlay. Commercial zoning allows for a range of commercial land uses, including hotel, retail, tourist, office, and mixed uses.

The project's planning and design approach is consistent with Sonoma's General Plan policies and Development Code guidelines. No variances are required for this project.

SITE
The Project site is 54,000 SF (1.24 acres). As shown in Section 11 and Sheet A0.01 Code Analysis and FAR Calculations. The project site includes a total of approximately 16,184 SF of existing building area and includes 79 surface parking spaces.

The site includes three existing buildings: 153 West Napa Street currently used as a retail shop, a two story metal warehouse building previously used for newspaper production by the Sonoma Index-Tribune, and a shed along the southern edge of the project site. Adjoining the site at 135 West Napa Street, is the mixed use, three story Lynch Building. The Lynch Building includes retail tenants, offices, seven studio apartments, and a surface parking lot. The Lynch Building will not change use and, excepting for modifications to its shared parking lot and site utilities, is not part of the project.

All properties being considered for the new Hotel (including the Lynch Building) are controlled or owned by the applicant. Therefore any proposed modifications to the existing site utility system or property line adjustments will be made possible by the ownership group. Upon project approval a single hotel parcel will be formed.

Conceptual Site Plan
The site is a roughly "L" shaped configuration with frontage, at each end of the" L", on West Napa Street (Highway 12) and First Street West. The site design is arranged with two primary connected hotel buildings occupying the western and central portions of the property. The new buildings will be separated by courtyards and landscaped areas. Public vehicular access to the site is from West Napa Street (Highway 12). Public pedestrian access to both the restaurant and hotel entries are from West Napa Street. The restaurant fronts West Napa Street activating the streetscape with outdoor seating and views into the interior dining room. The main hotel entry and lobby is visible from the street through an axial driveway and Hotel Plaza Courtyard. The massing of the hotel building, landscaping and site features reinforce the importance of the hotel entry. The hotel lobby is both a physical and visual destination from the highway. Access to underground parking is via a curved ramp from the Hotel Plaza Courtyard. The hotel spa and swimming pool courtyard occupy the quiet central portion of the site. Service access to the property is from First Street West. There is a staff and delivery parking lot at this southeast corner of the property. In addition, a secondary vehicle ramp to the underground parking lot is off of First Street West.

HOTEL - AN ENSEMBLE OF FOUR PRIMARY ELEMENTS
The hotel, restaurant and spa has been designed as an ensemble of four primary elements built around three exterior courtyards. These include:

Hotel Restaurant Building: This 21,281 SF building fronts West Napa Street and includes a ground floor restaurant and two upper floors consisting of 20 guestrooms.

Main Hotel Building: The 44,417 SF Main Hotel Building is built around two exterior garden courtyards and includes the public lobby, guest reception, guest meeting rooms, 3 first floor accessible guest rooms, two upper floors with 39 guestrooms and a Spa with six treatment rooms.

Hotel Basement Parking Garage: The 37,655 SF Basement Parking Garage includes parking for 94 cars and other building support, delivery and storage spaces. An additional 21 surface parking spaces are provided on site.

First Street West Service Support Building: This 1,780 SF building includes the swimming pool mechanical room, the emergency generator room, service elevator to garage, a pool refreshment service counter, storage and exit stairs.

THREE COURTYARDS
The Hotel will be constructed around three exterior courtyards including the Hotel Plaza Courtyard, a sheltered lobby courtyard and the raised swimming pool veranda area. The courtyards will be landscaped with raised planting beds and tree wells irrigated with captured, stored and recycled rain water.

PROJECT DATA
Site Parcel Addresses: 153 West Napa Street and 541 First Street West, Sonoma CA
APN's: 18-251-52, 18-251-51 & 18-251-55
Zoning: Downtown District, New Development, Commercial (C) Zone, Historic Overlay District
Setbacks: None required
Building Height: 35' with an additional 5' allowance for HVAC equipment, equipment screening and elevator screening (Section 19.40.040Sonoma Development Code).
Total Lot Area: 54,000 SF
Allowable Lot Coverage: 100%

Actual Lot Coverage: 23,805 SF = 44.1%
Allowable FAR: Lot area x 2.0 = 108,000 SF
Actual Building Area: 67,478 SF (excludes basement areas) = FAR compliant

BUILDING AREAS
Basement Parking Garage and Ramp: 37,655 SF - Cast in Place Concrete Construction
First Floor: 23,805 SF: Podium Concrete Construction for Three Hour Assembly. Building superstructure Type V construction, mixed occupancies with occupancy separations
Second Floor: 22,168 SF: Type V construction, mixed occupancies with occupancy separations
Third Floor: 21,505 SF: Type V construction, mixed occupancies with occupancy separations
Total Hotel Building Area: 67,478 SF (excludes basement garage and ramp)
Open Space: Exterior Courtyards and Patio Areas: 26,962 SF (approximately 50% of site area)
Landscape: Perimeter plantings, raised planters and tree wells in exterior courtyards, Auto Court landscape and street trees and street entry planters, second floor roof top garden. Decorative exterior pavers and decorative concrete paving over structural concrete podium construction and roadbeds.


Sonoma Plaza
City Hall
Second Street West
First Street West
West Napa Street
Broadway
Restaurant Entry
Vehicle Entry
HOTEL PLAZA
Hotel Entry
PROPOSED HOTEL
Hotel Courtyard
Swimming Pool
Staff Parking
Vehicle Exit
North
PROJECT LOCATION MAP

Design Intent
The project shall be an ensemble of different but mutually related buildings designed, sized and scaled to evoke Sonoma's vernacular style. The architectural design shall feature gabled thick walled buildings parallel to the street, with deep recessed windows, exterior timber arcades at the sidewalk level, and overhanging sheltering roofs. Architectural drawing sheets in Section 11 of this report depict the architectural design of the project.

Massing, Scale and Height
Overall building height will not exceed 35' except in areas with mechanical system screening (40' maximum). The scale of the buildings will be mitigated through the use of "layering" strategies whereby the overall scale of the building is broken down into smaller articulated elements. Layering strategies will include the introduction of appropriately scaled building elements at the street edge and the staggering and sloping of the upper floor plates and third floor roof surfaces back from the street or the Hotel Plaza Courtyard. Steep roofs with dormers will fold over the third story of many of the buildings to minimize the sense of wall height. Other scale reduction strategies will include articulation of the exterior facades with exterior timber arcades, balconies, awnings, recessed entry doors, porches and window seats. The use of stone, plaster and wood siding will create a visually rich material palette. The hotel's street frontage and courtyards will include street trees in planters, seating, fountains and other landscape features.

General
Codes and Standards: The design shall comply with the most current adopted edition of applicable city, county, state and national codes and standards including but not limited to:

- City of Sonoma Development Code, February 2005
- City of Sonoma General Plan
- 2013 California Building Code
- 2013 California Mechanical Code
- 2013 California Plumbing Code
- 2013 California Electric Code
- 2013 California Fire Code
- 2013 California Energy Code
- 2013 CALGreen Building Requirements and the City of Sonoma Additional Mandatory Standards
- TITLE 19 Public Safety, State Fire Marshal, California Code Of Regulations
- TITLE 24 Americans with Disabilities Act Accessibility Guidelines (ADAAG) Uniform Accessibility
- Standards, California Code of Regulations
- NFPA 101 - Life Safety Code, Current Edition - Chapters 5 And 13
- NFPA 13 - Current Edition with Approved California Amendments
- UL - Underwriters Laboratories Fire Resistive Directory, Current Edition
- UL - Underwriters Laboratory Building Materials Directory, Current Edition
- SMACNA - Fire, Smoke & Radiation Damper Installation Guide for HVAC Systems, Current Edition

Functional Life of Building Components
The architectural elements shall be designed to meet the functional lifetimes per the following Table.

Table 2: Functional Life of Building Components or Assemblies.	Target Functional Lifetime (Years)
Architectural Elements: Shell and Core	
Foundations, Horizontal, Vertical Framing and Floor Structures	50–75
Exterior Cladding (Except Sealants)	50
Windows, Doors and Glazing Systems	30
Roofing/Sloped Roofs, Metal or Tile	50
Low Slope (Flat) Roof Membranes	20
Elevator	30
Public Restrooms, Stairs	50
Interior Construction	
Permanent / Core Partitions	50
Improvements Requiring Periodic Remodeling - e.g. Guest Rooms or "Tenant Improvements"	10-20
Casework	20
Stone, Terrazzo, Ceramic Tile Flooring	25
Wood Flooring	20
Vinyl Composition Tile (VCT), Linoleum, Acoustical Tile	5–10
Carpet and Wall Coverings	5–7
Heating, Ventilating, and Air-Conditioning Systems (HVAC)	
Primary Water Cooled Equipment	25
Primary Air Cooled Equipment	12
Fans, Air Handling Units	25
Distribution Systems (Ductwork)	50
Control Systems	15
Trim/Diffusers	20
Pump Seals	5
Electric Motors	10
Electrical Systems	
Primary Equipment (Switch Gear, Transformers)	25
Distribution System	50
Fixtures	25
Low Voltage/Security/Access Control	15
Engine-Generator Set	25
Plumbing Systems	
Primary Equipment, Pumps, Boilers	15
Distribution Piping	50
Fixtures	50
Valves, Faucets, Trim	10
Fire Protection Sprinkler Systems	50

Building Elements
Building Envelope
For detailed Building Envelope Design Recommendations refer to Section 08 of this Report.

Exterior Materials
Exterior building materials will include but not be limited to stone veneer, exterior plaster, rustic plywood board and batten siding, heavy timber arcades, and corrugated roofing and flat tile roofing. The buildings will include unique exterior detailing consisting of custom stone, steel and plaster finishes, timber and precast concrete sills, and miscellaneous running trim. Guest rooms will include exterior custom metal railings. The exterior courtyards, pool deck and landscaped areas will have pedestal mounted or topping slab concrete or stone paving systems. Refer to Section 08 for paving system assemblies.

Flashing
Concealed flashing systems that cannot be easily replaced shall be permanent, stainless steel, copper or other metal flashing systems not subject to corrosion. All other flashings shall be GSM. Provide flashing systems consistent in material, detail, scale, color and quality with the building design. Flashing systems will also include self adhesive flexible flashing, membranes, coatings, caulks, sealants and adhesives. Refer to Section 08.

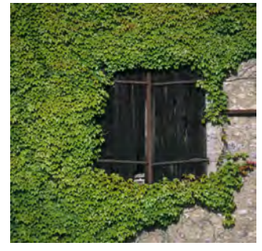
Expansion and Seismic Joints
Develop the structure to limit movement consistent with the requirements of the expansion joints. Design expansion joints to be minimally visible and watertight. Joint cover assemblies shall meet all code requirements for impact, loading access compliance and fire protection. Refer to Structural Section 04 for additional information.

Windows and Doors
Provide the best proven hospitality grade clad aluminum and wood window and door systems. Some public lobby entry doors shall be custom wood, and glass assemblies. All exterior glazing shall be insulated for optimum thermal and acoustic performance. Windows shall be fixed or operable consistent with access compliance and sustainability requirements. Provide hospitality grade hardware and door locking systems. Flashing and weatherproofing requirements are included in Section 08.

Shading and Glare Control
Control glare and heat gain in all guest rooms, work areas and public spaces. Provide window coverings for sun control and visual privacy.

Protection of Building Entrances
Protect building entries from exposure to weather. Provide exterior canopies, building recesses or overhangs to protect exterior doorways and balconies.

Concept Images
Actual design may vary.



Walk off Mats
Provide a permanent walk off mat system flush with the public entries to improve indoor air quality through the reduction of dirt and dust tracked into the building. Mats shall be removable cleanable and replaceable.

Roofs, Walls and Waterproofing
Exterior walls will be constructed with 6” (minimum) wood studs. Where stone veneer is used either 6” or 8” wood studs will be used. The roofs will be constructed of wood framing and plywood sheathing. Thermal insulation will be incorporated into the exterior wall and roof assemblies and may impact the size of materials. Refer to Section 04 for additional information on building framing and construction. Provide an overall watertight building envelope and at subgrade conditions. For detailed recommendations refer to Building Envelope Design Recommendations Section 08 of this Report.

Exterior Courtyard, Landscape and Pool Deck Paving
Paving for courtyards, landscaped areas and the pool deck constructed above the underground garage shall be a pedestal paving or a concrete topping slab system over an integral waterproofing system. The waterproofing system shall be applied to the structural slab which will be sloped to a drain system. The pool deck is raised approximately 4’-0” above the first floor level (0’-0”) and is flush with the swimming pool coping and gutter assembly. Exterior paving shall be applied over a secondary non structural slab in locations where there is vehicle traffic over occupied space. Refer to Section 08.

Low Slope Roofing Systems
Low sloped roofs shall be a white, single ply PVC, roof membrane system weather tight and provided with positive drainage to effectively dispose of rainwater. The roof will be insulated so that the heat transfer values from roof to occupied areas shall comply with California Energy Code Title 24. Low sloped roofs shall provide a minimum slope of 1/4” per foot to drain along valleys into the rainwater capture scupper and downspout system. Mechanical and rooftop screens shall be designed to permit reroofing in the future. Curbs and equipment bases on roofs shall be a minimum of 8” high. Roof drains shall be recessed below the roof level to form a collective basin, drain and overflow system. Refer to Section 08.

Rooftop Equipment
Rooftop equipment shall be located behind screens or raised roof plane elements. Critical roof top equipment will be installed to permit future replacement without unreasonable disruption of the hotel operation. Rooftop equipment will have a visual screen wall surrounding the equipment with access gates. Screen walls will not exceed the 40 foot height limit.

Roof Access
Provide a dedicated permanent interior access system with locking roof hatch covers to all roofs.

High Sloped Roofs
Provide a mixture of roofing material types including: flat tile, prefinished corrugated metal roofing or composition shingles over a fully adhered roof underlayment system. Refer to Section 08

Seismic Joints
Provide watertight prefabricated seismic joints locations indicated on the structural drawings and as described in Section 04. Seismic joints will be located on floors, walls and roofs.

Flag Poles
Two building mounted flagpoles and one ground mounted flagpole may be installed. (Verify with owner).

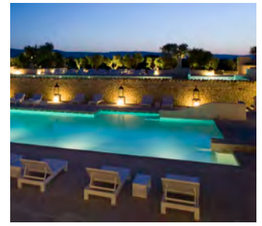
Fountains and Water Features
Provide a water fountain system in the hotel entry plaza and the courtyard. Fountains shall be filtered and configured to minimize water use and will use recycled or stored storm water.

Swimming Pool
The swimming pool shall be a prefabricated pool system. The pool system shall be watertight and fabricated for use over the occupied parking garage in the basement. The minimum water depth of the swimming pool is 3’-6” deep. Provide an ADA compliant entry or lift system into the pool. The pool equipment shall be configured to utilize solar water heating and to minimize the amount of water used. The pool coping and gutter system shall be flush with the surrounding pool deck. Pool pumps, filters and heaters shall be located in the pool mechanical room and shall be acoustically mitigated. The swimming pool shall have an electrically operated cover system.

Interior Construction
Guest rooms
Guest rooms will be constructed with finishes consistent with a high quality resort hotel. Provide a minimum 9’-0” ceiling heights in all rooms. Sloped ceilings and higher ceiling heights are acceptable on upper levels where applicable. Guest rooms will be constructed with special emphasis on acoustic isolation. The developer shall provide an acoustic engineer to design all required acoustic assemblies and mitigation systems.

Walls between rooms will be constructed as double cavity walls with acoustic batt insulation and acoustic sealants. Multiple layers of gypsum board will be used to mitigate noise where

Concept Images
Actual design may vary.



applicable. All plumbing walls will have acoustic mitigations. Floor construction on the first floor will be over the concrete podium level with finish floors constructed over an acoustic mat layer. The second and third floors will be acoustic assemblies suitable for high level hospitality design. These floors will likely consist of a finish floor material (wood, tile or carpet), 1" gypsum concrete, 3/8" acoustic mat layer, 3/4" wood subfloor, 12" deep truss joists with 8" acoustic batt insulation between joists, metal resilient channels on the underside of the joists, two layers of 5/8 gypsum board ceiling and acoustic sealants. Level Three roof construction above hotel guest rooms will have a similar construction assembly as the floor systems for noise mitigation.

Day Lighting

The use of natural light will be maximized where possible throughout the project. Provide large windows into the lobby, public spaces, spa and restaurant to ensure ample daylight to these areas. Guest rooms have been located on courtyards or are setback from the property lines to allow for walls of windows and glass doors. Where applicable, service areas will utilize natural light. Daylight sensors will tie into the interior light controls for an energy efficient comprehensive lighting system. Day lighting is a component of the overall sustainable design strategy for the project. Refer to Section 07 for further description of lighting systems.

Workplace Environment

Provide a quality work place environment that is conductive to and suitable for performing the tasks of the building occupants and support a positive hotel guest experience. Appropriate standards for lighting, acoustics, HVAC, indoor air quality and other building systems shall be applied to enhance the work environment and to achieve sustainable design objectives.

Floor to Floor Heights

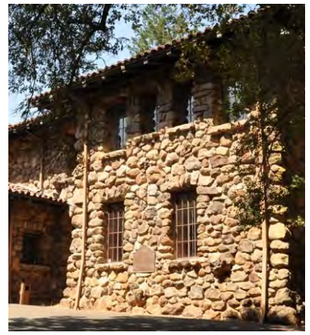
First Floor +0'-0" Finish Floor Elevation (+/- 80' actual grade, refer Section 05)
First Floor to Basement -11'-2" Finish Floor Elevation
First Floor to Second Floor +12'-4" (+12'-4") Finish Floor Elevation
Second to Third Floor +10'-4" (+22'-8") Finish Floor Elevation
Third Floor to Roof +10'-4" (+33'-0") Base Roof Elevation
Roof to Roof Parapet/Roof Ridges +2'-0" (+35'-0")
Roof Parapet to High Roof Parapet/Mechanical Screens +5'-0" (+40'-0")

Plenum Spaces, Vertical Shafts, Equipment Rooms, Telecom and Data Closets

All plenum spaces, vertical shafts, equipment rooms, telecom and data closets will be constructed to meet building codes and standards for fire resistance service clearances and life safety. Equipment rooms and vertical shafts will be constructed to mitigate noise transmission to guest areas. Building systems, service areas and infrastructure will be concealed from guest areas.

Interior Partitions

Interior partitions will be constructed of wood studs, plywood shear walls and metal resilient channel furring. Steel frames will be used in some areas to carry loads and provide seismic lateral resistance. Comply with industry recommendations for deflection and span. Refer to Section 04 for additional information on interior framing systems. Interior partitions, where applicable, will have acoustic mitigations in the form of double stud walls, acoustic batt insulation, resilient channels, multiple layers of gypsum wallboard and acoustic sealants. Specific assemblies will apply to different areas of the buildings. Wall finishes in guest areas will be high quality finishes consistent with a luxury hotel. Staff and service area walls will be a cleanable paint finish. Some interior basement level walls shall be constructed of concrete masonry units (CMU), including stair and elevator enclosures. CMU may also be used where vehicle impact is of concern.



Backing, Supports and Anchorage

Provide a secure system of concealed, permanent, backing, supports and anchorages for all handrails, grab bars, wall hung cabinets, video monitors, and other building elements.

Ceilings

Hotel ceilings will be two layers of 5/8" gypsum board over resilient metal channels at 16" on center run perpendicular to the joists. This base ceiling system is part of the total acoustic assembly between floors or roofs. Decorative finishes, faux beams, wood trim or other additive ceiling finishes will be applied over the base layers of gypsum board.

Public and Private Restrooms

Public restrooms and guest room bathrooms will be constructed to maximize acoustic privacy. Acoustic mitigations will apply to floor, walls and ceilings. Finishes will be high grade consistent with luxury hospitality construction. Plumbing fixtures and accessories will also be low water use, high grade quality. Lighting fixtures will be premium LED fixtures consistent with the high quality standards. Staff restrooms will have utilitarian finishes, fixtures and appointments.

