The Bayview Marquis Hotel and Marina

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Setting the Scene

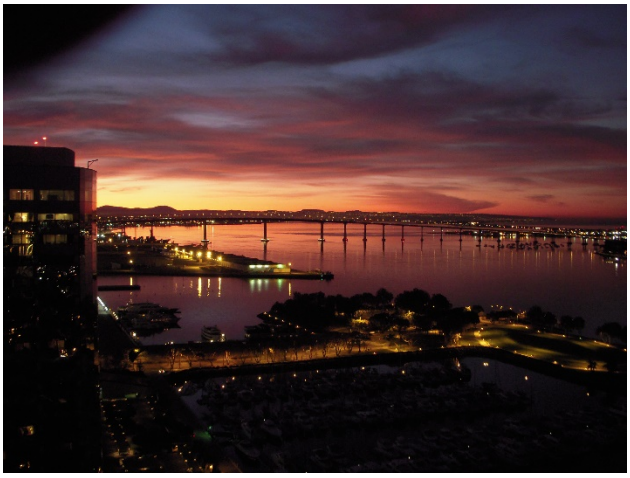

Figure 1 - Sunrise from the Balcony of one of the Marquis' nicer rooms

The Bayview Marquis Hotel and Marina is a full-service hotel owned and operated by two different divisions of Hijend Hospitality International, a major player in the hospitality industry. The company was started by Sven Hijend in the late 1920's and is now run by his son Sven Jr. The Bayview facility was designed by the renowned architectural firm of Morgan, Wright, Jungermann and Kelly and is a favorite of both the Senior and Junior Hijend.

Known for its spectacular views of San Diego Bay, the facility served its first guests in early January of 2006 and has become a flagship for the company. Eighty percent occupancy is a slow day for them, and their average occupancy for the past two years has been 84%.

As you drive towards the site for your first day on the job as the new DOE, the weather forecast you are listening to is predicting a cool, foggy morning with temperatures running in the low to mid 50°F until mid-afternoon when then sun is expected to burn through and warm things up.

Driving down the highway towards town, the hotel begins to emerge from the fog and you see the cooling towers, which are located across the parking lot from the central plant.