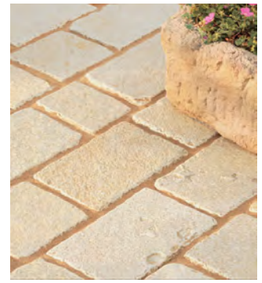
Elevators

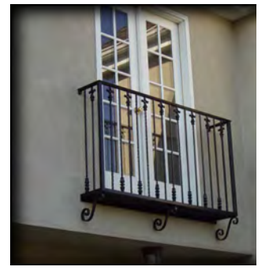
The project has five (5) elevators. The elevators will be hydraulic type elevators. There are 2 two-stop elevators (both public) and 3 four-stop elevators (one public and two service). Public lobby elevator will have premium wood, metal and stone paver finishes. Provide elevator cabs sized to accept medical gurneys as required. All other elevator cabs will have utilitarian finishes; plastic laminate walls, stainless steel trim and resilient flooring.

Stairs

All stairs will be steel construction with concrete filled pan treads. All stairs will be constructed to minimize the noise. Acoustic mitigations for floor, wall and ceiling finishes will be incorporated

Concept Images
Actual design may vary.





into all stairs. The public stair at the hotel lobby will have high quality railings and finishes. All other stairs will have utilitarian finishes with prefabricated railing systems.

Doors, Frames and Hardware
All interior public area doors will be high quality solid wood with tempered glass where applicable. Guest room entry doors will be self closing, fire rated, solid core wood doors fitted with acoustic seals. Guest rooms will also have solid wood and tempered glass pocket doors where shown. Service and staff area doors will be flush metal doors with a paint finish. All public area and guest room door frames will be custom steel frames with wood trim. Service and staff area doors will have stock steel frames. Door hardware in public areas and guest rooms will be premium quality solid metal. Guest room entry doors and doors to service areas will be equipped with a card key access system and door position sensors. Doors shall have a central monitoring system located at the lobby reception desk and at the hotel security office.

Security Systems
The site will have building mounted security monitoring cameras signaling to the Hotel security office. The buildings will be equipped with an intrusion alarm systems. Interior security cameras will be located in hallways, elevators and in the parking garage. Duress alarms will be located in the parking garage and in all elevators. Duress alarms will be located at each bed and in the bathrooms of the ADA accessible guest rooms on the first floor. A public address system will be provided for public and staff areas. Each guest room will be equipped with an in-room safe for guest valuables.

Materials and Finishes
Service Corridors and Rooms
Service corridors and rooms will have durable utilitarian finishes. Walls and ceilings will be gypsum board with a washable paint finish. Corner guards will be place at all hallway corners. Floors will be sheet or tile resilient flooring. Staff restrooms will have tile on wet walls, painted ceilings and tile floors

Ceilings and Walls in Public Areas
Public areas will have decorative ceiling finishes that incorporate acoustic mitigations. Examples include antiqued box beams, moldings, coffered wood ceilings, decorative plaster finish & trim, pressed metal ceilings and decorative specialty paint finishes. Walls in public areas will have a combination of high quality paint and decorative finishes. Guest room walls and ceilings may have specialty paint finishes, fabric wall coverings and other decorative accents. Guest room bathrooms will have painted walls and ceilings with porcelain tile floors and wainscots . Public restrooms will have commercial quality tile walls and painted ceilings.

Flooring
First floor public areas will have commercial quality tile, hardwood and/or stone paving. The second and third floor public hallways will have a commercial quality carpet with accent patterns. Public restrooms will have commercial quality tile floors. Guest rooms will have carpet, wood or stone floors. Guest room exterior balconies and decks will have or tile or traffic topping decking over a waterproof assembly.

Window Coverings
All guest rooms will have hospitality quality curtains or blinds and blackout shades.

Architectural Woodwork & Running Trim
Public areas, meeting rooms and guest rooms will have wood, tile or stone wall bases, wood trim at windows and doors, wood wainscots, chair rails, picture rails and crown molding. The full extent and specific location of architectural woodwork and running trim is yet to be determined.

Public areas will have architectural wood casework with stone countertops for the reception desk area. Guest rooms will have architectural wood casework and wardrobes.

Fireplaces
Interior and exterior fire places are sealed combustion chamber gas fired prefabricated units with venting to the exterior. Fireplaces will have a stone hearth with a stone and wood surround.

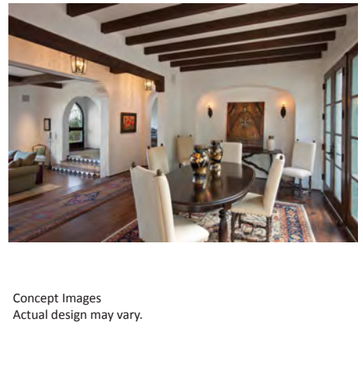
Signs
Provide all code required accessibility signs and fire egress signs. Signage system will include room numbers, room names, way-finding signs, pool signage, on-site traffic signs, lobby signage, exterior hotel name signs and street view monument signs.

Lockers
Staff areas will have prefabricated metal lockers.

Bicycle Racks and Storage
Bicycle racks will be provided for staff and guests. Bicycle racks and storage will be provided in the parking garage and in the Hotel Plaza Courtyard.

Wardrobe and Closet Specialties
Guest room closets will have built-in clothes poles, shelves and robe hooks with digital locking room safes.

Restaurant and Spa Interiors
Restaurant, commercial kitchen and Spa interiors shall be custom tenant improvements. The exact interior design of these spaces is pending.



Concept Images
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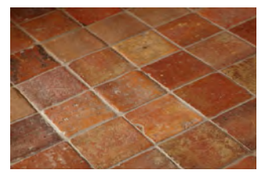


SUSTAINABLE DESIGN/LEED
The hotel will be sustainably designed and LEED Certified. The project's LEED checklist on Page 03-7, indicates 44 "yes" points with 46 "maybe" points.

Proposed sustainable design strategies include:

- Compliance with State of California CALGreen Building Codes

- Sustainable Site Development Strategies
  - Use of Brownfield Site
  - Pedestrian oriented. Encouragement of guests to walk or bike Sonoma
  - Bicycles available to guests for duration of stay
  - Secure short and long term bicycle parking
  - Changing rooms and shower facilities for staff.
  - Electric vehicle recharging stations
  - Reduced parking footprint through the use of underground parking

- Sustainable Building Design
  - Cool roof system for low slope roofs with increased solar reflectance and reduced thermal emittance.
  - Areas of vegetated roof gardens.
  - Building thermal insulation in walls and roofs
  - High performance thermal glazing
  - Whole building weather protection and waterproofing systems
  - Cal Green compliant direct-vent sealed-combustion gas fireplaces.

- Water Use Reduction Strategies
  - Water conservation program including low flow plumbing fixtures and low water use laundry
  - Rainwater capture, storage and recycle system
  - Water use reduction program for staff and guests
  - Building-level water metering
  - Grading and paving to control surface storm water
  - Low water use landscape design and plant selection
  - Low water use irrigation systems
  - Use of HVAC system condensate for landscape irrigation

- Energy Efficiency and Atmospheric Quality
  - Ample use of natural light
  - Daylight sensor lighting systems
  - High energy efficient mechanical and electrical systems
  - Light pollution reduction for all outdoor lighting.
  - HVAC systems that do not contain CFCs and Halon
  - Refer to Section 06 for additional information on mechanical system design
  - Fundamental building commissioning and verification
  - Optimized energy performance
  - Building level energy metering
  - Fundamental refrigerant management

- Renewable Energy
  - Rooftop solar panel array

- Materials and Resource Management
  - Recycled construction waste
  - Construction and demolition waste management planning
  - Storage and collection area for recyclables.
  - Sustainably sourced new and recycled materials
  - Recycled content in steel
  - Recycled content in concrete
  - Recycled content in carpets and flooring
  - Use of regional materials

- Indoor Environmental Quality
  - Enhanced Indoor air quality performance
  - Environmental tobacco smoke control
  - Low emitting paints and finishes
  - Cal Green compliant carpet, cushion and adhesive systems
  - Low VOC emission resilient flooring and adhesive
  - Composite wood products with formaldehyde free content
  - Thermal insulation without added formaldehyde
  - Exhaust and control of indoor air quality in the basement parking garage
  - Cal Green Compliant HVAC system to provide optimum air quality
  - Provide individual thermal comfort control to all guest rooms
  - Acoustic barriers and mitigations

- Innovations in Design
  - LEED accredited professional
  - Sustainable design innovations to be determined

Concept Images
Actual design may vary.

PRELIMINARY LEED CHECKLIST

LEED v4 for BD+C: New Construction and Major Renovation
Project Checklist PROJECT HOTEL SONOMA
April 2015

Y	?	N			
	1		Credit	Integrative Process	**1**

10	5	2	**Location and Transportation**		**16**
			Credit	LEED for Neighborhood Development Location	16
1			Credit	Sensitive Land Protection	1
		2	Credit	High Priority Site	2
3	3		Credit	Surrounding Density and Diverse Uses	5
5			Credit	Access to Quality Transit	5
1			Credit	Bicycle Facilities	1
	1		Credit	Reduced Parking Footprint	1
	1		Credit	Green Vehicles	1

6	2	2	**Sustainable Sites**		**10**
Y			Prereq	Construction Activity Pollution Prevention	Required
	1		Credit	Site Assessment	1
		2	Credit	Site Development - Protect or Restore Habitat	2
1			Credit	Open Space	1
2	1		Credit	Rainwater Management	3
2			Credit	Heat Island Reduction	2
1			Credit	Light Pollution Reduction	1

3	8	0	**Water Efficiency**		**11**
Y			Prereq	Outdoor Water Use Reduction	Required
Y			Prereq	Indoor Water Use Reduction	Required
Y			Prereq	Building-Level Water Metering	Required
	2		Credit	Outdoor Water Use Reduction	2
2	4		Credit	Indoor Water Use Reduction	6
	2		Credit	Cooling Tower Water Use	2
1			Credit	Water Metering	1

11	14	8	**Energy and Atmosphere**		**33**
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Building-Level Energy Metering	Required
Y			Prereq	Fundamental Refrigerant Management	Required
3	3		Credit	Enhanced Commissioning	6
5	5	8	Credit	Optimize Energy Performance	18
	1		Credit	Advanced Energy Metering	1
1	1		Credit	Demand Response	2
1	2		Credit	Renewable Energy Production	3
1			Credit	Enhanced Refrigerant Management	1
	2		Credit	Green Power and Carbon Offsets	2

2	6	5	**Materials and Resources**		**13**
Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Management Planning	Required
		5	Credit	Building Life-Cycle Impact Reduction	5
	2		Credit	Building Product Disclosure and Optimization - Environmental Product	2
	2		Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
	2		Credit	Building Product Disclosure and Optimization - Material Ingredients	2
2			Credit	Construction and Demolition Waste Management	2

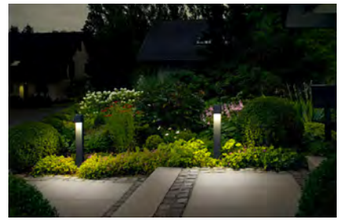
8	4	4	**Indoor Environmental Quality**		**16**
Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
1		1	Credit	Enhanced Indoor Air Quality Strategies	2
2	1		Credit	Low-Emitting Materials	3
1			Credit	Construction Indoor Air Quality Management Plan	1
1	1		Credit	Indoor Air Quality Assessment	2
1			Credit	Thermal Comfort	1
1	1		Credit	Interior Lighting	2
		3	Credit	Daylight	3
1			Credit	Quality Views	1
	1		Credit	Acoustic Performance	1

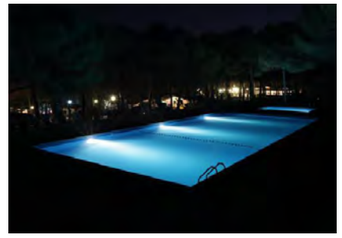
1	5	0	**Innovation**		**6**
	5		Credit	Innovation	5
1			Credit	LEED Accredited Professional	1

3	1	0	**Regional Priority**		**4**
	1		Credit	Optimize Energy Performance	1
1			Credit	Access to Quality Transit	1
1			Credit	Rainwater Management	1
1			Credit	Outdoor Water Use Reduction	1

44	46	21	**TOTALS**	Possible Points:	**110**

Certified: 40 to 49 points, **Silver:** 50 to 59 points, **Gold:** 60 to 79 points, **Platinum:** 80 to 110





Concept Images
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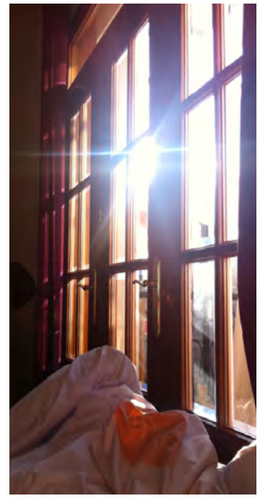


PARKING PLAN

Parking Plan Description

Total parking capacity will be 115 off street shared parking spaces managed by a full time valet parking service (refer to the Parking Study and sheets A2.01 and A 2.00). 94 spaces will be located in the basement parking garage, with an additional 21 surface parking spaces provided on site. Parking capacity in the basement parking garage will be maximized through the use of a combination of 90 degree stalls and stacked tandem spaces. The parking plan includes enough spaces for the existing Lynch Building (135 West Napa) and Index Tribune Building (117 West Napa) and its possible future expansion.

Auto key management will be by the valet service. Guests will arrive by car in the Hotel Plaza Courtyard and following check in, the guest's car will be parked by the valet attendant. Upon departure, the guest's car will be delivered to the valet station for pick up. Street side valet parking is proposed during the evenings for restaurant patrons.

Table 3: Baseline Parking Requirements Comparing City Standards with Urban Land Institute Shared Parking Analysis

The baseline parking requirements are an estimate based on three scenarios prepared by the applicant for the Hotel, Lynch Building and IT Building. Based on the use of the Urban Land Institute's shared parking analysis, adequate parking to meet the hotel's IT Building and Lynch Building's requirements will be provided. The following table compares the application of the City of Sonoma's parking standards with the Urban Land Institutes shared parking approach.

The following describes each parking scenario.

1) **City Required:** Refers to the a la carte menu for each use (hotel, restaurant, spa) on its own.

2) **Shared Parking Estimated Weekday:** Refers to calculating the parking requirement based on the Urban Land Institute's analysis that "shared parking can be defined as parking utilized jointly among different buildings and facilities in a single area to take advantage of different peak parking characteristics that vary by time of day or day of the week." See article link: http://www.horsleywitten.com/DEM-LID-Guide/docs/6_LIDparkingguidance.pdf. The estimate weekday parking requirement also takes into consideration the additional spaces required for the expansion of the IT building.

3) **Shared Parking Estimated Weekend:** Reflects the decreased use by the retail/bank tenants and reduced parking demand on the weekends in the Lynch Building.

	Size	City Required	Shared Parking Estimated Weekday	Shared Parking Estimated Weekend
Index Tribune Building				
Sisters - Retail	1229	4	4	4
Index-Tribune Office	5500	18	21	0
IT Building Expansion	4000	13	7	0
Lynch Building				
Bank	2029 SF	7	9	0
Office	6208 SF	21	12	0
Residential	7 Apartments	13	11	13
Hotel				
Rooms	62 Rooms	62	44	62
Restaurant	80 Seats	20	1	3
Employees	16 max shift	8	6	3
Meeting Room	50 Seats	0	0	5
		166	**115**	**90**
Hotel Parking Spots		73	73	73
Valet Spots		42	42	42
		115	**115**	**115**
Deficit		**-51**	**0**	**25**

Concept Images
Actual design may vary.

How the Parking System will Work:

- Valet parking services will be provided to all Hotel, spa and restaurant patrons
- Designated marked spaces will be reserved for self parking as well as surface parking reserved for Lynch Building retail use.
- Restaurant patrons will be provided valet parking service with drop off and pick up in the Hotel Plaza auto court.
- Spaces 1 -7 in the garage area will be reserved for the Lynch Building apartments and are not planned as stacked valet spaces

DELIVERIES

Large truck deliveries will be staged from the street on First Street West similar to how The Red Grape restaurant and other Sonoma Plaza businesses currently receive deliveries. Deliveries will be restricted to off-peak periods to minimize impacts to downtown activities. Small truck or van deliveries will take place inside the basement parking garage at the service core receiving area. Three service elevators are provided in the hotel to efficiently facilitate the vertical transfer of deliveries inside the hotel.

The designation of a truck loading zone on First Street West located adjacent to the hotel garage entry is being requested as part of the Use Permit Application.

TRASH AND RECYCLING

The Hotel will conform to the recycling requirements of the City of Sonoma. Trash and recycling staging and storage areas are identified on drawing A2.01. Recycling staging will take place in the southern receiving dock of the service core. Trash and recycle storage enclosures will be located adjacent to First Street West in a fully enclosed service building.

Concept Images
Actual design may vary.

04
STRUCTURAL SCHEMATIC DESIGN REPORT

I. INTRODUCTION

A. Project Description: The proposed hotel building will be located on the south side of West Napa Street, just west of the historic city center plaza. The project includes three stories of Type V hotel construction over a single level below grade parking garage with back-of-house functions. The hotel superstructure and the basement parking garage are two different structural systems.

1. The hotel structure is located over the below grade parking garage, with a portion (3,000 sf) of the hotel supported on grade at street level. The superstructure is approximately 67,000 gross square feet of usable space with a height of 35 feet. The structural system consists primarily of wood framed floors and roof, supplemented with structural steel beams and posts at the first story. Exit stairs will be steel framed.

2 The basement parking structure is a single level, below grade parking garage with an area of approximately 36,360 gross square feet. There will be one curved entry and exit ramp at the front of the building and an exit ramp to the east. The garage will be designed to prevent floating and leaking. The garage construction will be a reinforced concrete slab (mild reinforced or post-tensioned) with cast-in-place (CIP) concrete columns and either CIP or shotcrete walls. The plaza level slab over the garage will support numerous functions with various structural loading requirements, including hotel interior, a landscaped courtyard, pool deck with elevated pool, and staff parking.

The elevated parking area will be designed for fire truck loading.

B. Structural Design Philosophy: The structural analysis and design shall follow established principles and practices of structural engineering. The design shall be compatible with the owner's expectations of a luxury hotel and optimize efficiency without compromising system performance and constructability. Maximum benefit shall be obtained for the costs expended while not compromising safety, reliability and owner performance objectives as a cost savings measure.

II. GENERAL

A. Codes and Standards: Design work shall comply with the most current adopted edition of applicable city, county, state and national codes and standards. In addition, the current adopted edition of the following codes, standards and publications, are considered as the governing references to this section. Applicable recommendations of related trade and professional associations not listed here shall also be considered.

1. California Building Code, 2013 (CBC)

2. International Building Code, 2012 (IBC), with California and City of Sonoma amendments

3. International Code Council (ICC)

   a. ICC-ES for product evaluation reports

4. American Institute of Steel Construction (AISC)

   a. Specification for Structural Steel Buildings, AISC 360

   b. Seismic Provisions for Structural Steel Buildings, AISC 341

5. American Concrete Institute (ACI)

   a. Building Code Requirements for Structural Concrete, ACI 318

   b. Guide to Hot Weather Concreting, ACI 305

   c. ACI 302.1 Guide for Concrete Slab and Floor Construction

6. Post Tensioning Institute (PTI)

   a. PTI DC20.7-01: Design, Construction and Maintenance of Cast-in-Place Post-Tensioned Concrete Parking Structures

   b. PTI DC20.8-04: Design of Post-Tensioned Slabs Using Unbonded Tendons

7. American Wood Council (formerly American Forest & Paper Association) (AWC)

   a. National Design Specification for Wood Construction

   b. Special Design Provisions for Wind and Seismic

8. American Institute of Timber Construction (AITC)

   a. AITC A190.1 Glued Laminated Construction

9. American Plywood Association (APA)

10. American Society of Civil Engineers (ASCE)

11. American Society of Testing Materials (ASTM)

    a. Various material and testing standards

12. American National Standards Institute (ANSI)

13. American Welding Society (AWS)

14. Concrete Reinforcing Steel Institute (CRSI)

B. CBC Risk Category Classification for Structural Loads

1. Building and Garage: Risk Category II

C. Safety and Testing

1. Safety: All designs shall conform to the safety requirements of OSHA and all other applicable safety standards.

2. Materials Testing: A testing laboratory, retained by the Owner, will inspect all structural welding (structural steel, rebar, headed studs); placement of post-tensioning tendons and anchors; concrete, grout and rebar placement; high strength bolting; plywood shear wall and diaphragm nailing; installation of shear wall tie-downs; and installation of post-installed concrete anchors and epoxy grouted dowels. The laboratory shall collect all mill certificates for structural steel, rebar, PT tendons and glulam beams, and review welders' qualifications and welding procedure specifications. The laboratory shall also perform concrete slump tests and compressive strength tests. The structural engineer of record will indicate on the structural drawings items requiring structural tests and inspections.