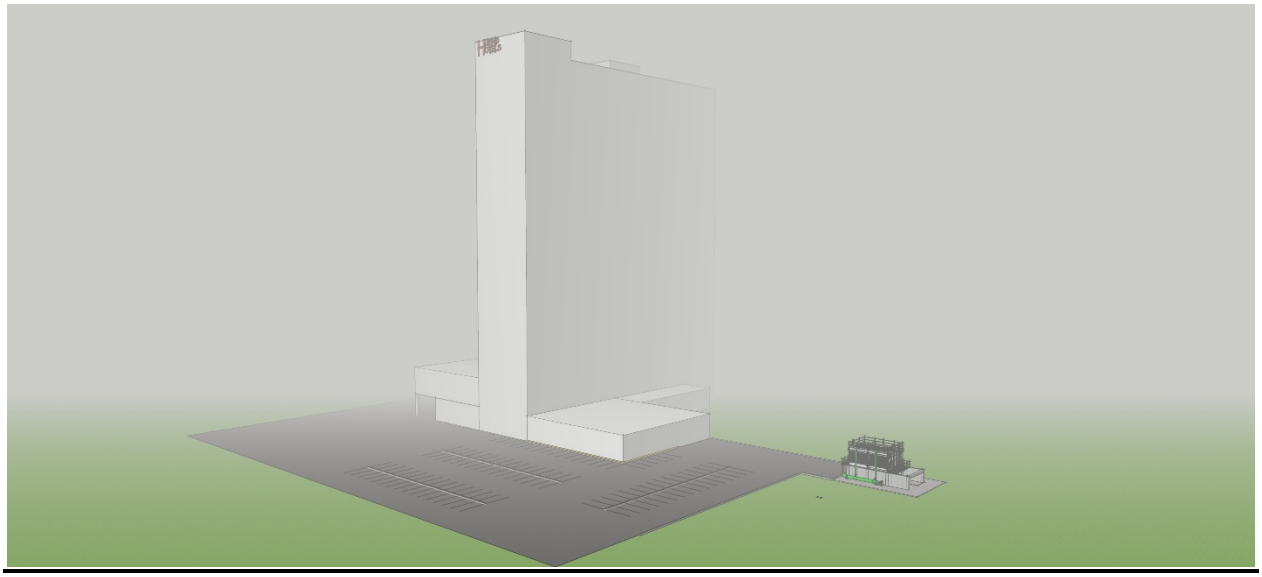

Figure 2 - The Hijend Bayview Marquis emerging from the fog as you approach

If you are correctly remembering the walk-through you had during your final interview, there are a number of air handling systems adjacent to the central plant, primarily serving the back of the house, the lobby, and the restaurant areas. The ball-room and meeting room systems are at the far end of the first floor and a large make-up system serving the guest rooms is located in an equipment space on the roof (see Figure 2).

COOLING COIL SCHEDULE

Cooling Coil Number	Unit or System Served	Flow, cfm	Maximum Fins per Inch	Rows	Minimum Face Area, sq.ft.	Airside Performance: Entering Air Dry bulb, °F	Entering Air Wet bulb, °F	Leaving Air Dry bulb, °F	Leaving Air Wet bulb, °F	Face Velocity, fpm	Pressure Drop, in.w.c.	Waterside Performance: Entering Water Temperature, °F	Leaving Water Temperature, °F	Flow Rate, gpm	Pressure Drop, ft.w.c.	Tons
CC-1	AHU1 - Hotel Lobby and Administration	26,000	8	6	52.0	81.0	63.8	51.0	50.5	433	0.63	42.0	56.0	141.0	8.6	82.2
CC-2	Main Ball Room	20,000	9	6	40.0	86.6	66.1	51.4	50.9	500	0.82	42.0	54.0	148.7	11.0	74.4
CC-3	Junior Ball Room	15,000	8	6	30.0	80.2	63.5	51.7	51.1	500	0.74	42.0	54.0	88.7	9.2	44.3
CC-4	Meeting Rooms	15,000	9	6	30.0	90.3	67.6	52.2	51.6	500	0.83	42.0	54.0	120.1	9.1	60.1
CC-5	Corridor Make-up Air	28,300	8	6	56.6	90.3	67.6	52.8	52.0	500	0.76	42.0	54.0	221.6	6.9	110.9
CC-6	Corridor Make-up Air	28,300	8	6	56.6	90.3	67.6	52.8	52.0	472	0.70	42.0	54.0	221.6	6.9	110.9
CC-7	Back of House	10,000	8	6	20.0	81.3	65.0	53.9	53.3	500	0.75	42.0	54.0	57.9	3.1	29.0
CC-8	Breakfast/Lunch Café	6,500	8	6	13.0	82.7	64.5	50.9	50.4	406	0.56	42.0	54.0	43.9	7.8	21.9
CC-9	Restaurant and Lounge	11,500	8	6	23.0	82.7	64.5	51.8	51.2	479	0.70	42.0	54.0	73.7	9.3	36.9
CC-10	Main Kitchen	19,000	8	6	38.0	88.5	67.6	51.5	51.0	396	0.56	42.0	54.0	257.2	9.2	78.6
VF-1	Electrical Room	8,200	8	3	16.4	83.7	67.6	60.7	57.9	410	0.35	42.0	54.0	42.5	9.8	21.2
CC-GR01	Typical North Exposure Guest Room (272 tons)	300	14	3	1.4	72.0	60.0	49.4	49.0	214	0.15	42.0	48.6	2.7	3.5	0.7
CC-GR02	Typical East Exposure Guest Room (44 tons)	400	14	3	1.4	72.0	60.0	51.2	50.5	285	0.22	42.0	49.4	2.8	3.7	0.9
CC-GR03	Typical South Exposure Guest Room (224 tons)	600	14	3	2.2	72.0	60.0	50.4	49.8	273	0.21	42.0	50.1	4.1	9.7	1.4
CC-GR04	Typical West Exposure Guest Room (22 tons)	400	14	3	1.4	72.0	60.0	51.2	50.5	285	0.22	42.0	49.4	2.8	3.7	0.9
CC-GR05	Typical Luxury Guest Room (4 tons)	1,000	14	3	3.2	72.0	60.0	51.2	50.4	313	0.26	42.0	50.3	6.3	8.9	2.2