3. Structural Observation in accordance with the requirements 0f the CBC will be provided by the structural engineer of record (SEOR). The SEOR will also assist the Architect in the preparation of the Statement of Special Inspections for structural features as required by the CBC and the City of Sonoma.

IIIL STRUCTURAL DESIGN CRITERIA

A. Dead Loads

1. Use actual weights of materials of construction and fixed partition walls (hotel levels 2 and 3) and service equipment.

2. Superimposed Dead Loads

a.	Hanging ceilings and MEP	6 psf
b.	Fixed ceilings and MEP	8 psf (2 layers 5/8" sheetrock)
c.	Exterior cladding stone veneer clad walls.	20 psf vertical surface typical; 75 psf at

B. Live Loads (reference Table 1607.1, CBC)

1.	Restaurant (dining and kitchen)	100 psf
2.	Lobbies	100 psf
3.	Residential private rooms & corridors	40 psf
4.	Meeting rooms, spa and fitness areas	100 psf
5.	Residential public rooms & corridors	100 psf
6.	Exterior balconies & decks	Same as occupancy served
7.	Exterior plaza over garage (courtyard, pool deck, etc.)	100 psf
8.	Parking Garage slab for passenger vehicles	40 psf
9.	Level 1 Garage slab with truck access	Greater of HS20-44 or Sonoma Fire Truck
10.	Light Storage	125 psf
11.	Corridors (unless otherwise indicated)	100 psf
12.	Stairs and Exits	100 psf
13.	Roof	20 psf
14.	Accessible Roof Gardens	100 psf
15.	Partitions (added to occupancy load above) subject to change (Level 1)	15 psf, where partition walls are

C. Snow Loads (reference ASCE 7-10)

1.	Ground Snow Load, P_g	0 psf

D. Wind Loads (reference ASCE 7-10)

1.	Basic Wind Speed	110 mph (ASCE 7 Figure 26.5-1A)
2.	Exposure Category	B
3.	Importance Factor, I_w	1.0

E. Earth Lateral Pressures

1. Basement walls shall be designed for earth lateral pressures specified in the project-specific geotechnical report for drained conditions, including seismic induced lateral earth pressures. Basement walls shall be designed as “Restrained” walls with lateral support provided by the basement concrete floor slab and the Level 1 podium slab.

2. Wall design lateral pressures shall account for surcharge loading due to adjacent existing building foundations and vehicle traffic, where appropriate.

F. Seismic Loads (reference ASCE 7-10)

1.	Site Class:	D
2.	Risk Category	II
3.	Seismic Design Category	D
4.	Importance Factor, I	1.0
5.	Short Period Spectral Acceleration, S_s	1.50 g
6.	Long Period Spectral Acceleration, S_1	0.60 g
7.	Seismic Analysis Procedure:	Equivalent Lateral Force

G. Framing Deflection Limits

1. Hotel Guest Room Floor Framing
   - a. Live Load: Span/600
   - b. Dead + Live Load: Span/240
2. Other Floor Members (reference Table 1604.3, CBC):
   - a. Live Load: Span/360
   - a. Dead + Live Load: Span/240
3. Roof Members (reference Table 1604.3, CBC):
   - a. Live Load: Span/240
   - b. Snow Load: Span/240
   - c. Dead + Live Load: Span/180
4. Out of Plane Lateral Deflection of Exterior Walls:
   - a. Walls with brittle finishes Span/240
   - b. Walls with flexible finishes Span/120
5. Lateral Drift of Structural Frame: Drift is the displacement of a floor relative to the floor below. Drift limits are specified as a ratio of the story height (h).
   - a. Wind: 0.0025(h)
     - At 10 year mean recurrence interval per ASCE 7-10, Figure CC-1
   - b. Seismic: 0.020(h)

H. Special Loading Conditions: As identified by the Architect and Owner.

IV. Structural Materials

A. Structural Steel

1. Wide Flange shapes: ASTM A992 Grade 50 typical.
2. Base Plates, gusset plates, and continuity plates: ASTM A572 Grade 50.
3. Channels, angles and miscellaneous plates: ASTM A36.
4. Rectangular and Round Hollow Tube shapes: ASTM A500 Grade B.
5. Pipe: ASTM A53 Grade B.
6. High Strength Bolts: ASTM A325-N typical; A325-SC where specified.
   - a. Use standard holes, typical; slotted holes where specified.
7. Welding: E70XX electrodes minimum.
8. Composite Connectors: ASTM A108 automatic end welded headed studs.
9. Anchor Rods: ASTM F1554, grade 36 typical.
10. Grout under base plates: 8,000 psi cementitious non-shrink grout.

11. Finishes:

    a. Steel permanently exposed to weather shall be hot dipped galvanized.

    b. Exposed items and embedded items at exterior balconies shall be hot dipped galvanized.

    c. Do not prime paint steel surfaces to be encased with fire protection material.

    d. Prime paint exposed interior steel scheduled to receive finish paint.

B. Steel Stairs: Steel stairs shall be a design-build item by a specialty subcontractor, engineered from performance specifications and conceptual details.

C. Reinforced Concrete

1. Reinforcement

    a. Typical bars; ASTM A615 Grade 60.

    b. Welded bars: ASTM A706 Grade 60.

    c. Bar Splice Couplers: Type 1 bar splice couplers which develop 1.25 times the specified yield strength of the reinforcement

    d. Deformed Bar Anchors: AWS Type D and ASTM A496

    e. Welded Wire Mesh: ASTM A185, minimum 6x6-W1.4xW1.4 in topping slabs and fill over metal pans.

2. Post-Tensioning Steel

    a. Post-tensioning reinforcement shall be unbonded, ½" diameter tendons.

    b. Strand: ASTM A 416 Low Relaxation Type, with a minimum ultimate strength based on nominal area of 270 KSI.

    c. Forces shown on the drawings are effective forces after all immediate and long term losses.

3. Classes of Concrete (28 day compressive strengths unless noted otherwise)

    a. Footings and grade beams: 4,000 psi normal weight.

    b. Slab on grade: 3,000 psi normal weight.

    c. Podium Slab: 5,000 psi normal weight.

    d. Garage basement and other walls: 4,000 psi normal weight.

4. Concrete Mix Requirements

    a. Use 25%-50% fly ash replacement of cement in concrete used in slabs on grade, basement walls and foundation. Specified concrete strength in these uses shall be 56 days.

    b. Provide air entrainment at garage slab concrete and all other concrete exposed to the exterior for durability.

    c. Coatings and finishes shall be as specified by the Architect.

5. Post Installed Concrete Anchors: Hilti Kwik Bolt TZ Expansion Anchors

D. Hotel Floor Fill at Levels 2 and 3

1. Gypcrete (or equal) lightweight cementitious underlayment, 110 pcf, compressive strength 2,000 psi (ICC-ESR 2540).

E. Timber

1. Wall Studs: Douglas Fir No. 2, S-Dry

2. Floor Joists: Wood I-Joists, TrusJoist by Weyerhauser

3. Roof Joists: Wood I-Joists, TrusJoist by Weyerhauser

4. Mansard Framing: Douglas Fir No. 2, S-Dry

5. Plates, blocking, miscellaneous: Douglas Fir No. 2, S-Dry

6. Sills in contact with concrete: Douglas Fir No. 2, Pressure Treated

7 Posts: Douglas Fir No. 1 and Select Structural; Parallal Strand Lumber (PSL) where noted.

8. Headers less than 12" deep: Douglas Fir No. 1, S-Dry

9. Beams and Headers 12" and deeper: Glulam, 24F-V4 and 24F-V8, industrial grade where concealed by finishes, Architectural Grade where exposed to view.

10. Miscellaneous Engineered Framing:
    a. Timber Strand LSL studs, rim board and joists, by Weyerhauser
    b. Parallam PSL posts and beams, by Weyerhauser
11. Plywood: APA rated sheathing, CD and Structural 1 grades, Exposure 1
    a. Walls: ½" thick, blocked panel joints
    b. Roof: ½" thick, span rated 32/16, blocked panel joints
    c. Floors: ¾" thick, span rated 48/24, tongue and groove edges, blocked joints
12. Framing Connectors: Manufactured by Simpson Strong-Tie Company.
13. Shear Wall Tie Down System: Continuous Rod Tiedown system with compensation couplers, by Simpson Strong-Tie Company. Refer to Figure 4.
14. Fasteners:
    a. Nails: Common wire nails conforming to CBC Table 2304.9.1; nails into Pressure Treated lumber shall be hot dipped galvanized.
    b. Screws: Simpson Strong Drive ¼" diameter self drilling screws.
    c. Lag Screws: ANSI/ASME B18.2.1
    d. Bolts: ASTM A307, standard hex head typical, dome head carriage bolts where specified.
        1. Sill bolts in shear walls shall have ¼" thick galvanized plate washers, minimum 3" x 3".
        2. All other bolts shall have standard cut washers under the bolt head and nut.
    a. Adhesive: Glue floor sheathing at T&G joints and to supporting members with adhesive meeting APA AFG-01.

V. STRUCTURAL SYSTEM DESCRIPTIONS

A. General Requirements

1. Construction is anticipated to be Type V for the hotel superstructure and Type II noncombustible construction for the garage. The podium slab will provide a 3 hour rated separation of the hotel from the garage.
2. A full height seismic separation joint will be provided between the front and main building wings, where the building width shrinks to 6 feet at the transition in the southwest corner of the entry plaza. Refer to the framing plans for the location and Figure 5.
3. Floor to floor heights (Roof Level = 35'-0")
    a. Garage basement to Level 1: 11'-2"
    b. Level 1 to Level 2: 12'-4"
    c. Level 2 to Level 3: 10'-4"
    d. Level 3 to Roof: Varies from 10'-4" to 12'-4"
4. The 3-story Hotel structure will be a wood frame structure with supplemental structural steel.
    a. The typical floor system will consist of a 1" cementitious underlayment over a 3/8" sound control mat over ¾" thick tongue and groove plywood floor sheathing over prefabricated wood I-joists. The I-joists will typically bear on wood stud walls and flush frame with glulam beams. Refer to Figure 3.
    b. The typical roof framing will consist of plywood roof sheathing over prefabricated wood I-joists. I-joists will typically bear on wood stud walls and flush frame with glulam beams. Roof joist framing will generally be oriented in the direction of the roof slopes, with built up crickets or tapered rigid insulation providing cross slopes to drains. Portions of the complex roof geometry (dormers, mansards, etc.) will be framed with solid sawn 2x joists.
    c. The lateral force resisting system used to resolve wind and seismic loads will consist primarily of plywood shear walls with some concentrically braced steel frames, interconnected at the roof and floors by the plywood diaphragm. The CBC minimum standards for the earthquake resistant design of Risk Category II Occupancy buildings are intended to provide for the safety of the building occupants and reduce the risk of severe building damage. The seismic performance objective for this building is considered "Life Safety" under the CBC minimum standards.

5. The Garage Parking/Podium structure will be constructed with reinforced cast-in-place reinforced concrete or shotcrete systems.

   a. The elevated garage/podium slab will be flat slab construction with drop panels at the columns. Slab reinforcement will be either all mild reinforcement, or post-tensioned with supplemental mild reinforcement, Concrete beams will be provided to support superstructure columns and other special concentrated load conditions. Columns will be mild reinforced cast-in-place concrete. Refer to Figure 2 for a typical slab bay.

   b. Reinforced cast-in-place or shotcrete retaining walls are anticipated at the perimeter of the below grade garage.

   c. Multiple varied loading conditions occur across the podium and include:

      - Pavers over sand bed.
      - Pool deck with elevated pool, 3’-6” deep.
      - Raised planters and fountains.

6. The structural design will be coordinated with the building envelope and waterproofing system recommendations prepared by Simpson Gumpertz & Heger (SGH), building envelope consultants for the Sonoma Hotel Project.

B. Foundation System.

1. A project specific geotechnical report has been prepared by PJC & Associates, Inc., dated March 9, 2015.

2. The site is relatively flat and consists of weak, compressible artificial fills which range from three to seven feet below the ground surface. These fills are underlain by firm native soils. The fills are not suitable for supporting building foundations and will need to be removed and replaced as compacted engineered fill.

3. Ground water was encountered during drilling at depths ranging from five to seven feet below the ground surface. Ground water levels can fluctuate throughout the year due to seasonal rainfall and other factors. As the garage floor extends below the water table, a temporary dewatering system will be required during construction excavation, and a permanent dewatering system of the garage basement slab will be required to prevent hydrostatic uplift pressures. Refer to Figure 1. The foundation slabs and walls shall be designed and constructed to comply with the building envelope and waterproofing recommendations provided by the project building enveloped consultant, SGH.

4. Based on the reference report, the new building and garage will be supported on a conventional shallow foundation system consisting of spread footings at column locations and continuous strip footings at wall locations. Grade beams are anticipated from perimeter wall footings back to the nearest column footing. Refer to the Foundation Plan S2.00.

   a. At Grade, footings shall bear on engineered fill with a minimum embedment of 30 inches below the lowest adjacent grade. The engineered fill replaces the weak, compressible artificial fills currently on site. On site soils are suitable to be used as engineered fill with proper moisture conditioning.

   b. At the Parking Garage, footings shall bear on firm existing native soils, extending at least 18 inches into this material.

5. The allowable soil bearing pressures for the new footings are:

   a. At Grade: Continuous Wall Footings (D+L) = 2,000 psf
   Isolated Spread Footings (D+L) = 2,800 psf
   Allowable bearing pressures may be increased 50% for wind and seismic loads.

   b. Parking Garage: Continuous Wall Footings (D+L) = 4,000 psf
   Isolated Spread Footings (D+L) = 4,500 psf
   Allowable bearing pressures may be increased 33% for wind and seismic loads

   c. At these allowable bearing pressures, the total building settlement is estimated to be 1.25” with differential settlement between adjacent footings estimated to be 0.50”. The majority of settlement is expected to occur during construction with the placement of dead loads.

6. Subgrade preparation, moisture protection and below slab drainage at the building and parking garage slabs on grade shall be provided as recommended by the project geotechnical report.

   a. The hotel building slab at grade shall be underlain by a 15 ML vapor retarder over a 4” layer of clean gravel or crushed rock, over the engineered fill.

b. The garage slab on grade shall be underlain by a 15 ML vapor retarder over a layer of clean gravel or crushed rock with 4" diameter perforated drain pipes, which is placed over the firm native soil. The free draining rock shall be a minimum of 6" thick and increase to 12" thick at the locations of the drain pipes. See Figure 1.

7. Basement walls are anticipated to be 12" thick cast-in-place reinforced concrete or shotcrete walls, designed to span from foundation to the Level 1 slab. Temporary shoring will be required for these walls if they are backfilled prior to construction of the Level 1 podium slab. Basement walls will be back-drained and water proofed.

8. Construction Excavation

   a. Temporary construction cut slopes shall not exceed ¾ Horizontal to 1 Vertical slopes. Steeper cuts will require an engineered shoring system designed by the contractor and a specialty shoring engineer retained by the contractor.

C. Hotel Building

1. Gravity Load Carrying System (Dead and Live Loads)

   a. Level 1

   - At grade, the Level 1 floor is a 5" thick concrete slab on grade reinforced with #4 bars at 12" on center each way, placed mid depth of the slab. Control joints will be sawcut at spacing not more than 15 feet square, coordinated with any architecturally exposed concrete finishes.

   - Over the basement garage and back-of-house spaces, the Level 1 floor is a 12" thick mild-reinforced concrete slab with 10 inch thick drop panels at the columns.

   - Bearing walls are typically 3x6 studs at 16" on center with pressure treated 3x6 sill plates. Sill plates for structural walls are bolted to the slab with cast-in-place sill bolts.

   - Columns will be a combination of timber and square hollow structural steel sections.

   - Slabs will be depressed as needed for tile finishes.

   b. Levels 2 and 3:

   - The typical floor framing consists of ¾" thick tongue and groove plywood over 12" nominal depth prefabricated wood I-joists spaced at 24" on center, with intermediate glulam beams. Framing shall be oriented and detailed to minimize the transfer of vibrations due to foot fall from corridors to guest rooms and between adjacent guestrooms. Plywood panel joints shall be blocked. Plywood tongue and groove joints and bearings shall be field glued. Floor beams shall be engineered lumber, typically glulams or Parallel Strand Lumber (PSL) members.

   - The floors will be platform framed, with joists bearing on 2x6 at 16" on center wood stud walls. Wall headers at doors and windows shall be glulams.

   - Party walls between guestrooms shall be double stud walls, with floor joists non-continuous across the walls. Floor plywood shall be continuous for the structural diaphragm.

   - Columns shall be either wood posts (6x6 or PSL) or square HSS steel, depending on the magnitude of the loads.

   c. Roof

   - The typical roof framing consists of ½" thick plywood over 12" nominal depth prefabricated wood I-joists spaced at 24" on center, with intermediate glulam beams. Framing shall be oriented parallel to the drainage slopes, with cross slopes created by built up crickets. Plywood panel joints shall be blocked. Roof beams shall be engineered lumber, typically glulams or PSL members.

   - Mansard shall be framed with 2x6 solid sawn rafters, sheathed with ½" roof plywood.

   d. Glulams exposed to view in the finished building shall be architectural grade material.

   e. Exterior exposed timbers shall be either pressure treated or naturally decay resistant wood material.

f. Balcony framing shall be enclosed and not exposed to the weather. Decks shall slope away from the building and have a waterproof membrane over the balcony plywood. Exposed brackets for guardrails and other features shall be galvanized steel.

2. Lateral Force Resisting System (Wind and Seismic Loads)

a. Vertical System: Plywood shear walls typical, with some concentric braced steel frames between Levels 1 and 2.

- Reference Sheets S2.01a, S2.02a and S2.03a
- Single and double sided plywood shear walls with continuous rod tiedown system.

b. Horizontal System:

- Diaphragms: Nailed roof and floor plywood diaphragms (flexible).
- Chords: Wall top plates and glulam beams.
- Collectors: Wall top plates and glulam beams, with beam depths to match adjacent joist framing wherever possible.

c. Building Seismic Joint: Across the narrow service corridor between the restaurant building and the hotel lobby.

d. Horizontal Discontinuities (reference Table 12.3-1, ASCE 7-10)

- Type 2: Reentrant Corner Irregularity
- Type 4: Out-of-Plane Offset Irregularity

e. Vertical Discontinuities (reference Table 12.3-2, ASCE 7-10)

- Type 4: In-Plane Discontinuity in Vertical Lateral Force-Resisting Element Irregularity.

D. Parking Garage/Podium Structure

1. Gravity Load Carrying System (Dead and Live Loads)

a. The garage slab and ramps on grade subject to vehicular loading are anticipated to be 6” thick with #5 bars spaced at 12”on center each way. Control joints will be sawcut at spacing not more than 15 feet square.

b. The Level 1 podium floor will be either a post-tensioned or mild-reinforced concrete slab, stepped at the hotel building exterior walls and sloped to area drains, a minimum of 12” thick, with 10 inch thick drop panels at the columns. Concrete cover over bottom reinforcement shall achieve a 3 hour fire rating.

c. Elevated parking deck slabs with access from the street shall be designed for fire truck loads provided by the City of Sonoma.

d. Columns will be square cast-in-place reinforced concrete, sizes ranging from 18” to 22” square.

e. Beams: As needed at the pool and at major concentrated loads.

f. Walls: Perimeter basement walls are retaining, bearing and seismic shear walls. They shall be 12” thick typical, with two curtains of reinforcement, doweled into the podium slab and the slab on ground. Horizontal shrinkage resistance shall be provided through continuous horizontal reinforcement, not expansion joints.

g. Swimming Pool: The swimming pool structural will be a design-build pool installed within a sealed and drained “tub” assembly, raised on top of the podium concrete slab structure.