Figure 3 - The cooling coil schedule for all of the loads on the central plant

The GM greets you in the lobby and walks you down to your office, explaining on the way that while he had not intended to "throw you in the deep end", by pure

coincidence, the program manager from the local utility has just arrived on site to begin auditing the facility to get it into their existing building commissioning rebate program.

Both he and the chief are excited about the potential incentives but are a bit concerned about getting a full accounting of things because during a quick walk through the facility, when the very young and passionate PM came calling to offer participation in the program, one of their first questions was to ask if they could see the facility's chillers. At the time, all three of them were standing in the central plant next to one, which was on line.

So, both he and the chief are hoping you would be willing to make the central plant your first stop on your first day on the job to join them as they make a more detailed inspection of the facility. Given your AEP credentials, GM is hoping you can mentor the utility rep a bit so that nothing is missed.

Anxious to learn more about the systems and equipment in your new facility, you happily agree and the two of you head towards the central plant where you are greeted by the chief, her lead technician, and the program manager outside the entrance.

After exchanging a few pleasantries, you suggest that maybe you should start out by taking a look around the chiller plant. Being the "new guy", you don't say anything, but given the weather and what you remember from your visit last summer, you are a bit surprised to find the plant running at all since your furnace at home was running when you left and the air handling systems are all either make-up air systems or have economizers.

In any case, everyone agrees that the central plant is a good place to start and you all head there. On the way, the lead technician points out that given the location, a lot of their regular guests are high ranking military or ex-military officers. Given the rates they are paying, the hotel wants to be sure they have cooling at any time they want it to avoid complaints from people accustomed to chewing out junior officers.

The operating team jokingly calls them the *Ex-warriors bold who like their room cold*, and in their efforts to "keep the peace", they keep the plant running round-the-clock. And its probably a good thing because they always seem to have at least 150 tons of load or more. That probably translates to lots of happy customers.

You agree that guest satisfaction is your main mission. But considering the perimeter location of the guest rooms and the amount of glass and the patio doors they have, you were thinking they would be loads that were more like your house and that the furnace in your house was running when you left. Combine that with the nature of the other loads and it sure seems like there should not be much need for mechanical cooling.

The chief breaks stride for a minute, looks up at you and says:

You know, I never thought about it like that. Now you've got me curious.

Exercise 1 – Scoping the Central Plant

Overview

Thus begins your first day on this imaginary job and the second exercise we will be doing using SketchUp models as a tool to facilitate technical learning.

This exercise revolves around the chilled water side of the central chilled water plant serving the hotel. There are at least 16 potential opportunities for improvement in the plant. Some of them can be identified by obvious indicators while others will require some knowledge of the fundamental principles behind the equipment and systems and connecting a few dots.

The goal of the exercise is for you to work with your team to see if you can find all of the opportunities. You may even find a few that I wasn't thinking of when I built the model but happen to exist by virtue of what is there and how it is set up. At least one of the known opportunities evolved that way.

And I should mention that in this model, missing insulation *is not* an opportunity at this point in time. The reason being I am still working on that aspect of the model, so while some of the insulation is in place, I don't have all of it there yet.

Leading Questions

To facilitate your effort and to provide fodder for discussion when we review your results in our next webinar, I put together the following questions for you to answer. Some of them are intended to simply get you accustomed to using SketchUp. Others will exercise your self-study effort and reinforce important concepts. A few are intended as clues that may lead you to an opportunity.