2. Lateral Force Resisting System (Wind, Seismic, and Retained Soil Loads)

a. Vertical System: Cast-in-place reinforced perimeter concrete shear walls.

b. Horizontal System:

- Diaphragm: Concrete slab (rigid).
- Chord Members: Additional reinforcement in the perimeter of the slab
- Chord Members: Additional reinforcement in the slab or the top of the walls.

E. Seismic Bracing of Building Non-Structural Systems

1. General

a. All bracing and anchorage of nonstructural building components including exterior cladding, ceilings, partitions, mechanical and electrical equipment, plumbing, elevators, ducts, pipes and conduit, fire protection systems, storage racks, tall cabinets and access floor systems shall be designed in accordance with the 2013 California Building Code.

b. Restraint of mechanical and electrical equipment, including storage racks, are primarily for anchorage and bracing to prevent sliding, overturning or other damage to the equipment unit as a whole. Post-earthquake operability is assured only if the attached piping, conduits control wiring and ductwork essential to the proper functioning of the equipment, as well as the internal equipment features, are protected from earthquake damage.

c. Proper consideration shall be given to flexibly mounted equipment (such as equipment on spring isolators) and the use of snubbers to limit horizontal displacements of the isolators, thereby preventing instability.

2. Seismic Loads for Bracing Design

a. Seismic design forces shall be in accordance with the requirements of the 2013 CBC, with importance factor, I, as specified in the project seismic design criteria. The seismic force level used in bracing nonstructural components shall be consistent with the seismic force level used for the building as a whole.

b. Details for bracing and support of all nonstructural components shall be shown on the contract drawings, except:

- Equipment with operating weight less than 200 pounds mounted directly on a floor or roof
- Equipment with operating weight less than 20 pounds suspended from the roof, floor or walls
- Ductwork, piping or conduit supported and braced in accordance with SMACNA or other approved national standard.

3. Partitions

a. For stud and drywall partitions, brace tops of partitions directly to the structure. Provide expansion connections at columns and other structural elements coordinated with designated structural drift limits.

b. Reinforce masonry partitions and separate them from the structure with large joints.

4. Ceiling Systems: Support and brace ceiling systems in accordance with CBC referenced standards.

5. Racks and Storage Systems

a. Anchor all storage racks, tall cabinets and open shelving at the base and laterally brace at the top. Provide safety face bars or rails for open shelving where practical. Storage racks with internal bracing shall meet the same lateral force criteria as specified for the anchorage.

6. Piping and Conduit

a. Tie each line run to a single structural system. Where pipe/conduit runs across structural system change or seismic joint, provide flexible joints with adequate movement.

b. Install fire sprinklers per NFPA standards

c. Provide earthquake shutoff valves in gas lines and other critical piping

d. Brace pipe/conduit trapezes in transverse and longitudinal directions

7. Ducts

a. Brace in accordance with SMACNA standards

b. Laterally brace long hangers. Brace all ducts to the structure

8. Mechanical, Electrical and Kitchen Equipment

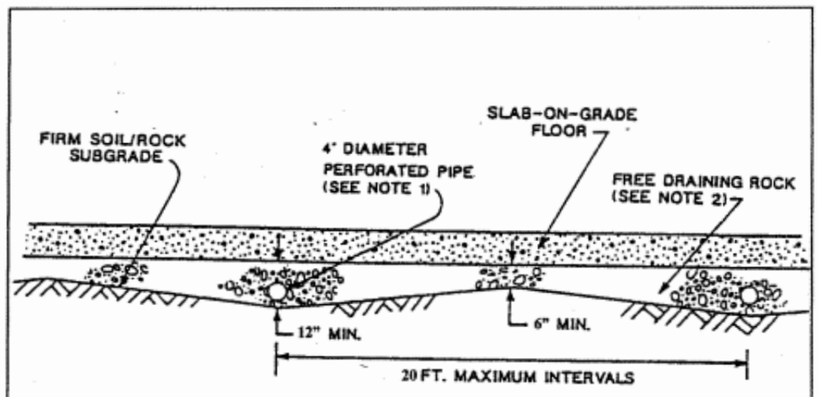
a. Laterally brace all floor mounted, roof mounted and suspended equipment. Provide restraints on vibration isolators to limit excessive movement, or provide seismic rated isolators

b. Wall studs supporting heavy control panels and stud connections at top and bottom to the structure shall be upsized per backing plate schedule.

c. Use through-bolting where inadequate embedment depth for desired fastener strength.

9. Elevators

a. Brace elevator systems in accordance with the 2013 CBC Elevator system bracing shall be the responsibility of the elevator manufacturer.

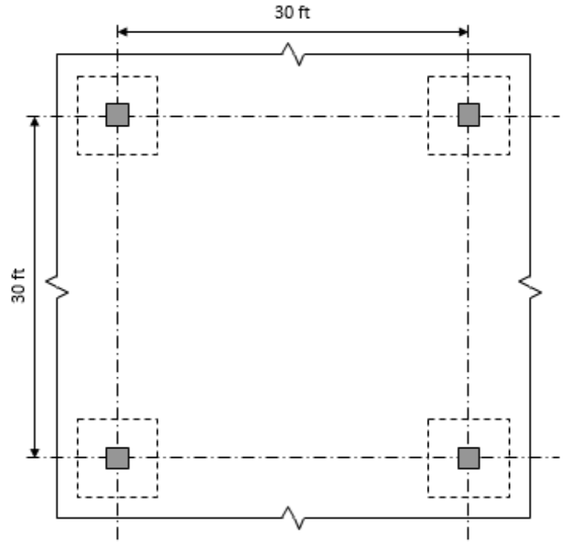


Notes:

1. PERFORATED PIPE (PVC OR EQUIVALENT) SHOULD BE PLACED WITH PERFORATIONS DOWN. THE PIPE SHOULD BE SLOPED FOR GRAVITY FLOW AND OUTLET THROUGH SOLID PIPE TO DAYLIGHT.

2. DRAIN ROCK SHOULD BE AT LEAST 6" THICK AND A MINIMUM OF 12" WHERE PIPES ARE LOCATED. THE DRAIN ROCK SHOULD BE ½ OR ¾ INCH DRAIN ROCK ON FILTER FABRIC OR CONSIST OF CLASS II PERMEABLE MATERIAL.

PJC & Associates, Inc. *Consulting Engineers & Geologists*	SLAB UNDERDRAIN SYSTEM PROPOSED NEW HOTEL 135 WEST NAPA STREET SONOMA, CALIFORNIA	PLATE 2
	Proj. No: S927.01 Date: 3/15 App'd by: PJC	



FLOOR SYSTEM:
1. MILD 12" TWO-WAY FLAT SLAB WITH 10.25" x 10' x 10' DROP PANELS

ESTIMATED FLOOR QUANTITIES:
1. FLOOR REBAR = 6.20 PSF
2. FLOOR CONCRETE VOLUME = 0.0406 CY/SF

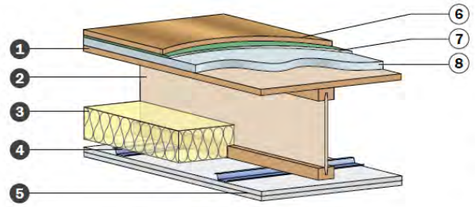
NOTES:
1. REINFORCEMENT QUANTITY IS FOR TYPICAL BAY ONLY
2. 28 DAY CONCRETE STRENGTH = 4000 PSI
3. REINFORCING STEEL IS GRADE 60.
4. VALUES INCLUDE AN ALLOWANCE FOR HOOKS AND LAP SPLICES
5. MATERIAL QUANTITIES DO NOT INCLUDE SUPPORT BARS OR CHAIRS, OPENING REINFORCEMENT, MATERIAL WASTE, ETC.
6. REINFORCING SHOWN IS FOR GRAVITY SYSTEM ONLY

WALTER P MOORE	PROJECT NAME: Sonoma Hotel FRAMING SYSTEM: Mild Two-Way Slab w/ Drops - 400 PSF		
	PROJECT NO.: S13-15001-00	DATE: 3/13/2015	SHEET NUMBER: S1.01

Figure 2 - Typical Podium Slab Framing

Assembly B Two Layer Ceiling, One-Hour Rated[1]

ICC-ES ESR-1153, PFS FA-1,
Intertek WNR FCA 60-01, WNR FCA 60-03



Base Components:

1. Single layer of 48/24 minimum, span-rated tongue-and-groove sheathing, nailed and glued with a subfloor adhesive.
2. TJI® joists with on-center spacing of 24" maximum
3. Glass fiber insulation[2], above resilient channels and between bottom flanges. Maximum R-30 rating. See tables for specifications.
4. RC1 resilient channels[2] at 16" on-center. Spacing can be increased to 24" on-center for joists spaced 16" on-center.
5. Two layers of ⅝" thick Type X gypsum board complying with ASTM C36 or two layers of ½" thick Type C gypsum board.

Flooring Components, see tables below:

6. Finish flooring
7. Acoustic mat
8. Underlayment

(1) For more information on design, installation and fire performance of this assembly, see the *Weyerhaeuser Fire-Rated Assemblies and Sprinkler Systems Guide 1500*, ICC-ES ESR-1153, PFS and Intertek Listings.

(2) Insulation and resilient channels are optional for the fire resistance rating.

ALLOWABLE HOLES IN I-JOISTS

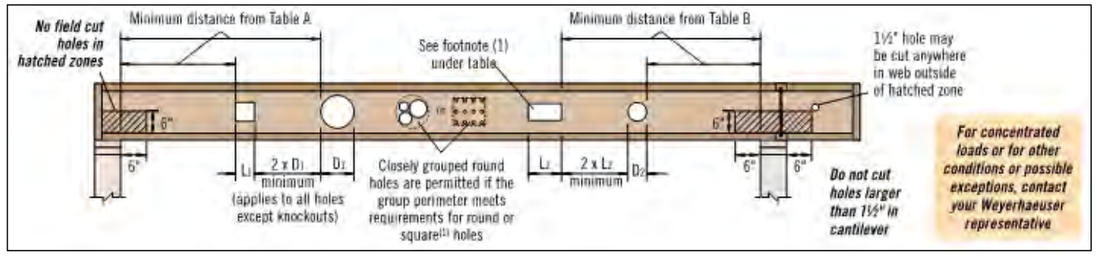


Figure 3 – Typical Floor Assembly at Levels 2 and 3

Figure 4 – Plywood Shear Wall Tie Down Example

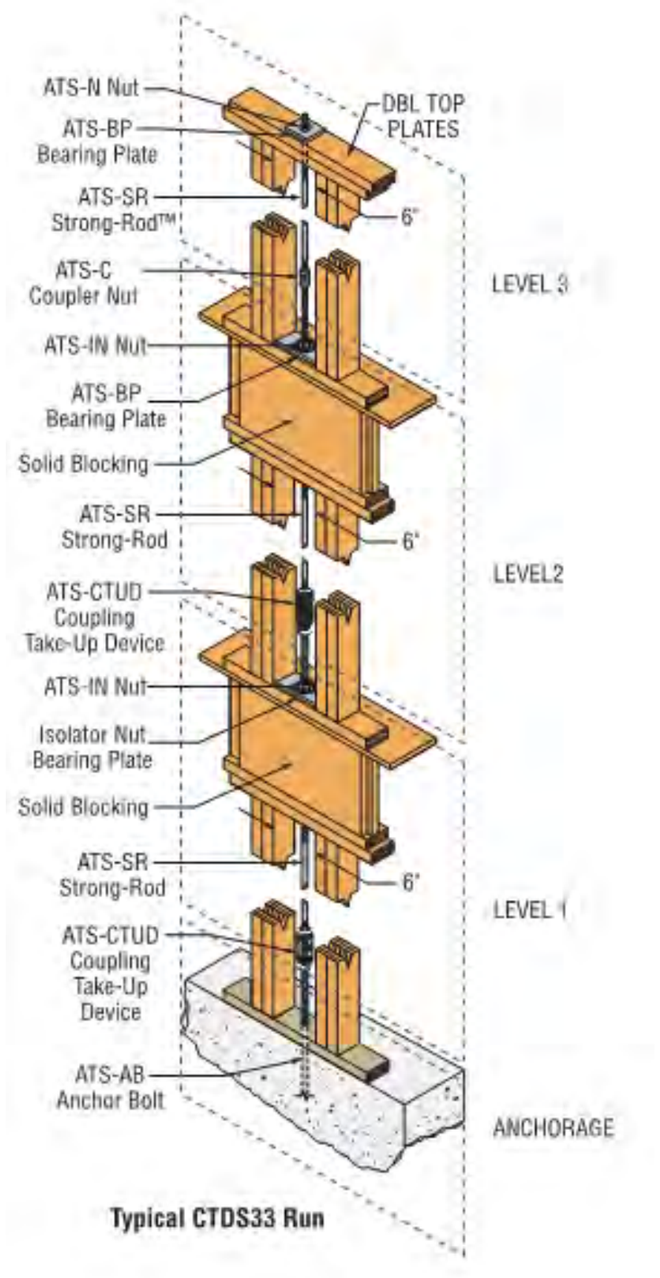
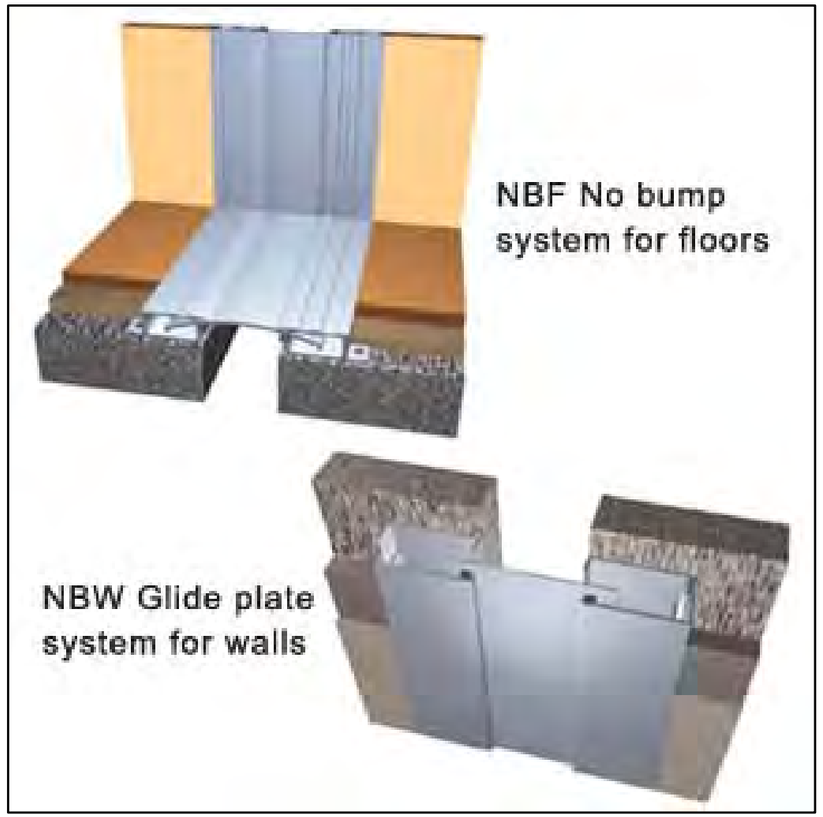


Figure 5 – Seismic Joint Example Detail

04



05
SITE CIVIL DESIGN AND STORM WATER MANAGEMENT PLAN

Project Description
Hotel Project Sonoma straddles the southwest corner of West Napa Street(Highway 12) and First Street West, with access from both West Napa Street and First Street West. Huffman Engineering has studied the existing utilities in both West Napa Street and First Street West to determine the required modifications to support the new hotel. Additionally, Huffman Engineering has analyzed the effects of the new hotel on storm water runoff in the area, and in accordance with LEED requirements has planned for a 25% reduction in storm water runoff from the site for the 85th percentile 24-hour storm event.

The project will be designed in accordance with the standards set forth by the City of Sonoma, Sonoma County Water Agency, State of California Department of Transportation (Caltrans), City of Santa Rosa Low Impact Development Code (for NPDES MS4 compliance), Pacific Gas & Electric Greenbook, CalGreen, and U.S. Green Building Council (LEED), in so far as they apply.

Storm Water Management Plan
The main entrance off Napa Street will consist of a paver stone roundabout, and contain the majority of storm water treatment facilities and storm water detention for the project. Storm water will be routed to a centrifugal storm water treatment system which will remove trash, suspended solids and pollutants in accordance with NPDES MS4 requirements. Storm water will be routed via an ACO Brickslot slot drain. After passing through the treatment system, storm water will flow to an underground storm water detention system which will contain the required runoff volume to limit runoff levels to 25% less than the predevelopment runoff levels for the 85th percentile 24-hour storm event. The calculations below reflect the volume capture requirement for sizing detention on site.

Volume Capture Calculations:
Pre-Development CN value = 94
Post-Development CN value = 98
A = Total Runoff Area = 53,553

Pre-Development Storm Water Runoff Volume:
P = Precipitation(in)
= 0.92
K = Seasonal Precipitation Factor
= 1.0
S_{PRE} = Potential Maximum Retention After Runoff(in)
= $(1000/CN_{pre})-10$
= (1000/94)-10
=0.63830 inches
Q_{PRE} = Runoff Depth
= $[(PxK)-(0.2xS)]^2/[(PxK)+(0.8xS)]$ x 1/12
= $[(0.92x1.0)-(0.2x0.64)]^2/[(0.92x1.0)+(0.8x0.64)]$ x 1/12
= 0.03650
V_{PRE} = Pre-Development Volume of Storm Water Generated
= (Q)(A)
= (0.03650)(53,553)
= 1954.68-Cu.Ft.

Post-Development Storm Water Runoff Volume:
P = Precipitation(in)
= 0.92
K = Seasonal Precipitation Factor
= 1.0
S_{POST}= Potential Maximum Retention After Runoff(in)
= $(1000/CN_{pre})-10$
= (1000/98)-10
=0.20408 inches
Q_{POST} = Runoff Depth
= $[(PxK)-(0.2xS)]^2/[(PxK)+(0.8xS)]$ x 1/12
= $[(0.92x1.0)-(0.2x0.20)]^2/[(0.92x1.0)+(0.8x0.20)]$ x 1/12
= 0.05975
V_{POST}= Pre-Development Volume of Storm Water Generated
= (Q)(A)
= (0.05975)(53,553)
= 3199.79-Cu.Ft.

Volume Capture Goal:
V_{DELTA}= (V_{POST}) - $[(V_{pre}$ x 75%)]
= (3200 Cu.Ft.) – [(1955 Cu.Ft. x 0.75)]
= 1733.75 Cu.Ft.
≈ 13,000 Gallons

Storm water will be stored in 893’ of 36” DuroMaxx SRPE Storm Water detention pipes by Contech. Rain water harvesting is also planned for the site, and is discussed in more detail in subsequent sections. The upper twelve inches are designed to store rainwater to limit runoff to 25% less than predevelopment runoff levels. The lower twenty-four inches will act as a permanent rain water cistern. Rainwater harvesting values were not included in storm water detention or treatment calculations; this is a conservative approach which will result in a reduction beyond the 25% target.

Storm water that has been detained and treated by the systems discussed above, as well as runoff from storm events that exceed the 85th percentile 24-hour storm event, will route via twelve-inch storm drain off site in kind with existing runoff patterns. The vast majority of the site currently drains via overland flow and small diameter pipes to a 12" storm drain at the southwest corner of the site, and connects to the storm drain system of the adjacent Sonoma Valley Inn. Our intention is to continue flow patterns in kind with existing in this manner.

In the event that a storm event exceeds 10-year runoff volumes, storm water will back up into the slot drain system and overflow onto West Napa Street, avoiding flood damage to hotel facilities.