In preparation for the webinar on Monday, March 11, 2019, please work with your team to answer these questions and submit the answers to Barry with a copy to myself no later than Friday morning, March 8, 2019.

1. What is the load on the plant and how did you come up with the number? There are several ways you could do this that would be grounded by some physical indicator. So please document the technique you use in your answer.
2. If you are looking at a pump, without labeling on the pipe and with the pump trim and specialties insulated, how can you know for sure which way the water is flowing? (This is a technique that you can use to verify that labels on the piping are correct.)
3. Is there any portion of the piping where the water could flow in either direction depending on the operating mode? Include a screen-shot of that portion of the piping circuit with the piping highlighted somehow with your answer.
4. What is the nameplate rating for the chilled water distribution pumps?
5. Who sealed the mechanical drawing set for the facility?
6. Who manufactured the valves on the discharge of the pumps and are their any issues associated with them that would concern you as an facilities engineer running a facility that may require 24/7 chilled water service to accomplish your mission?
7. What is the purpose of the balance valve on the coupon rack and how is the setting determined?
8. What is the temperature differential across the condenser water system?
9. How many hours and how many starts have been accumulated by each of the chillers?
10. Do the things you are observing in the central plant make you want to go look at other areas in the facility or are the issues you are discovering specific to the equipment in the chiller room? Either way, explain the reasoning behind your conclusion and how what you are seeing would target your next steps.

Exercise Resources

Chiller Plant Model

This is the obvious resource of course. This is one of my largest models so it would be desirable when you are working as a team to have the person doing the navigating be the person with a machine that has:

1. The most memory, and
2. The best graphic card, and
3. The most recent version of SketchUp available for use as a desktop application (SketchUp Make 2017).

As you know, you can find legacy versions of SketchUp on the website on the SketchUp home page along with suggestions regarding how to pick the best version given your computer situation.

What is not on the webpage yet is that there is a SketchUp Viewer available with the current 2019 release of SketchUp and the entire purpose of the viewer is to allow models to be shared and viewed with people who do not have "full blown" SketchUp. It has all of the basic features required to navigate the model and the only tool that you might miss having is the ruler.

Since it is a "stripped down" version of SketchUp, it is likely less resource intensive than the free or Pro version, thus it may run better on a machine with limited resources. The one limitation it has is that it requires a 64 bit operating system. So if you don't have that, then you will not be able to use it (or Sketchup 2017 for that matter).

If you are finding SketchUp to be sluggish, it may be helpful to minimize the number of other applications you are running concurrently with it. For instance, only open one model at a time and close spreadsheets that have a lot of data in them (spreadsheets with trend analysis graphs in them are an example).

If you open up Task Manager and pick the performance tab you can see which applications are using the most memory. On my machine, Chrome can use almost as much memory as Sketchup, so I often shut it down when I am working on models.

And, as we found in the class on Monday, turning off layers that have a lot of edges in them can make SketchUp run faster. That might be more challenging for

you to figure out and do, especially figuring out which layers have a lot of edges and which can be sacrificed without loosing a feature you need to scope the model. So if you get to that point, it would be best to get in touch with me so I can help you figure that out.

But the one layer that I know you could sacrifice (if it exists) is the layer with the cooling tower fill on it. That layer is not used in the model you will work with for the first exercise, but it will be there in the model for the third exercise. Having said that, I think I may have figured out a way to minimize the impact of that layer and hope to implement that improvement by the time we get to the third model.

Scene Guide

As you know, I build scenes into the models to facilitate navigation or to turn off a layer so you can see something. Also, a lot of the scenes will put you in the general vicinity of a clue of some sort.