Grading Plan
The hotel structure will have a first floor finished floor of 80-feet. The garage grades will vary for drainage purposes but will be approximately 11-feet lower. The autocourt area will be generally flat to maximize infiltration through the porous paver system. Grades will allow flood routing towards West Napa Street. The employee parking and delivery area will generally slope towards First Street West. In general grades will slope away from underground parking ramps to minimize storm water flowing into the garage. Trench drains will be used at the bottom of each ramp to route storm water to a sand/oil interceptor.

To prevent floating and leaking, under slab & retaining wall sub drains will be designed in accordance with the Soils and Geotechnical Report by PJC & Associates. Flows from the under slab drain system will route to a sump tank to be combined with the outflows from the sand/oil interceptor. Both tanks will be designed with anti-flotation measures. Outflows from this tank will be pumped to the outlet pipe of the main storm water pump and off site.

Curb gutter and sidewalk will be replaced on the project frontage on both West Napa Street and First Street West.

Sanitary Sewer System
Sanitary sewer mains exist in both West Napa Street with an 8-inch main; and in First Street West with a 6-inch main. Based on fixture counts will require an 8-inch main to serve all portions of the new hotel. The existing sewer system will be studied to verify capacity in accordance with Sonoma County Water Agency requirements. A new 48-inch manhole will be installed to support the connection.

To serve the facilities on the garage/basement level a 2-horsepower, 30-gallon per minute pump will be installed to lift waste to the gravity sewer at the first floor level. The pump will be contained in a 1000 gallon sump tank near the northwest corner of the garage.

A 1500 gallon grease trap will be installed on the westerly side of the autocourt area to serve the new restaurant. A monitoring manhole will be installed at the outflow of the grease trap before connecting the new 8-inch main leaving the site.

An existing sanitary sewer manhole serving the "Lynch Building" will be relocated to make room for new storm drainage facilities discussed in previous sections. The existing sewer lateral connection for the "Lynch Building" to the existing main in West Napa Street will remain. A sewer lateral serving the existing warehouse behind the "Tribune Building" from First Street West will be abandoned.

Domestic & Landscape Water Service
Based on fixture counts the new hotel will require 307 gallons per minute during peak flows. This demand will require the installation of a new 6-inch domestic water meter connected to the existing 8-inch main in West Napa Street. The existing 2-inch water service serving the "Lynch Building" will be relocated to the back of sidewalk, and on-site service piping relocated to avoid conflicts with the new hotel building. The existing water service serving the "Chateau Sonoma" store will be abandoned. An existing water service serving the warehouse behind the "Tribune Building" from First Street West will also be abandoned. A new 2" water meter will be installed to serve the "Lynch Building".

Below are calculations estimating the existing water demand of each parcel based on equivalent single family dwelling units for sanitary sewer flow characteristics provided by the Sonoma County Water Agency:

Sonoma Valley Community Sewer District:
People per ESD: 2.60
Flow per ESD: 200 Gallons per Day
Average Dry Weather Flow per ESD: 200 Gallons per Day

Existing Domestic Water Demand:
Chateau Sonoma Building:
1 ESD x 200 = 200 Gallons per Day

Lynch Building:
7.69 ESD x 200 = 1538 Gallons per Day

Tribune Building (Includes Warehouse):
7.31 ESD x 200 = 1426 Gallons per Day

A new 1-inch meter will be installed adjacent to the new 4-inch meter to serve landscaping irrigation on-site. At peak flows the system is expected to demand 12 gallons per minute. Landscaping water will be supplemented by a rain water catchment system on-site. Roof

downspouts and condensate from roof mounted condenser units will flow to the stormwater cistern in the autocourt. The addition of the rainwater catchment system will result in a 30% reduction in annual landscape water demands.

Below are calculations estimating the required volume for the rain water catchment system:

Rainwater Catchment Calculations:
60 Trees x 4 Emitters/Tree x 2 Gallons/Hour x 3 Hours/Week = 1440 Gallons/Week
+
300 Plans x 1 Emitter/Plant x 2 Gallons/Hour x 3 Hours/Week = 1800 Gallons/Week
x
32 Weeks/Year (8 Months) = 103,680 Gallons/Year
x
30% Provided by Rain Water Catchment System
=
31,104 Gallons

As discussed in previous sections, rainwater storage volume is available in the bottom twenty-four inches of the DuroMaxx SRPE Stormwater detention system. The addition of the HVAC condensate to the system will further offset the landscaping water use for the site.

Fire Water Services
The hotel footprint conflicts with the location of the existing double detector check valve serving the “Lynch Building”. A new 8-inch double detector check valve will be installed to support both buildings of the new hotel as well as the “Lynch Building”. Separate post indicator valves and fire department connections will be provided for each of the three buildings and the basement garage. A Class 1 standpipe system will be installed in the basement garage. An existing fire service serving the existing warehouse will be abandoned on First Street West.

The hotel footprint is also in conflict with an existing fire hydrant on the west side of the driveway entrance. A new hydrant will be installed on the east side of the entrance, closer to the “Lynch Building”. In addition to the hydrant at the front of the parcel, two more hydrants exist within 300-feet of the site. One is located on the northwest corner of the intersection of West Napa Street and First Street West; one is 145-feet, south along First Street West, from the south east corner of the project.

Electrical
Electrical for the new hotel will originate on West Napa Street. A new bell hole will be installed in front of the “Lynch Building”, and route power to a new transformer on the east side of the autocourt area. The existing transformer serving the lynch building will be relocated adjacent to the new transformer serving the hotel. Power from the existing bell hole for the “Lynch Building” will be re-routed to the new transformer location.

Gas
Gas service will be served from West Napa Street. An existing 3” service exists serving “Chateau Sonoma”. A lateral from First Street West serves the existing warehouse. Each lateral will be abandoned and new service provided from First Street West.

Telecom
An AT&T splice box exists on First Street West will be relocated northerly or underground to avoid conflict with a new garage ramp and driveway entrance. Drainage from an existing drop inlet in the “Feed Store” building parking lot will need to re-routed to avoid conflict with the new location. Existing overhead power and utilities along First Street West will be placed underground. New telecom services will be provided from the existing facilities along West Napa Street.

Caltrans
An existing traffic monitoring station in front of the “Lynch Building” may be needed to be relocated 10-feet east along West Napa Street. Caltrans will be consulted regarding planned tree box locations to address sight distance concerns.

Example Spreadsheet of Equivalent Single Family Dwelling Units. Refer to electronic document for complete sewer capacity data content.

APN	ESD	Address	*Note: Information as of 2014.*
018-011-004	1.00	192	5TH STREET W
018-011-005	1.00	486	LINDA
018-011-006	1.00	474	LINDA
018-011-007	1.00	462	LINDA
018-011-008	1.00	450	LINDA
018-011-009	1.00	440	LINDA
018-011-010	1.00	426	LINDA
018-011-011	1.00	416	LINDA
018-011-012	1.00	402	LINDA
018-011-017	0.00	0	NONE
018-012-001	1.00	487	LINDA
018-012-002	1.00	475	LINDA
018-012-003	1.00	463	LINDA
018-012-004	1.00	451	LINDA
018-012-005	1.00	439	LINDA
018-012-006	1.00	427	LINDA
018-012-007	1.00	415	LINDA
018-012-008	1.00	403	LINDA
018-021-003	0.00	0	3RD
018-021-004	0.00	0	3RD
018-021-005	0.00	0	NONE
018-021-006	0.00	0	NONE
018-031-003	0.00	0	1ST STREET W
018-031-005	0.00	99	1ST STREET W
018-032-006	0.00	0	NONE
018-032-007	0.00	0	NONE
018-032-008	0.00	0	NONE
018-032-009	0.00	0	NONE
018-041-001	0.00	0	NONE
018-041-005	1.00	91	2ND
018-041-006	1.00	87	2ND
018-041-007	1.00	83	2ND
018-041-008	1.00	79	2ND
018-041-009	1.00	75	2ND
018-041-010	1.00	71	2ND
018-041-011	1.00	67	2ND
018-041-012	1.00	63	2ND
018-041-013	1.00	59	2ND
018-041-014	1.00	55	2ND
018-041-015	1.00	51	2ND
018-041-016	1.00	47	2ND
018-041-017	1.00	43	2ND
018-041-018	1.00	39	2ND
018-041-019	1.00	35	2ND
018-041-020	1.00	31	2ND
018-041-021	1.00	0	2ND
018-042-006	1.80	80	2ND
018-042-007	1.80	60	2ND
018-051-002	0.00	400	BRAZIL
018-051-005	0.00	0	BRAZIL
018-051-006	0.00	434	BRAZIL
018-051-007	0.00	0	BRAZIL
018-051-010	0.00	480	BRAZIL
018-051-011	0.00	436	BRAZIL
018-051-012	0.00	95	BRAZIL
018-061-001	0.00	0	4TH STREET W
018-061-002	0.00	0	NONE
018-061-003	0.00	0	NONE
018-071-006	0.00	0	NONE
018-071-007	0.00	0	1ST STREET W
018-071-008	5.00	151	1ST STREET W
018-091-007	1.00	142	2ND
018-091-008	1.00	118	2ND
018-091-010	1.00	140	2ND
018-091-015	0.00	0	2ND STREET E
018-091-016	1.00	175	4TH STREET E
018-091-017	0.00	0	4TH STREET E
018-091-018	0.00		
018-091-019	1.00	131	4TH
018-101-012	1.00	282	4TH STREET E
018-101-027	1.00	213	WILKING
018-101-028	1.00	221	WILKING
018-101-029	1.00	231	WILKING
018-101-030	1.00	241	WILKING
018-101-031	1.00	251	WILKING
018-101-032	1.00	263	WILKING
018-101-033	1.00	271	WILKING
018-101-034	1.00	281	WILKING
018-101-035	1.00	466	LOVALL VALLEY
018-101-036	1.00	450	LOVALL VALLEY
018-101-048	1.00	292	4TH STREET E
018-101-058	1.00	430	LOVALL VALLEY
018-101-059	1.00	440	LOVALL VALLEY
018-101-065	1.00	200	4TH STREET E
018-101-066	1.00	425	GREVE
018-101-067	1.00	435	GREVE
018-101-068	1.00	445	GREVE
018-101-069	1.00	201	WILKING
018-101-070	1.00	272	4TH STREET E
018-101-071	0.00	0	LOVALL VALLEY
018-101-072	0.00	0	LOVALL VALLEY
018-101-073	1.00	410	LUCCA
018-101-074	1.00	420	LUCCA
018-101-075	1.00	430	LUCCA
018-101-076	1.00	450	LUCCA
018-101-077	1.00	445	LUCCA
018-101-078	1.00	435	LUCCA
018-101-079	1.00	425	LUCCA
018-101-080	1.00	240	4TH
018-102-001	1.00	486	LOVALL VALLEY
018-102-002	1.00	498	LOVALL VALLEY
018-102-003	1.00	280	WILKING
018-102-004	1.00	272	WILKING
018-102-005	1.00	264	WILKING
018-102-006	1.00	252	WILKING
018-102-007	1.00	242	WILKING
018-102-008	1.00	232	WILKING
018-102-009	1.00	220	WILKING
018-102-010	1.00	210	WILKING
018-102-011	1.00	200	WILKING
018-102-012	1.00	190	WILKING
018-102-013	1.00	180	WILKING
018-102-014	1.00	170	WILKING
018-102-015	1.00	160	WILKING
018-102-016	1.00	150	WILKING
018-102-017	1.00	155	WILKING
018-102-019	1.00	175	WILKING
018-102-020	1.00	185	WILKING
018-102-021	1.00	450	GREVE
018-102-022	1.00	430	GREVE
018-102-023	1.00	420	GREVE
018-102-024	1.00	180	4TH STREET E
018-102-026	0.00	148	4TH STREET E

06
MECHANICAL, HEATING, VENTILATION AND COOLING SYSTEMS

Design Narrative Overview – HVAC & Plumbing
As a whole, the Hotel Project Sonoma will be sustainably designed utilizing proven environmentally responsible strategies that meet or exceed LEED Certified and the CalGreen standards set for by the State of California.

In addition to increased HVAC efficiencies and reduced potable water supply, the building's basis of design will be a leader in technology, reliability and maintenance.

Mechanical and plumbing engineering drawings in Section 11 of this report depict the mechanical and plumbing system requirements for this project.

Garage Exhaust (M101)
The underground garage is to be ventilated by use of a rooftop mounted exhaust fan with a variable frequency drive and downstream distribution system. The ductwork will route down in a chase through three levels and distribute exposed ductwork within the garage level. The distribution and system will be designed in accordance with the 2013 California Building Energy Efficiency Standards (Codes and Standards Enhancement Initiative Case Study) and established engineering practices.

According the Codes and Standards Enhancement Initiative Case Study, the "adverse environmental impact of the measures suggested far out-weigh the environmental benefit of energy savings".

The energy savings is directly attributed to the utilization of demand control ventilation with adjustable fan speeds and energy consumption.

As a part of the system, there will be multiple Carbon Monoxide (CO) sensors installed at strategic locations throughout the garage.

Space Conditioning (M102)
There are two main conditioned space types within the building; commercial spaces on the ground floor and hotel rooms on the second and third floors.

The proposed Heating, Ventilating and Air Conditioning systems is a Variable Refrigerant Flow (VRF) system that utilize the technology to heat and cool simultaneously (Noted on M102 as "VRF HEAT PUMP".

The benefit of VRF is to allow the refrigerant to act as the medium for different load profiles within the building which can be expected in a hotel model.

The net result is a large increase in energy efficiencies throughout the building. The energy value used to compare systems is indicated by "IEER" (Integrated Energy Efficiency Ratio). In short, IEER provides a single value for comparison and it is comprised of averaging how often an air conditioning system is operating, and at what ambient levels it is operating at.

A conventional hotel air conditioning solution operates in the range of 13-17 IEER while the VRF system operates in a range of 17-24 IEER. The increase in energy efficiency is directly attributed to the ability of the system to cool and heat at the same time sending waste energy to a space that is calling for heating.

All HVAC systems will be designed in accordance with all applicable codes, including the following codes and referenced standards:

- ASHRAE 90.1 – Energy Standards for Buildings
- ASHRAE 62.1 and 62.2 – The Standards for ventilation and Indoor Air Quality.
- ASHRAE 15.1 – Refrigerant Safety.
- California Mechanical Code.
- California Plumbing Code.
- California Building Code.
- NFPA 101.

Sanitary Sewer (P0.01 & P0.02)
According to our calculations, the buildings will require a 8" sanitary main to accommodate the 691 waste fixture units generated at maximum occupancy and use.

In addition, there will be a 1,500 gallon grease trap installed just outside the proposed restaurant footprint that will allow the grease to separate from the waste discharge prior to entering the sanitary system. Grease trap was sized in accordance with 2013 California Plumbing Code.

All below sanitary sewer piping is proposed to be cast iron with heavy duty couplings and sloped at ¼" per foot.

Basement sanitary sewer will be routed to a grinder and sump to be discharged to the main 8" sanitary sewer line.

System will be sized and designed in accordance with the 2013 California Plumbing Code and established engineering practices.

Domestic Cold Water (P102)
The domestic water system has been calculated to have a peak usage of 307 GPM requiring a 5” line.

Depending on tested water pressure conditions, the water system might require a domestic booster pump as it is anticipated that there will be a 20 PSI drop in pressure from the entry point to the most remote fixture on the third floor.

All plumbing fixtures are to be CalGreen compliant low-flow fixtures. In addition, all fixtures are to be lead-free as required by code.

Domestic Hot Water (P103)
The domestic hot water system has been calculated to have a peak usage of 90 GPM.

The domestic hot water heating system is proposed to be two separate instantaneous water heater arrays for each building. The system will be complete with circulating system and storage buffer tanks.

The utilization of a non-stored water heating system will provide additional energy savings ensuring that only the minimum amount of hot water is generated throughout the day.

Equipment Matrix
The following matrix represents the list of major equipment, quantity, size and noise levels when in operation.

MARK	EQUIPMENT	QUANTITY	SIZE	dB Level
EF-1	EXHAUST FAN	1	30"W x 24"H	54
EF-2	EXHAUST FAN	1	30"W x 24"H	54
EF-3	EXHAUST FAN	1	30"W x 24"H	54
EF-4	EXHAUST FAN	1	30"W x 24"H	54
EF-5	EXHAUST FAN	1	30"W x 24"H	54
KEF-1	KITCHEN EXHAUST FAN	1	36"W x 30"H	58
MUA-1	MAKE UP AIR UNIT	1	15'L x 48"W x 48"H	58
HP-1	HEAT PUMP	1	8'L x 30"W x 60"H	64.3
HP-2	HEAT PUMP	1	8'L x 30"W x 60"H	64.3
HP-3	HEAT PUMP	1	8'L x 30"W x 60"H	64.3
HP-4	HEAT PUMP	1	8'L x 30"W x 60"H	64.3
HP-5	HEAT PUMP	1	8'L x 30"W x 60"H	64.3
HP-6	HEAT PUMP	1	8'L x 30"W x 60"H	64.3

07
ELECTRICAL AND LIGHTING SYSTEMS

ELECTRICAL BASIS OF DESIGN

A. Applicable Codes and Design Criteria

1. The codes governing the electrical design generally include the California Electrical Code, National Fire Codes, State of California Energy Code, as interpreted and enforced by the City of Sonoma.

2. The Design Criteria used will be generally accepted standards for current low rise building design with respect to power service and distribution, fire alarm/life safety, data/telecommunications infrastructure, and security system rough-in. Lighting controls will follow established practices and California Energy Code requirements. Due to the fact that this building has several interior functions there will be several areas that will require special consideration for electrical power. Those areas include:

   - Restaurant and kitchen areas
   - Spa area
   - Pool

B. Power Service and Distribution

1. The building is approximately 66,933 square feet which includes the hotel, restaurant and spa. 36,359 square feet of parking and storage is located on the lower level. The estimated total electrical load requirement is 1201 KVA. This capacity is developed using generally accepted load criteria found in similar occupancies The basis of the analysis is as follows:

• Parking	93 KVA
• Storage	54 KVA
• Hotel	644 KVA
• Restaurant	128 KVA
• Spa	170 KVA
• Pool	102 KVA
• Exterior grounds and surface parking	10 KVA

2. This service size will be 2500 amps at 480 volts, three phase, 4 wire. This will be derived from a PG&E pad mounted transformer on the site. The main distribution board will have three meters: 1600amp for the hotel, 225 amp for the restaurant and 400 amp for the spa. Each meter will have 480 volt distribution and a transformer to derive 120/208 volt power and 120/208 volt distribution. The hotel's transformers and 120/208 volt distribution equipment will be located in the main electrical room. The spa and restaurant will each require an electrical room housing their 480 volt distribution equipment, transformer and 120/208 volt distribution panels.

3. Demand response Controls will be provided per the California Energy Standards. Lighting power will be capable of being reduced by 15%. Controlled receptacles will be provided per the California Energy Standards.

4. The branch circuit panelboards will all be 42 pole and contain reasonable space for foreseeable future modifications to the building. Panels will be distributed throughout the complex and provide approximately 1-20 amp, 120 volt receptacle branch circuit for each 150 square feet, 1-20 amp, 277 volt lighting circuit for each 2000 square feet. Each 15,000 square feet of building area will require an electrical equipment room that is approximately 6'x8'.

5. Emergency power will be provided by a skid mounted diesel generator. This will provide power to the elevators, the SS grinder pumps, the fire alarm system and egress lighting throughout to exit the building. In addition, emergency power would be provided for the refrigerators in the restaurant kitchen. The emergency generator will be a 350 KW unit, located outside the building in a weatherproof, sound attenuating housing. Two automatic transfer switches will be located in the main electrical room. One for life safety loads throughout the facility, including the spa and restaurant, and the second transfer switch will serve all other emergency loads.

C. Lighting

1. Lighting levels will be designed to light levels in compliance with the Illuminating Engineering Society guidelines and within the 2013 Energy Efficiency Standards of the California (Title 24) Electrical Code. Lighting controls will be provided to meet the Title 24 Electrical Code and will include occupancy sensors, daylight controls, photocell controls and automatic timeclock control. Hotel guest rooms shall have captive card key controls.

   LED lamp sources will be used wherever possible for maximum efficiency. Exterior lighting will be full cut-off fixtures and dark sky compliant.

D. Fire Alarm/Life Safety System

1. The fire alarm/life safety system will be a computer based, addressable fire alarm

system meeting the 2001 CBC and all ADA requirements. Each device in the system will have its own address. A system annunciator will be located in the main lobby for the fire department to access upon arrival to the site.

2. Fire alarm annunciating devices will include waterflow and tamper switches, smoke detectors located per CBC requirements: mechanical rooms, transformer rooms, telephone equipment rooms, elevator machine rooms, and elevator lobbies. Duct detectors are required in the main return and exhaust air plenums. Manual pull stations may be provided if desired. Activation of any device will initiate the voice alarm system and smoke evacuation system (if applicable) and will annunciate at the Main Control Panel and Annunciator with both audible and visual display. Activation of the smoke detector in an elevator lobby will close the lobby doors and initiate elevator recall.

3. The voice alarm system will be controlled from the Main Control Panel and shall be capable of announcing to all areas of the building.

E. Data and Telecommunications Systems

1. The main telephone room will be in the basement of the building. It will provide facilities for incoming phone lines as well as cable TV and internet servers.

2. Distribution within the building will be routed through the ceiling space with the use of lightweight “flextray” cable trays and/or conduits depending on the floor accessibility configuration. Main runs will be run in accessible ceiling areas as much as possible and terminated in at tel/data closets on each floor.

F. Sound Level

1. The sound level during emergency generator operation will be 90 DB at a distance of three feet from the generator.

G. Power Consumption

1. The existing electrical power consumption on the site is now 5203 kwh/month. The expected usage during construction is 3000 kwh/month. The expected usage with full operation of the hotel, restaurant and spa is expected to be 123,120 kwh/month.

08
BUILDING ENVELOPE AND WATERPROOFING SYSTEMS

PROJECT DESCRIPTION

The Hotel Project Sonoma is a new 54,000 sq ft hotel located at the corner of West Napa Street and First Street West in downtown Sonoma. The building will consist of a three-story hotel/restaurant wood-framed building with a ground-floor restaurant and two upper floors with twenty guestrooms; a three-story main hotel building including ground floor lobby and reception, two upper floors with thirty-nine guestrooms, and a spa; and a single-story basement parking garage. There will be three exterior courtyards constructed on a podium over the basement parking. The exterior wall cladding will consist of exterior stone veneer, wood siding, limited areas of plaster, and aluminum-framed windows. The first floor has the three aforementioned courtyards over the below-grade garage space, and there are decks and terraces at the second and third floors. The buildings have central low-slope roofs as well as steep-slope roofs with large dormers consisting of both slate shingles and metal roofing.

INFORMATION PROVIDED BY OTHERS

Review of Geotechnical Report

Based on our review of the Geotechnical Report provided by PJC, dated 9 March 2015, we understand the following:

- Groundwater was encountered at 9 ft below grade level at two borings and at 7 ft below grade level at one boring. After the groundwater was allowed to equalize, it rose to a level of 8 ft and 5 ft below grade level at one boring each. Groundwater was not encountered at two borings.
- There is likely no potential for liquefaction or liquefaction-related secondary effect.
- The report recommends designing the basement structure to resist hydrostatic uplift pressures on the basement walls, or to provide a subsurface drainage system and back-drain the below-grade walls.
- Construction dewatering of the site is recommended at the basement area.
- The report recommends 30 in. deep spread footings at the slab-on-grade and 18 in. deep spread footings at the basement.
- Differential settlement between adjacent footings is expected to be 1/2 in.
- Provide 4 in. of clean gravel as a capillary break under the slab-on-grade. At areas with moisture sensitive surfacing, the report recommends providing an impermeable membrane over the gravel to prevent moisture vapor migration through the slab.

SYSTEM RECOMMENDATIONS

Below-grade Waterproofing

Below-grade Exterior Walls

Based on our current understanding of the geotechnical conditions and the proposed below-grade structure elevations, we understand that the basement level walls will extend into the water table. We also understand that some of the basement walls will be constructed along the property line, and therefore shoring will be required. We understand that the wall construction has not been fully developed, however, cast-in-place concrete or shotcrete walls, will be provided particularly at properly line walls where a blind-side waterproofing membrane is required. We have the following specific recommendations for the below-grade waterproofing at vertical applications:

- We recommend using Bituthene 4000 by Grace Construction Products (GCP) over the Bituthene B2 LVC Adhesive at all concrete substrates at over-excavated walls. Lap seams a minimum of 6 in. and seal with Liquid Membrane. Install drainage composite with integral filter fabric with taped seams over the membrane prior to backfilling.
- Where the concrete foundation walls will be cast against permanent lagging, we recommend using an integrally bonded sheet waterproofing membrane designed for vertical applications, such as Preprufe 160R by GCP.
- At factory laps in the bonded sheet waterproofing, we recommend lapping the membrane a minimum of 3 in. and sealing the front (concrete) side with approved tape. For the purpose of this narrative, we are referencing the Preprufe Product. We also recommend back sealing the lap with a 6 in. strip of Bituthene Sheet Membrane. At non-factory laps, we recommend lapping the Preprufe 6 in. and setting the lap in Bituthene Liquid Membrane. Similar to the factory laps, the front and back of the lap should be sealed with Preprufe Tape and a strip of Bituthene Sheet Membrane, respectively.
- Provide continuous block waterstops, such as Adcor ES by GCP, at all concrete construction joints with a direct path to the interior.
- Should the below grade exterior walls be shotcrete construction, provide the following below-grade waterproofing systems that provide a warranty in a hydrostatic, blind-side wall application:
  - Grace Construction Products – Preprufe 300R underslab and Preprufe SCS at walls
  - CETCO – CoreFlex 60 underslab and at walls

Under Slab Waterproofing – Basement Level
Based on our current understanding of the geotechnical conditions and the proposed below-grade structure elevations, we understand that the basement level will extend into the water table. We understand that there are ongoing discussions about providing permanent de-watering for the site. Regardless of the outcome of that discussion, we have the following specific recommendations for the below-grade waterproofing at horizontal applications:

- Provide an integrally bonded sheet waterproofing beneath the basement level slab and elevator pit mat slab. We recommend using Preprufe 300R by GCP. To support the membrane over a loose soil substrate, the membrane should be installed over two layers of 1/8 in. thick protection board with staggered joints, or one layer of 1/4 in. thick protection board with taped seams. Alternatively, we recommend considering a 2 in. thick concrete mud slab to function as a working platform and a substrate for the horizontal waterproofing.

- At factory laps in the Preprufe, we recommend lapping the membrane a minimum of 3 in. and sealing the front (concrete) side with Preprufe Tape. We also recommend back sealing the lap with a 6 in. strip of Bituthene Sheet Membrane. At non-factory laps, we recommend lapping the Preprufe 6 in. and setting the lap in Bituthene Liquid Membrane. Similar to the factory laps, the front and back of the lap should be sealed with Preprufe Tape and a strip of Bituthene Sheet Membrane, respectively.

- We recommend fully wrapping the spread footings with Preprufe; however, this needs to be coordinated with the structural engineer.

- Provide continuous block waterstops, such as Adcor ES by GCP or approved equal, at all concrete construction joints with a direct path to the interior.

Slab-on-Grade Waterproofing
Based on our current understanding of the geotechnical conditions, it is not anticipated that there will be any water pressure on the underside of the slab-on-grade foundation. However, we recommend a vapor barrier beneath the new slab-on-grade to prevent water vapor transmission through the slab from underlying soil. We have the following specific recommendations for the slab-on-grade applications:

- Due to the anticipated differential settlement, we recommend using and integrally bonded vapor retarder, such as Florprufe 120 by GCP.

- The vapor barrier should wrap onto the vertical edge of the spread footing, or into the construction joint at the slab-on-grade. The structural engineer should determine if it is acceptable to wrap the vapor barrier into the construction joint, as this may increase the required width of the grade beam.

- We recommend avoiding sand “blotter” layers on top of the vapor barrier, as they can trap construction moisture, which can migrate through the slab. If the structural engineer has specified a sand layer, we suggest asking if the slab can sufficiently cure without the sand layer to limit moisture migration to the interior.

- Provide continuous block waterstops, such as Adcor ES by Grace or RX-101 by CETCO, at all concrete construction joints with a direct path to the interior.

Split-Slab Waterproofing
Courtyards
It is our understanding that the courtyards assemblies will consist of pavers over a waterproofing membrane system over the structural deck. We understand that the method of drainage at the courtyards is still in design; however, we recommend using a sloped structural deck rather than a flat structural deck. If project conditions require a flat structural deck, we recommend using polymer-modified topping material, such as Dex-O-Tex A81 or SikaTop123 Plus or approved equal. We have the following specific recommendations for the split-slab waterproofing at the courtyards and podium:

- Using the sloped structural deck, we recommend incorporating an integral internal drainage system. Provide a minimum of 1/4 in. per foot slope in the courtyard deck toward the drains. The drainage layout should form inverted pyramids with apexes at the drains. This should be clearly shown on the plans.

- Provide bi-level drains where concrete topping slabs are used.

- We recommend using a hot fluid-applied reinforced asphalt membrane, such as American Hydrotech’s MM6125 or approved equal. The assembly should include the integral flexible protection layer as well as a 1/4 in. thick asphalt protection board. Provide neoprene reinforcing at drains, penetrations, and transitions in plane.

- Provide perimeter concrete curbs along the exterior of the building. We recommend designing this curb with a minimum height of 12 in. to accommodate the waterproofing system.

- Turn the split-slab waterproofing up at the perimeters and terminate a minimum of 4 in. above the top of the finish walking surface. The split-slab waterproofing should integrate with adjacent below-grade waterproofing systems and the exterior wall cladding and glazing assemblies.

- The membrane terminations should be protected with stainless steel counterflashing. We recommend stainless steel because of its durability, particularly for buried conditions below pavers and soil.

- For the architectural pavers, we recommend using the Hanover Architectural Pavers that are part of American Hydrotech's Ultimate Assembly or approved equal. These are open joint pavers on tabs or pedestals. The advantage in using these pavers is that the entire assembly can be warranted by Hydrotech. If there are issues with the membrane, the warranty covers removal of the overburden, which can be a significant cost and is typically excluded from warranties for buried waterproofing systems.

Vehicle Ramp

We understand that a small section of the vehicle ramp at Level 1 will be located over the Basement Level. For this location, we recommend using the Hydrotech MM6125 hot rubberized asphalt assembly as described above or approved equal. Provide slope in the structural slab, either two-way slope to an interior drain or one-way slope out towards the Basement exterior below-grade wall. We recommend providing a 5 in. thick, minimum, reinforced concrete topping slab over this location.

Terraces and Decks over Occupied Space

We understand that there are terraces and decks over occupied spaces at levels two and three, and some of these locations will include raised concrete planter boxes over the structural deck. Based on our understanding of the building design and previous discussions, we are assuming that wood diaphragms will be used at the upper floor and roof levels. For this construction, we recommend providing a sloped structural deck, installing a waterproofing membrane, and covering with a paver assembly or concrete topping slab. For the waterproofing membrane over plywood, we recommend using either a single-ply PVC membrane (at non-reinforced concrete overburden areas only) or modified bituminous membrane.

We have the following general comments and recommendations for the terrace waterproofing assembly:

- For the PVC membrane we recommend specifying a Sarnafil G410 60-mil feltback PVC roof membrane or approved equal.

- For the modified bituminous membrane, we recommend using the Siplast Teranap assembly, which would consist of the Pardeine 20 SA base layer and the torch-applied Teranap membrane or approved equal.

- We recommend incorporating an integral internal drainage system. Provide a minimum of 1/4 in. per foot slope in the courtyard deck toward the drains. The drainage layout should form inverted pyramids with apexes at the drains. This should be clearly shown on the plans. The structural deck can be drained under the concrete planter boxes. Set the planter boxes over a high compressive strength drainage composite, such as Versi-Cell or approved equal, over the waterproofing membrane. Provide bi-level drains in the planter and integrate with the waterproofing membrane at both the planter and structural deck.

- At planter areas, provide a fully sealed root barrier and drainage composite over the waterproofing membrane.

Deck Waterproofing

The architectural drawings indicate that the building will have balconies over both occupied and exterior space. Based on our previous discussions, we understand that there are several surfacing types for these balconies: tiles, wood, and traffic deck coating. We recommend a minimum of 1/4 in. per foot slope to drain in the structural deck. We are assuming that the balcony deck is integrated structurally with the building, and therefore, we recommend providing stainless steel flashing at the balcony-to-wall interface extending 6 in. onto the wall and 6 in. onto the balcony and integrating the exterior wall weather barrier with the balcony waterproofing system. Our recommendations for each system are dependent upon whether this is occupied space below and the surfacing material. Based on our understanding of the building design and previous discussions, we are assuming that wood diaphragms will be used at the balconies

Over Occupied Space

We recommend using a poly-methyl-methacrylate (PMMA) liquid-applied waterproofing, such as Soprema's Alsan RF or Siplast Parapro or approved equal. The membrane is fully reinforced with fabric or fleece, and can be covered with a wear surface, similar to a traffic deck coating, or it can be covered by a thin-set tile assembly.

For the wood deck surfacing, please reference our recommendations for a modified bituminous membrane as outlined above for terraces and decks over occupied space. We recommend using Ipe wood decking for these locations.

Over Non-Occupied Space

The thin-set tile surfacing can be installed over a PMMA waterproofing membrane or approved equal as described above. Alternatively, these surfacing options can also be installed over CIM-1000, which is an asphalt-extended polyurethane coating.

For the traffic deck coating surfacing, we recommend providing a polyurethane traffic deck coating, such as NeoGard's Peda-Gard system or approved equal.

Exterior Wall Systems
Based on our preliminary design discussions and our review of the drawings, we understand that the building's exterior wall system will include adhered stone veneer, wood siding, limited areas of cement plaster, and metal-clad punched windows. For the stone veneer assembly, we recommend adhering the stone to two-coat cement plaster with a thin-set mortar bed.

Exterior Cladding
We recommend that the exterior wall assemblies be designed to include a waterproofing membrane and dedicated drainage layer over a continuous solid substrate such as exterior gypsum sheathing. We do not recommend relying on the industry standard minimum of two layers of building paper.

Due to recent code changes regarding energy and fire protection, the selection of the exterior wall weather barrier needs to be coordinated to comply with these requirements. At this stage of the project, the insulation strategy is unclear as to whether or not continuous exterior insulation will be required within the exterior wall assemblies. We recommend confirming with your energy consultant which approach will be used to comply with code required (i.e., Prescriptive Method or Whole Building Energy Modeling) and what the insulation strategy will be. Related to this, we can provide moisture migration computer modeling to assess the risk of hidden condensation within the wall cavities as outlined in our proposal dated 29 August 2014.

The exterior wall assembly components, including the weather barrier also need to comply with fire code and NFPA 285 requirements regarding combustible materials in the exterior wall assembly. We recommend coordinating the design of the exterior wall assembly with your fire consultant. If you do not have either an energy or fire consultant, we can provide these services in-house; however, these services were not included in our original proposal.

Once the above information has been coordinated, we can provide additional recommendations regarding the wall assemblies.

Metal-Clad Wood Windows and Sliding Glass Doors
We understand that the building will have metal-clad wood windows and sliding glass doors. The two major considerations in the selection of these assemblies are the performance criteria and the integration with the surrounding wall system. We recommend using Loewen, Sierra Pacific or Anderson Windows for the metal-clad wood window assemblies. The selected window product should meet the projects performance criteria. To provide integration with the surrounding cladding assemblies, we recommend using a window frame profile that includes an integral nailing flange. Additionally, we recommend providing sheet metal sill pans with end dams integrated with the air and water barrier in order to provide additional protection against water penetration. Provide "peel and stick" membrane flashings over all window flanges per manufacturer recommendations.

For the sliding glass doors, we will provide manufacturer and product recommendations as the building design progresses. Similar to the window assemblies, we recommend providing sheet metal sill pans with end dams. If these doors also need to be ADA compliant, we recommend that these locations be designed for installation under overhangs

Code requirements for window performance are based on the building height, building exposure, and design wind speed, which determine the design pressure on the building. For water infiltration, the code requires that there be no leakage at a test pressure that is 15% or 20% of the design pressure, depending on the window type. However, since local conditions vary, code requirements are general, and window performance significantly decreases with time, it has been our experience that merely meeting the core requirement is often not sufficient to prevent water intrusion and air infiltration at windows. We will provide further recommendations regarding window and door performance requirements as the building design progresses.

Cement Plaster Assembly
We recommend installing the Portland cement plaster system over 3.4 lbs per square yard self-furring galvanized metal lath, two layers of Grade D 60 minute building paper as a slip sheet and drainage layer, and a continuous air and water barrier. Additional design work is still needed before we can recommend a product for the air and water barrier. The following additional detailing recommendations should be incorporated into the design:

- Solid exterior sheathing (such as DensGlass by Georgia Pacific or approved equal) should be provided at all locations, and metal straps should be provided as backing for the fastening of flashings and cement plaster accessories where they do not align with framing locations.

- All penetrations through the cement plaster must be detailed with watertight sheet metal collars integrated with the air and water barrier. The sheet metal collars should be mechanically fastened and soldered watertight and have minimum 4 in. flanges.

- To minimize panel cracking, arrange control joints to create Portland cement plaster panels of less than 144 sq ft, less than 15 ft in any direction, and a length-to-width ratios of 2:1 or less in accordance with ASTM C 1063. Cut the lath at control joints so it is not continuous, and install in accordance with ASTM C 1063.

- We recommend that the control joints be a single product that allows movement within the plaster system and expanded metal flanges to integrate with the metal lath (such as the Joint #XJ15 by Cemco). Extruded aluminum reveals, which do not have the capability to expand, should not be considered control joints. To minimize bulk water entry, tab and seal plaster accessory joints and terminations with compatible sealant.

- Cement plaster assemblies should terminate 2 in. minimum above hardscapes and paved areas and 4 in. above landscape areas.

- A weather barrier sealant (such as Dow 758) should be used at locations where sealant is integrated with the rubberized asphalt sheet membrane or the plastic facer of most air and water barriers and flashing membranes.

- At plaster soffits, we recommend a drip edge at the front edge of the soffit.

- The cement plaster mix for the scratch and brown coats must comply with the requirements of the California Building Code. In addition, we recommend that plastic cement (complying with ASTM C1328) be the primary constituent in the plaster mix. Cement plaster accessories should be galvanized G-90 sheet metal (GSM). GSM plaster accessories should be painted with an industrial-grade protective coating to ensure long-lasting performance.

- At fenestrations, we recommend that the flexible-flashing turn into the rough opening and a sealant joint be provided between the facer of the flexible-flashing and the glazing assembly framing. We recommend that a second sealant joint be provided between the plaster accessory and the glazing assembly framing to maintain a clean appearance and deflect bulk water.

- Tie-back anchors for scaffolding and other special conditions must be addressed with specific details. We recommend permanent tie-back couplers that are integrated with the waterproofing during construction and remain in place after removal of the scaffolding.

If exterior insulation is required within the cement plaster assembly to meet the Title 24 energy requirements, the requirements discussed above will have to be modified to accommodate a continuous air and water barrier along the primary sheathing, a secondary water management system outboard of the insulation, and method of attachment of the insulation, as well as the cement plaster lath and accessories.

Stone Veneer Assembly

As stated above, we recommend adhering the stone veneer over a two-coat cement plaster assembly. Please reference our recommendations above for the cement plaster assembly as these apply to this assembly as well. We have the following additional recommendations:

- Control joints in the two-coat cement plaster assembly should extend through the stone veneer. We recommend installing sealant over backer rod at the joints in the stone veneer.

- We recommend adhering the stone veneer in a thin-set mortar over a waterproofing and crack suppression membrane, such as Laticrete 9235 or approved equal, over the two-coat cement plaster.