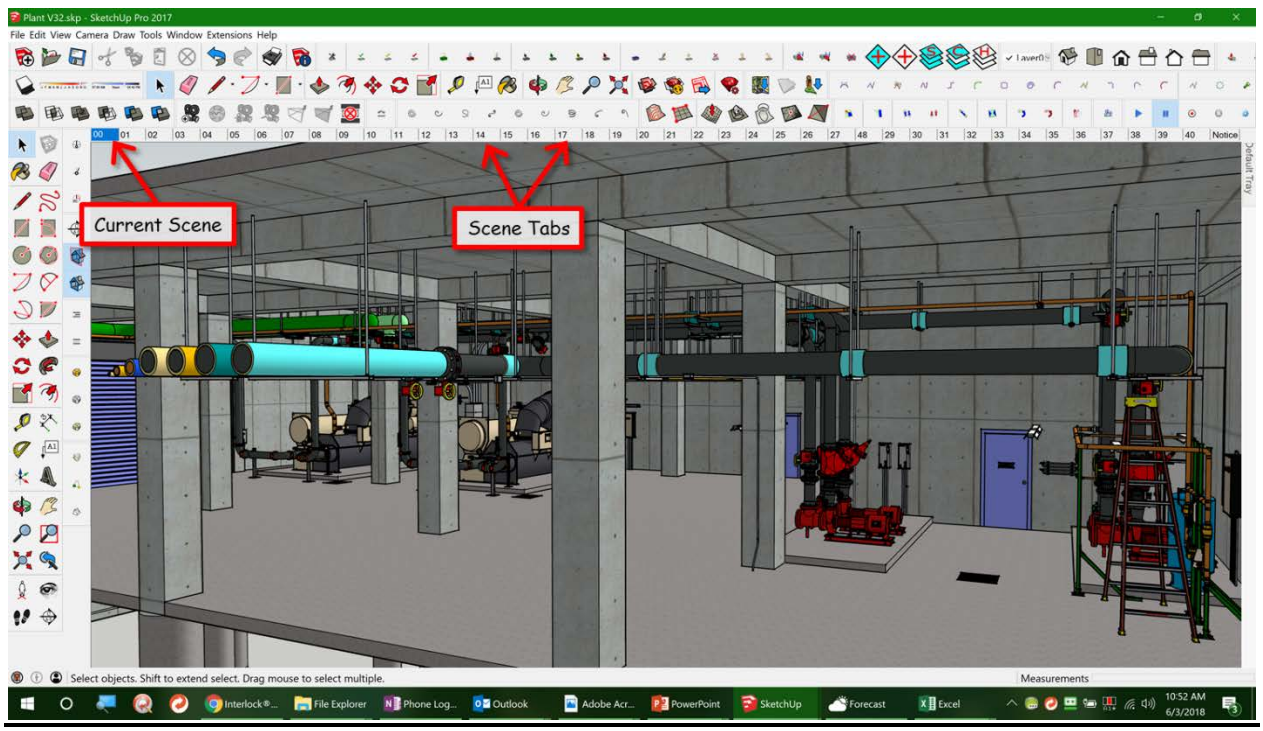

Figure 4 - Scene tabs

Examples in this model are:

- Scene 3, which places you in front of the pumps.

- Scene 4, which places you behind the pumps and turns of the insulation on the trim and specialties so you can see them.
- Scene 1, which turns off the roof slab.

To allow the maximum number of scene tabs to be visible (and to not give away too many clues), I numbered them instead of giving them a name. But if you hover over them, you will generally get a description of what the scene is about.

In addition, I have created a scene guide that consist of a table that has the scene number, a thumb-nail of the scene, and a brief description of the scene. It also includes general information about how to work with scenes and how to get the scene tabs turned on if they are not on in your model.

One thing to bear in mind is that if, for instance, you select Scene 1 to turn off the roof slab, then to keep it off, you will need to navigate to the place you want to be with out selecting a different scene.

In other words, if you were to, for instance select Scene 3 after selecting Scene 1 (which would have turned the roof off), then you would be placed in front of the pumps but the roof would be back on. That may not matter, but if you had wanted to look at the pumps from above, with out the roof in the way, you would need to select Scene 1 and then zoom, orbit and pan over to the location you wanted to observe at the pumps from.