Wood Siding

We understand that the wood board and batten siding will be installed. We recommend installing this assembly over one layer of building paper over the air and water barrier. Additional design work is still needed before we can recommend a product for the air and water barrier. The following additional detailing recommendations should be incorporated into the design:

- Solid exterior sheathing (such as DensGlass Gold or approved equal by Georgia Pacific) should be provided at all locations, and metal straps should be provided as backing for the fastening of flashings and accessories, where they do not align with framing locations.

- All penetrations through the wood siding must be detailed with watertight sheet metal collars integrated with the air and water barrier. The sheet metal collars should be mechanically fastened and soldered watertight and have minimum 4 in. flanges.

If exterior insulation is required within the wood siding assembly to meet the Title 24 energy requirements, the requirements discussed above will have to be modified to accommodate a continuous air and water barrier along the primary sheathing, a secondary water management system outboard of the insulation, and method of attachment of the insulation, as well as the accessories.

Integration of Exterior Wall Systems

It is important to note that glazing performance data alone does not guarantee that the system will provide adequate water and air infiltration resistance. In our experience, the primary mode of failure is related to poor installation or manufacturing. Therefore, it is critical to include provisions in the specifications that will help ensure adequate installation and, ultimately, good performance. Adequate installation relies on proper integration with the surrounding wall system. These concerns can be addressed with complete performance specifications, adequate detailing, shop drawings, laboratory mockup testing prior to production, observations during installation, and field testing throughout installation.

The integration of the drainage wall systems with the glazing assemblies is a critical area that will require additional detailing as the design progresses. During construction, these systems will require coordination between the installers. Additionally, we recommend that the cladding installers and the window manufacturer and/or installer be required to submit shop drawings showing all parts of their assemblies, including integration with the surrounding construction,

and that no materials be delivered to the site until shop drawings have been reviewed and approved.

Steep-slope Roof
We understand that a mixture of roofing materials will be used including flat tile, and metal roofing will be used at the steep sloped roof locations. For both these assemblies, we recommend using a fully-adhered roof underlayment, such as Grace Ultra or Ice & Water Shield HT, and then cover with one layer of 15 lb felt or an inorganic slip sheet, such as Tyvek. We understand that the Design Team would like a corrugated-panel look for the metal roof assembly, and for this, we recommend using an engineered roof system.

Low-slope Roof
We recommend using a single-ply PVC membrane as the basis of design for the low-slope roofing areas. We recommend a minimum of 2 in. of rigid polyisocyanurate insulation with a 1/4 in. cover board between the roof deck and the roofing membrane. At any areas with new concrete roof deck, we recommend applying a self-adhered vapor retarder over the concrete prior to adhering the tapered insulation.

We have the following general comments and recommendations for the low-slope roof assembly:

- We recommend specifying a Sarnafil G410 60-mil feltback PVC roof membrane or approved equal. For the purpose of this narrative, we are referencing the Sarnafil material.
- PVC membranes are not compatible with asphalt or butyl based materials. If any asphalt or butyl based materials, such as self-adhered detail membrane, will be installed, we recommend installing a layer of foil tape separating the two membranes. If there is existing asphalt or butyl based material on the roof, we recommend removing the material complete or installing Sarnafelt as a separation layer.
- The roof should slope to drain to meet the code-required minimum of 1/4 in. per ft roof slope. This can be achieved by installing sloped insulation or wood crickets over the structural deck. Crickets should be provided at equipment and return at 45 deg. Angles, so the valleys maintain a slope of no less than 1/8 in. per foot. Moving water quickly off the roof mitigates the risk of water leakage. Minimum slope can be achieved by the structural roof deck or the use of tapered rigid insulation. Please note that if tapered insulation is to be used over a structural concrete roof deck, we recommend including an adhered vapor barrier between the concrete and insulation. We recommend including all crickets in the architectural drawings for ease of coordination.
- We generally recommend drainage to roof drains set in depressed sumps. Scuppers, while acceptable, are often sources of leaks because they require integration on two sides of the wall, often rely on field-applied seals, and are often difficult construction sequence items. It should also be noted that all drainage requires overflow provisions. We recommend the primary drain and overflow drain be placed a minimum of 12 in. apart within a sump.
- Termination bars should be used to fasten the roof membrane to the substrate. If the termination bar cannot be adequately anchored to the structural slab, we suggest providing blocking.
- Mechanical equipment should be installed on top of curbs. We recommend a minimum of 8 in. between the roof surface and the top of the curbs to allow for proper roofing termination heights and flashing techniques.
- Roof penetrations should also provide a minimum of 8 in. between the top of the roof surface and the top of the penetration. We recommend using pre-fabricated flashing collars to seal around standard penetrations.
- Penetrations, mechanical curbs, and equipment pads should be spaced a minimum of 12 in. apart.
- Provide permanent roof anchors, such as D-ring anchorage points, for maintenance close to the roof perimeter.
- Provide sheet metal counterflashing at terminations in the roof membrane. We suggest using a two-piece counterflashing to provide easier access to the roof assembly during future re-roofing.
- Include a layout for walk pads to protect the roof surface from damage due to maintenance traffic and window washing equipment, in addition to increased slip resistance.

Construction Monitoring
We understand that the waterproofing is a critical component for the Design Team and Developer in terms of the overall performance of the building. As such, we recommend that the Developer considering retaining a qualified building envelope consultant, who is experienced with the installation requirements of the waterproofing systems on this project, to provide construction monitoring services to review the work in progress and verify general compliance with the Contract Documents.

APPENDIX A – PRODUCT LITERATURE

Waterproofing System	Recommended Product
Below-Grade Waterproofing	
Below-Grade Exterior Walls	Grace Bituhene 4000
	Grace Preprufe 160R
Under Slab Waterproofing – Basement Level	Grace Preprufe 300R
Slab-on-grade waterproofing	Grace Florprufe 120
Split-Slab Waterproofing *	
Courtyards	Hydrotech MM6125
	Hydrotech Ultimate Assembly
Terraces/Decks over occupied space	Sika Sarnafil G410 60-mil Feltback PVC Roof Memrbrane
	Siplast Paradiene 20 SA / Teranap
Deck Waterproofing *	
	Soprema Alsan RS
	Siplast Paradiene 20 SA / Teranap
	C.I.M. Industries CIM 1000 (over non-occupied space)
	NeoGard Peda-Gard System (over non-occupied space)
Steep-slope Roof *	
	Grace Ultra
	Grace Ice & Water Shield HT
Low-slope Roof *	
	Sika Sarnafil G410 60-mil Feltback PVC Roof Membrane

*Product substitutions will be considered if determined to be approved equal by Architect.

Grace Below Grade Waterproofing

BITUTHENE® SYSTEM 4000

Self-adhesive HDPE waterproofing membrane with super tacky compound for use with patented, water-based Bituthene® System 4000 Surface Conditioner

Description

Bituthene® System 4000 Waterproofing Membrane is a 1.5 mm (1/16 in.) flexible, pre-formed membrane which combines a high performance, cross laminated, HDPE carrier film with a unique, super tacky, self-adhesive rubberized asphalt compound.

Bituthene® System 4000 Surface Conditioner is a water-based, latex surface treatment which imparts an aggressive, high tack finish to the treated substrate. It is specifically formulated to bind site dust and concrete efflorescence, thereby providing a suitable surface for the Bituthene® System 4000 Waterproofing Membrane.

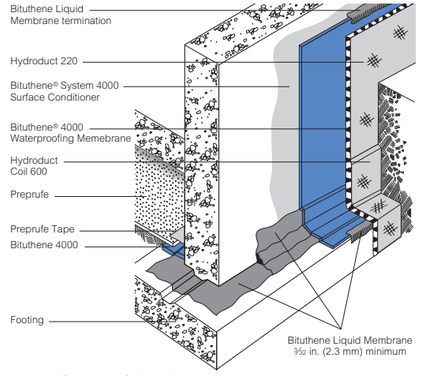
Conveniently packaged in each roll of membrane, Bituthene® System 4000 Surface Conditioner promotes good initial adhesion and, more importantly, excellent permanent adhesion of the Bituthene® System 4000 Waterproofing Membrane. The VOC (Volatile Organic Compound) content of this product is 100 g/L. Architectural and Industrial Maintenance Regulations limit the VOC content in products classified as Architectural Coatings. Refer to Technical Letters at graceconstruction.com for most current list of allowable limits.

Advantages

- **Excellent adhesion**—special adhesive compound engineered to work with high tack System 4000 Surface Conditioner
- **Cold applied**—simple application to substrates, especially at low temperatures
- **Reduced inventory and handling costs**—System 4000 Surface Conditioner is included with each roll of membrane
- **Wide application temperature range**—excellent bond to self and substrate from 25°F (-4°C) and above

Product Advantages

- Excellent adhesion
- Cold applied
- Reduced inventory and handling costs
- Wide application temperature range
- Overlap security
- Cross laminated, high density polyethylene carrier film
- Flexible
- Ripcord®



Drawings are for illustration purposes only.
Please refer to graceconstruction.com for specific application details.

- **Overlap security**—minimizes margin for error under site conditions
- **Cross laminated, high density polyethylene carrier film**—provides high tear strength, puncture and impact resistance
- **Flexible**—accommodates minor structural movements and will bridge shrinkage cracks
- **Ripcord®**—this split release on demand feature allows the splitting of the release paper into two (2) pieces for ease of installation in detailed areas

Use

Bituthene® membrane is ideal for waterproofing concrete, masonry and wood surfaces where in-service temperatures will not exceed 135°F (57°C). It can be applied to foundation walls, tunnels, earth sheltered structures and split slab construction, both above and below grade. (For above grade applications, see *Above Grade Waterproofing Bituthene® System 4000*.)

Bituthene® waterproofing membrane is 1/16 in. (1.5 mm) thick, 3 ft (0.9 m) wide and 66.7 ft (20 m) long and is supplied in rolls. It is unrolled sticky side down onto concrete slabs or applied onto vertical concrete faces primed with Bituthene® System 4000 Surface Conditioner. Continuity is achieved by overlapping a minimum 2 in. (50 mm) and firmly rolling the joint.

Bituthene® membrane is extremely flexible. It is capable of bridging shrinkage cracks in the concrete and will accommodate minor differential movement throughout the service life of the structure.

Application Procedures

Safety, Storage and Handling Information

Bituthene® products must be handled properly. Vapors from solvent-based primers and mastic are harmful and flammable.

For these products, the best available information on safe handling, storage, personal protection, health and environmental considerations has been gathered. Material Safety Data Sheets (MSDS) are available at graceconstruction.com and users should acquaint themselves with this information. Carefully read detailed precaution statements on product labels and the MSDS before use.

Surface Preparation

Surfaces should be structurally sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove contaminants such as grease, oil and wax from exposed surfaces. Remove dust, dirt, loose stone and debris. Concrete must be properly dried (minimum 7 days for normal structural concrete and 14 days for lightweight structural concrete).

If time is critical, Bituthene® Primer B2 or Bituthene® Primer B2 LVC may be used to allow priming and installation of membrane on damp surfaces or green concrete. Priming may begin in this case as soon as the concrete will maintain structural integrity. Use form release agents which will not transfer to the concrete. Remove forms as soon as possible from below horizontal slabs to prevent entrapment of excess moisture. Excess moisture may lead to blistering of the membrane. Cure concrete with clear, resin-based curing compounds which do not contain oil, wax or pigment. Except with Bituthene® Primer B2 or Bituthene® Primer B2 LVC, allow concrete to thoroughly dry following rain. Do not apply any products to frozen concrete.

Repair defects such as spalled or poorly consolidated areas. Remove sharp protrusions and form match lines. On masonry surfaces, apply a parge coat to rough concrete block and brick walls or trowel cut mortar joints flush to the face of the concrete blocks.

Temperature

- Apply Bituthene® System 4000 Membrane and Conditioner only in dry weather and when air and surface temperatures are 25°F (-4°C) or above.
- Apply Bituthene® Primer B2 or Bituthene® Primer B2 LVC in dry weather above 25°F (-4°C). (See separate product information sheet.)

Conditioning

Bituthene® System 4000 Surface Conditioner is ready to use and can be applied by spray or roller. For best results, use a pump-type air sprayer with fan tip nozzle, like the Bituthene® System 4000 Surface Conditioner Sprayer, to apply the surface conditioner.

Apply Bituthene® System 4000 Surface Conditioner to clean, dry, frost-free surfaces at a coverage rate of 300 ft^2/gal (7.4 m^2/L). Coverage should be uniform. Surface conditioner should not be applied so heavily that it puddles or runs. **Do not apply conditioner to Bituthene® membrane.**

Allow Bituthene® System 4000 Surface Conditioner to dry one hour or until substrate returns to its original color. At low temperatures or in high humidity conditions, dry time may be longer.

Bituthene® System 4000 Surface Conditioner is clear when dry and may be slightly tacky. In general, conditioning should be limited to what can be covered within 24 hours. In situations where long dry times may prevail, substrates may be conditioned in advance. Substrates should be reconditioned if significant dirt or dust accumulates.

Before surface conditioner dries, tools should be cleaned with water. After surface conditioner dries, tools should be cleaned with mineral spirits. Mineral spirits is a combustible liquid which should be used only in accordance with manufacturer's recommendations. **Do not use solvents to clean hands or skin.**

Corner Details

The treatment of corners varies depending on the location of the corner. For detailed information on Bituthene® Liquid Membrane, see separate product information sheet.

- At wall to footing inside corners—
  Option 1: Apply membrane to within 1 in. (25 mm) of base of wall. Treat the inside corner by installing a ¾ in. (20 mm) fillet of Bituthene® Liquid Membrane. Extend Bituthene® Liquid Membrane at least 2½ in. (65 mm) onto footing, and 2½ in. (65 mm) onto wall membrane.

  Option 2: Treat the inside corner by installing a ¾ in. (20 mm) fillet of Bituthene® Liquid Membrane. Apply 12 in. (300 mm) wide strip of sheet membrane centered over fillet. Apply wall membrane over inside corner and extend 6 in. (150 mm) onto footing. Apply 1 in. (25 mm) wide troweling of Bituthene® Liquid Membrane over all terminations and seams within 12 in. (300 mm) of corner.
- At footings where the elevation of the floor slab is 6 in. (150 mm) or more above the footing, treat the inside corner either by the above two methods or terminate the membrane at the base of the wall. Seal the termination with Bituthene® Liquid Membrane.

Joints

Properly seal all joints with waterstop, joint filler and sealant as required. Bituthene® membranes are not intended to function as the primary joint seal. Allow sealants to fully cure. Pre-strip all slab and wall cracks over 1/16 in. (1.5 mm) wide and all construction and control joints with 9 in. (230 mm) wide sheet membrane strip.

Application on Horizontal Surfaces

(Note: Preprufe® pre-applied membranes are strongly recommended for below slab or for any application where the membrane is applied before concreting. See Preprufe® waterproofing membrane product information sheets.)

Apply membrane from the low point to the high point so that laps shed water. Overlap all seams at least 2 in. (50 mm). Stagger all end laps. Roll the entire membrane firmly and completely as soon as possible. Use a linoleum roller or standard water-filled garden roller less than 30 in. (760 mm) wide, weighing a minimum of 75 lbs (34 kg) when filled. Cover the face of the roller with a resilient material such as a ½ in. (13 mm) plastic foam or two wraps of indoor-outdoor carpet to allow the membrane to fully contact the primed substrate. Seal all T-joints and membrane terminations with Bituthene® Liquid Membrane at the end of the day.

Protrusions and Drains

Apply membrane to within 1 in. (25 mm) of the base of the protrusion. Apply Bituthene® Liquid Membrane 0.1 in. (2.5 mm) thick around protrusion. Bituthene® Liquid Membrane should extend over the membrane a minimum of 2½ in. (65 mm) and up the penetration to just below the finished height of the wearing course.

Vertical Surfaces

Apply membrane in lengths up to 8 ft (2.5 m). Overlap all seams at least 2 in. (50 mm). On higher walls apply membrane in two or more sections with the upper overlapping the lower by at least 2 in. (50 mm). Roll all membrane with a hand roller.

Terminate the membrane at grade level. Press the membrane firmly to the wall with the butt end of a hardwood tool such as a hammer handle or secure into a reglet. Failure to use heavy pressure at terminations can result in a poor seal. A termination bar may be used to ensure a tight seal. Terminate the membrane at the base of the wall if the bottom of the interior floor slab is at least 6 in. (150 mm) above the footing. Otherwise, use appropriate inside corner detail where the wall and footing meet.

Membrane Repairs

Patch tears and inadequately lapped seams with membrane. Clean membrane with a damp cloth and dry. Slit fishmouths and repair with a patch extending 6 in. (150 mm) in all directions from the slit and seal edges of the patch with Bituthene® Liquid Membrane. Inspect the membrane thoroughly before covering and make any repairs.

Drainage

Hydroduct® drainage composites are recommended for both active drainage and protection of the membrane. See Hydroduct® product information sheets.

Protection of Membrane

Protect Bituthene® membranes to avoid damage from other trades, construction materials or backfill. Place protection immediately in temperatures above 77°F (25°C) to avoid potential for blisters.

- On vertical applications, use Hydroduct® 220 Drainage Composite. Adhere Hydroduct® 220 Drainage Composite to membrane with Preprufe® Detail Tape. Alternative methods of protection are to use 1 in. (25 mm) expanded polystyrene or ¼ in. (6 mm) extruded

polystyrene that has a minimum compressive strength of 8 lbs/in.² (55 kN/m²). Such alternatives do not provide positive drainage to the system. If ¼ in. (6 mm) extruded polystyrene protection board is used, backfill should not contain sharp rock or aggregate over 2 in. (50 mm) in diameter. Adhere polystyrene protection board with Preprufe® Detail Tape.

- In mud slab waterproofing, or other applications where positive drainage is not desired and where reinforced concrete slabs are placed over the membrane, the use of ¼ in. (6 mm) hardboard or 2 layers of ⅛ in. (3 mm) hardboard is recommended.

Insulation

Always apply Bituthene® membrane directly to primed or conditioned structural substrates. Insulation, if used, must be applied over the membrane. Do not apply Bituthene® membranes over lightweight insulating concrete.

Backfill

Place backfill as soon as possible. Use care during backfill operation to avoid damage to the waterproofing system. Follow generally accepted practices for backfilling and compaction. Backfill should be added and compacted in 6 in. (150 mm) to 12 in. (300 mm) lifts.

For areas which cannot be fully compacted, a termination bar is recommended across the top termination of the membrane.

Placing Steel

When placing steel over properly protected membrane, use concrete bar supports (dobies) or chairs with plastic tips or rolled feet to prevent damage from sharp edges. Use special care when using wire mesh, especially if the mesh is curled.

Approvals

- City of Los Angeles Research Report RR 24386
- Miami-Dade County Code Report NOA 04-0114.03
- U.S. Department of Housing and Urban Development (HUD) HUD Materials Release 628E
- Bituthene® 4000 Membranes carry a Underwriters' Laboratory Class A Fire Rating (Building Materials Directory, File #R7910) when used in either of the following constructions:
  - —Limited to noncombustible decks at inclines not exceeding ¼ in. (6 mm) to the horizontal 1 ft (0.3 m). One layer of Bituthene® waterproofing membrane, followed by one layer of ⅛ in. (3 mm) protection board, encased in 2 in. (50 mm) minimum concrete monolithic pour.
  - —Limited to noncombustible decks at inclines not exceeding ¼ in. (6 mm) to the horizontal 1 ft (0.3 m). One layer of Bituthene® waterproofing membrane, followed by one layer of DOW Styrofoam PD Insulation Board [2 in. (50 mm) thick]. This is covered with one layer of 2 ft x 2 ft x 2 in. (0.6 m x 0.6 m x 50 mm) of concrete paver topping.

Warranty

Five year material warranties covering Bituthene® and Hydroduct® products are available upon request. Contact your Grace sales representative for details.

Technical Services

Support is provided by full time, technically trained Grace representatives and technical service personnel, backed by a central research and development staff.

Bituthene System 4000 Surface Conditioner Sprayer

The Bituthene® System 4000 Surface Conditioner Sprayer is a professional grade, polyethylene, pump-type, compressed air sprayer with a brass fan tip nozzle. It has a 2 gal (7.6 L) capacity. The nozzle orifice and spray pattern have been specifically engineered for the optimum application of Bituthene® System 4000 Surface Conditioner.

Hold nozzle 18 in. (450 mm) from substrate and squeeze handle to spray. Spray in a sweeping motion until substrate is uniformly covered.

Sprayer should be repressurized by pumping as needed. For best results, sprayer should be maintained at high pressure during spraying.

To release pressure, invert the sprayer and spray until all compressed air is released.

Maintenance

The Bituthene® System 4000 Surface Conditioner Sprayer should perform without trouble for an extended period if maintained properly.

Sprayer should not be used to store Bituthene® System 4000 Surface Conditioner. The sprayer should be flushed with clean water immediately after spraying. For breaks in the spray operation of one hour or less, invert the sprayer and squeeze the spray handle until only air comes from the nozzle. This will avoid clogging.

Should the sprayer need repairs or parts, call the maintenance telephone number on the sprayer tank (800-323-0620).

Supply

Bituthene® System 4000	3 ft x 66.7 ft roll (200 ft²) [0.9 m x 20 m (18.6 m²)]
Roll weight	83 lbs (38 kg) gross
Palletization	25 rolls per pallet
Storage	Store upright in dry conditions below 95°F (+35°C).
System 4000 Surface Conditioner	1 x 0.625 gal (2.3 L) bottle in each roll of System 4000 Membrane
Ancillary Products	
Surface Conditioner Sprayer	2 gal (7.6 L) capacity professional grade sprayer with specially engineered nozzle
Bituthene® Liquid Membrane	1.5 gal (5.7 L) pail/125 pails per pallet or 4 gal (15.1 L) pail/48 pails per pallet
Preprufe® Detail Tape	2 in. x 50 ft (50 mm x 15 m) roll/16 rolls per carton
Bituthene® Mastic	Twelve 30 oz (0.9 L) tubes/carton or 5 gal (18.9 L) pail/36 pails per pallet
Complementary Material	
Hydroduct®	See separate data sheets

Equipment by others: Soft broom, utility knife, brush or roller for priming

Physical Properties for Bituthene® System 4000 Waterproofing Membrane

Property	Typical Value	Test Method
Color	Dark gray-black	
Thickness	1/16 in. (1.5 mm) nominal	ASTM D3767—method A
Flexibility, 180° bend over 1 in. (25 mm) mandrel at -25°F (-32°C)	Unaffected	ASTM D1970
Tensile strength, membrane, die C	325 lbs/in.² (2240 kPa) minimum	ASTM D412 modified[1]
Tensile strength, film	5,000 lbs/in.² (34.5 MPa) minimum	ASTM D882 modified[1]
Elongation, ultimate failure of rubberized asphalt	300% minimum	ASTM D412 modified[1]
Crack cycling at -25°F (-32°C), 100 cycles	Unaffected	ASTM C836
Lap adhesion at minimum application temperature	5 lbs/in. (880 N/m)	ASTM D1876 modified[2]
Peel strength	9 lbs/in. (1576 N/m)	ASTM D903 modified[3]
Puncture resistance, membrane	50 lbs (222 N) minimum	ASTM E154
Resistance to hydrostatic head	231 ft (71 m) of water	ASTM D5385
Permeance	0.05 perms (2.9 ng/m²sPa) maximum	ASTM E96, section 12—water method
Water absorption	0.1% maximum	ASTM D570

Footnotes:
1. The test is run at a rate of 2 in. (50 mm) per minute.
2. The test is conducted 15 minutes after the lap is formed and run at a rate of 2 in. (50 mm) per minute at 40°F (5°C).
3. The 180° peel strength is run at a rate of 12 in. (300 mm) per minute.

Physical Properties for Bituthene® System 4000 Surface Conditioner

Property	Typical Value
Solvent type	Water
Flash point	>140°F (>60°C)
VOC* content	91 g/L
Application temperature	25°F (-4°C) and above
Freeze thaw stability	5 cycles (minimum)
Freezing point (as packaged)	14°F (-10°C)
Dry time (hours)	1 hour**

* Volatile Organic Compound
** Dry time will vary with weather conditions

www.graceconstruction.com

For technical assistance call toll free at 866-333-3SBM (3726)

GRACE

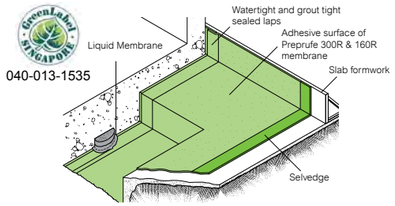
Grace Waterproofing Systems

Preprufe® 300R & 160R

Pre-applied waterproofing membranes that bond integrally to poured concrete for use below slabs or behind basement walls on confined sites

Advantages

- Forms a unique integral seal to concrete poured against it. This prevents water migration and makes it unaffected by ground settlement beneath slabs.
- Fully-adhered watertight laps and detailing
- Provides a barrier to water, moisture and gas – physically isolates the structure from the surrounding ground.
- BBA Certified for basement Grades 2, 3, & 4 to BS 8102:1990
- Zero permeance to moisture
- Solar reflective - reduced temperature gain
- Simple and quick to install, requiring no priming or fillets.
- Can be applied to permanent formwork - allows maximum use of confined sites.
- Self protecting - can be trafficked immediately after application and ready for immediate placing of reinforcement.
- Unaffected by wet conditions - cannot activate prematurely.
- Inherently waterproof, non-reactive system:
  - not reliant on confining pressures or hydration
  - unaffected by freeze/thaw, wet/dry cycling
- Chemically resistant, effective in all types of soils and waters - protects structure from salt or sulphate attack.



Description

Preprufe® 300R & 160R membranes are unique composite sheets comprising a thick HDPE film, an aggressive pressure sensitive adhesive and a weather resistant protective coating.
Unlike conventional non-adhering membranes, which are vulnerable to water ingress tracking between the unbonded membrane and structure, the unique Preprufe seal to concrete prevents any ingress or migration of water around the structure.

The Preprufe R System includes:

- Preprufe 300R - heavy-duty grade for use below slabs and on rafts (i.e. mud slabs). Designed to accept the placing of heavy reinforcement using conventional concrete spacers.
- Preprufe 160R - thinner grade for lighter applications and reverse tanking (i.e. blindside zero property line) applications against permanent formwork such as soil retention systems.
- Preprufe Tape LT - for covering cut edges, roll ends, penetrations and detailing (temperatures between -4°C and +30°C).
- Preprufe Tape HC - as above for use in Hot Climates (minimum10°C).
- Liquid Membrane - for sealing around penetrations, etc.

Preprufe 300R & 160R membranes are applied either horizontally to smooth prepared concrete or well rolled and compacted sand or crushed stone blinding; or vertically to permanent formwork or adjoining structures. Concrete is then cast directly against the adhesive side of the membranes. The specially developed Preprufe adhesive layers work together to form a continuous and integral seal to the structure.

Preprufe can be returned up the inside face of slab formwork but is not recommended for conventional twin-sided formwork on walls, etc. Use Bituthene self-adhesive membrane or Procor fluid applied membrane to walls after removal of formwork for a fully bonded system to all structural surfaces.

BBA BRITISH BOARD OF AGREMENT CERTIFICATE NO.

Installation

Preprufe® 300R & 160R membranes are supplied in rolls 1.2m wide, with a selvedge on one side to provide self-adhered laps for continuity between rolls. The rolls of Preprufe membrane and Preprufe Tape are interwound with a disposable plastic release liner which must be removed before placing reinforcement and concrete.

Substrate Preparation

All Surfaces - It is essential to create a sound and solid substrate to eliminate movement during the concrete pour. Substrates must be regular and smooth with no gaps or voids greater than 12 mm. Grout around all penetrations such as utility conduits, etc. for stability.

Horizontal Blinding - Monolithic concrete blinding or mud slab is preferred. The blinding must be free of loose aggregate and sharp protrusions. An angular profiled blinding is recommended rather than a sloping or rounded substrate. The surface does not need to be dry, but standing water must be removed.

Vertical Sheet Piling - Use concrete, plywood, insulation or other approved facing to sheet piling to provide support to the membrane. Board systems such as timber lagging must be close butted to provide support and not more than 12 mm out of alignment.

Membrane Installation

Preprufe can be applied at temperatures of -4ºC or above. During cold or damp conditions, the selvedge and tape adhesive can be gently warmed using a hot air gun or similar to remove moisture or condensation and improve initial adhesion.

Horizontal Substrates - Place the membrane HDPE film side to the substrate with printed coated side up facing towards the concrete pour. End laps should be staggered to avoid a build up of layers. Leave plastic release liner in position until overlap procedure is completed. Accurately position succeeding sheets to overlap the previous sheet 75 mm along the marked selvedge. Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap. Peel back the plastic release liner from between the overlaps as the two layers are bonded together. Ensure a continuous bond is achieved without creases and roll firmly with a heavy roller. Completely remove the plastic liner to expose the protective coating. Any initial tack will quickly disappear.

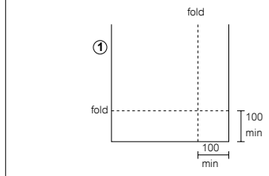
Vertical Substrates - Mechanically fasten the membrane vertically using fixings (i.e. fasteners) appropriate to the substrate with the printed coated side facing towards the concrete pour. The membrane may be installed in any convenient length. Secure the top of the membrane using a batten such as a termination bar or fixing 50 mm below the top edge. Fixings can be made through the selvedge so that the membrane lays flat and allows firmly rolled overlaps. Immediately remove the plastic release liner. Any additional fixings must be covered with a patch of Preprufe Tape. Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap. Roll firmly to ensure a watertight seal. Roll Ends and Cut Edges - Overlap all roll ends and cut edges by a minimum 75 mm and ensure the area is clean and free from contamination, wiping with a damp cloth if necessary. Allow to dry and apply Preprufe Tape LT (or HC in hot climates) centered over the lap and roll firmly. Immediately remove printed plastic release liner from the tape.

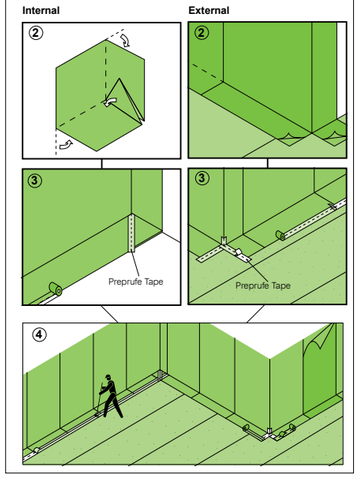
Penetrations

Use the following steps to seal around penetrations such as service pipes, piles, lightning conductors, etc.
Grout around the penetration if the penetration is not stable. Scribe membrane tight to the penetration. If the membrane is not within 12mm of the penetration, apply Preprufe Tape to cover the gap. Wrap the penetration with Preprufe Tape by positioning the tape 12 mm above the membrane.
Mix and apply Bituthene Liquid Membrane around the penetrations using a fillet to provide a watertight seal between the Preprufe membrane and Preprufe Tape.

Corners

Internal and external corners should be formed as shown in the diagrams returning the membrane a minimum of 100mm and sealing with Preprufe Tape. Ensure that the apex of the corner is covered and sealed with tape and roll firmly. Crease and fold the membrane to ensure a close fit to the substrate profile and avoid hollows.





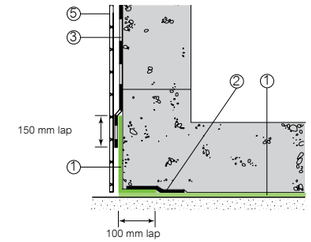
Membrane Repair

Inspect the membrane before installation of reinforcement steel, formwork and final placement of concrete. The membrane can be easily cleaned by jet washing if required. Repair damage by wiping the area with a damp cloth to ensure the area is clean and free from dust, and allow to dry. Apply Preprufe Tape centered over the damaged area and roll firmly. Any areas of damaged adhesive should be covered with Preprufe Tape. Remove printed plastic release liner from tape. Where exposed selvedge has lost adhesion or laps have not been sealed, ensure the area is clean and dry and cover with fresh Preprufe Tape, rolling firmly. Alternatively, use a hot air gun or similar to activate adhesive and firmly roll lap to achieve continuity.

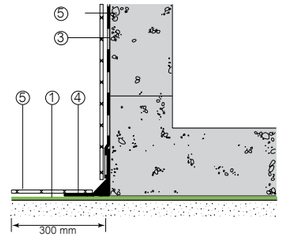
Pouring of Concrete

Ensure the plastic release liner is removed from all areas of Preprufe R membrane and Tape. It is recommended that concrete be poured within 56 days (42 days in hot climates) of application of the membrane. Concrete must be placed and compacted carefully to avoid damage to the membrane. Never use a sharp object to consolidate the concrete.

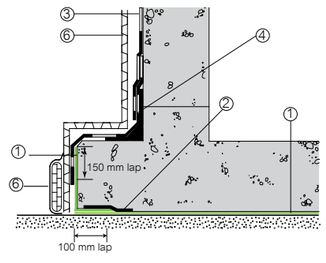
Wall base detail



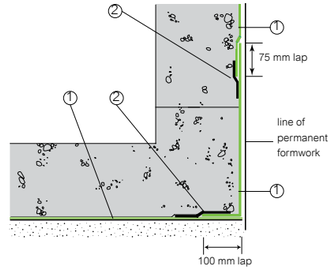
Alternative wall base detail for early shutter removal



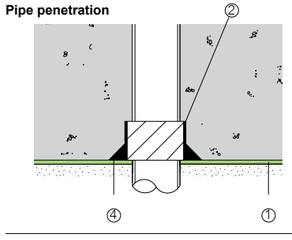
Wall base with toe detail showing drainage option



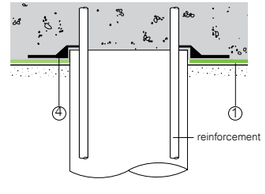
Wall base detail against permanent shutter



Pipe penetration



Pile detail



1 Preprufe **2 Preprufe Tape** **3 Bituthene® or Procor®** **4 Liquid Membrane** **5 Protection** **6 Hydroduct®**

Details shown are typical illustrations and not working details. For assistance with detailing and problem solving please contact Grace Technical Department.

Physical Properties

Property	Typical Value		Test Method
	300R	160R	
Colour	White		
Thickness*	1.2 mm	0.8 mm	ASTM D3767
Peel Adhesion to Concrete	880 N/m		ASTM D903 modified
Resistance to Hydrostatic Head	>70 m		ASTM D5385 modified
Low Temperature Flexibility	<-23°C		ASTM D1970
Puncture Resistance	990 N	445 N	ASTM E 154
Elongation	300% minimum		ASTM D412 modified
Tensile Strength, Film	27.6 Mpa		ASTM D412
Crack Cycling @ -23°C	Pass		ASTM C 836

Typical test values represent average values from samples tested. Test methods noted may be modified.
* Nominal thickness refers to the thickness of the membrane without release liner.

Supply

Preprufe	300R	160R	Tape LT or HC*
Thickness (nominal)	1.2 mm	0.8 mm	-
Roll size	1.2x30.0 m	1.2x35.0 m	100 mmx15.0 m
Roll area	36.0 m^2	42 m^2	-
Roll weight	50 kg	42 kg	2 kg
Min. edge/end laps	75 mm	75 mm	75 mm

* LT denotes Low Temperature (between -4˚C and +30˚C)
HC denotes Hot Climates (>+10˚C)

Ancillary Products
Liquid Membrane, 5.7 litre

Removal of Formwork

Preprufe membranes can be applied to removable formwork, such as slab perimeters, elevator and lift pits, etc. Once the concrete is poured the formwork must remain in place until the concrete has gained sufficient compressive strength to develop the surface bond. Preprufe membranes are not recommended for conventional twin-sided wall forming systems.

A minimum concrete compressive strength of 10 N/mm^2 (1500 psi) is recommended prior to stripping formwork supporting Preprufe membranes. Premature stripping may result in displacement of the membrane and/or spalling of the concrete.

As a guide, to reach the minimum compressive strength stated above, a structural concrete mix with an ultimate strength of 40 N/mm^2 (6000 psi) will typically require a cure time of approximately 6 days at an average ambient temperature of 4ºC, or 2 days at 21ºC.

Specification Clauses

Preprufe 300R or 160R shall be applied with its adhesive face presented to receive fresh concrete to which it will integrally bond. Only Grace Construction Products approved membranes shall be bonded to Preprufe 300R &160R. All Preprufe 300R &160R system materials shall be supplied by Grace Construction Products, and applied strictly in accordance with their instructions. Specimen performance and formatted clauses are also available.

Health and Safety

Refer to relevant Material Safety data sheet. Complete rolls should be handled by a minimum of two persons.

Grace Technical Services

For assistance with working drawings for projects and additional technical advice, please contact Grace Technical Services.

www.grace.com/construction

Australia 1800 855 525 New Zealand (64-9) 448 1146 China Mainland (86-21) 3158 2888
Hong Kong (852) 2675 7898 India (91-124) 402 8972 Indonesia (62-21) 893 4260 Japan (81-3) 3537 6366
Korea (82-32) 820 0800 Malaysia (60-3) 9074 6133 Philippines (63-49) 549 7373 Singapore (65) 6265 3033
Thailand (66-2) 709 4470 Vietnam (84-8) 3710 6168

GRACE

Grace Waterproofing Products

FLORPRUFE® 120

Integrally bonded vapor protection for slabs on grade

Description

Florprufe® 120 is a high perfor-mance vapor barrier with Grace's Advanced Bond Technology™ that forms a unique seal to the underside of concrete floor slabs.

Comprising a highly durable polyolefin sheet and a specially developed, non-tacky adhesive coating, Florprufe 120 seals to liquid concrete to provide integrally bonded vapor protection.

Florprufe exceeds ASTM E1745 Class A rating.

Advantages

- Forms a powerful integral seal to the underside of concrete slabs
- Protects valuable floor finishes such as wood, tiles, carpet and resilient flooring from damage by vapor transmission
- Direct contact with the slab complies with the latest industry recommendations
- Remains sealed to the slab even in cases of ground settlement
- Ultra low vapor permeability
- Durable, chemical resistant polyolefin sheet
- Lightweight, easy to apply, kick out rolls
- Simple lap forming with mechanical fixings or tape

Use

Florprufe 120 is engineered for use below slabs on grade with moisture-impermeable or moisture-sensitive floor finishes that require the highest level of vapor protection.

[1] ACI 302.1R-96

Product Advantages

- Forms a powerful integral seal
- Protects valuable floor finishes
- Ultra low vapor permeability
- Durable, chemical resistant
- Lightweight and easy to apply

Florprufe complies with the latest recommendations of ACI Committees 302 and 360, i.e. for slabs with vapor sensitive coverings, the location of the vapor barrier should always be in direct contact with the slab1.

The membrane is loose laid onto the prepared sub-base, forming overlaps that can be either mechanically secured or taped. The unique bond of Florprufe to concrete provides continuity of vapor protection at laps. Alternatively, if a taped system is preferred, self-adhered Preprufe® Tape can be used to overband the laps.

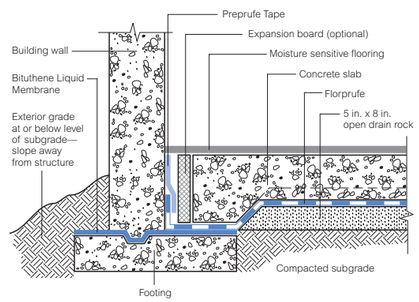
Slab reinforcement and concrete can be placed immediately. Once the concrete is poured, an integral bond develops between the concrete and membrane.

Installation

Health & Safety

Refer to relevant Material Safety Data Sheet. Complete rolls should be handled by 2 persons.

Florprufe 120 can be applied at temperatures of 25ºF (-4ºC) or above. Membrane installation is unaffected by wet weather. Installation and detailing of Florprufe 120 are generally in accordance with ASTM E1643-98.



Typical Assembly

Drawings are for illustration purposes only.
Please refer to www.graceconstruction.com for specific application details.