1   APPENDIX A

1.1   DAVIS EMBASSY SUITES EMISSIONS CALCULATION METHODOLOGY

Construction and operational criteria pollutant and greenhouse gas emissions associated with current existing conditions and the proposed Davis Embassy Suites project modeled using the California Emissions Estimator Model (CalEEMod) Version 2013.2.2. Additional greenhouse gas emission offsets due to planned on-site solar electricity generation were estimated using the National Renewable Energy Laboratory's (NREL) PVWatts® web-based calculator. Model inputs and outputs are described below.

1.1.1   CalEEMod Model Runs

Two project scenarios were modeled with CalEEmod, the Existing and the Proposed Project. The Existing scenario is characterized by the operation of the current on-site 43-room motel (University Inn) and 4,000-squarefoot high-turnover sit-down restaurant (Caffe Italia) in 2015. The Proposed Project scenario is characterized by the demolition of the existing motel and restaurant and the construction and operation of the proposed 132-room hotel and associated parking facilities where demolition and construction would begin in 2016 and operation in 2018. Due to YSAMQD's annual thresholds for ROG and NOx emissions and daily thresholds for particulate matter emissions, CalEEMod outputs were made for both annual and daily emissions.

The following discusses the inputs used to generate the modeled emissions for the specified project scenarios. The model outputs are found in Attachment A.

Custom Trip Lengths

In the project's traffic analysis, Fehr and Peers found that the average trip length for the proposed hotel would be 32 miles per trip (Voeller, pers. comm., 2015). However, CalEEMod assumes a default trip length of 7.3 miles per trip for high-turnover sit-down restaurants, motels, and hotels. The project-specific trip length calculated by Fehr and Peers would also likely represent actual trip lengths associated with the existing motel and could also apply to the existing restaurant given that both land uses are located along Interstate 80 and can be easily accessed by those travelling long distances. Given these possibilities, two existing scenarios were modeled. The first assumed trips generated by the motel have an average trip length of 32 miles and trips generated by the restaurant would have the CalEEMod default trip length (7.3 miles). The second scenario assumed trips generated by both the motel and restaurant would have a trip length of 32 miles per trip.

Within CalEEMod's operational vehicle trip module, the model assumes a certain ratio of commercial-to-work (C-W), commercial-to-commercial (C-C), and commercial-to-non-work (C-NW) trips based on each land use type. To keep CalEEMod's land-use-specific trip ratios and preserve an average trip length of 32 miles/trip, adjusted trip lengths for C-W, C-C, and C-NW trips were calculated based on the weighted average length of each trip type. In addition, the modified trips were assumed to be 100-percent primary trips, 0-percent diverted, and 0-percent pass-by, because the trips and trips lengths input into the model were exclusively being generated by the project site land use in question, as shown in Sections 4.2 and 4.3 of Attachment A.

EXISTING SCENARIO INPUTS

Under existing conditions, two scenarios were modeled based on the application of custom trip lengths for the proposed hotel quantified by Fehr and Peers (Voeller, pers. comm., 2015). The specific inputs and outputs for these existing scenarios are shown in Attachment A, under "Davis Embassy Suites - Existing (Motel Trips at 32mi/trip)" and "Davis Embassy Suites - Existing (All Trips 32mi/trip)". Key model inputs for each scenario are summarized below.

Davis Embassy Suites - Existing (Motel Trips at 32mi/trip)

▲ Land Uses

- o High Turnover (Sit Down Restaurant) – 4,000sqft
- o Motel – 43 rooms

▲ Operations in 2015

- o Assumes no architectural coating
- o 509 average daily trips for the High Turnover (Sit Down Restaurant)
  - o 120 average daily trips for the Motel
  - o Average 7.7 miles per trip for restaurant
  - o Average 32 miles per trip for motel land uses

Davis Embassy Suites - Existing (All Trips 32mi/trip)

▲ Land Uses

- o High Turnover (Sit Down Restaurant) – 4,000sqft
- o Motel – 43 rooms

▲ Operations in 2015

- o Assumes no architectural coating
- o 509 average daily trips for the High Turnover (Sit Down Restaurant)
- o 120 average daily trips for the Motel
- o Average 32 miles per trip for restaurant
- o Average 32 miles per trip for motel land uses

PROPOSED PROJECT SCENARIO INPUTS

Under the proposed project scenario, the quantification of the various aspects of the project was broken out into three separate model runs and later summed. This was done to allow for dissemination of outputs from each part of the proposed project. Not to be confused with the model runs for the existing condition, despite the three separate runs for the proposed project, they are combined to represent a single proposed scenario. Descriptions of each of the three model runs shown in Attachment A are described below.

Davis Embassy Suites – Proposed Project - Hotel w/o Parking Facilities
This run estimated the demolition of the existing land uses and the construction and operation of the hotel land use only, not including any pavements or parking facilities. Model defaults for total trips and trip lengths were replaced with project-specific traffic data from Fehr and Peers, shown in Table A1. Operation was assumed to begin in 2018.

Davis Embassy Suites - Proposed Project - Surface Lots + Circulation

This run estimated only the construction of surface parking spaces and ground level roadways for circulation around the property, as shown in the site plan. The "Other Asphalt Surfaces" land use category in CalEEMod was used to represent the on-site circulation. To account for off-gassing emissions from roadway striping not provided by CalEEMod under "Other Asphalt Surfaces", architectural coating was assumed to be applied to 5.8% of the paved surface area to model, as described in Appendix E of the CalEEMod User's Guide. No vehicle trips during operations were quantified in this run.

Davis Embassy Suites - Proposed Project - Parking Structure

This run estimated the construction and building operation of the planned parking structure adjacent to the proposed hotel building. The "Unenclosed Parking with Elevator" land use category in CalEEMod was used to represent the planned multi-level parking structure. Operation of this parking structure would result in indirect emissions from electricity generation from the operation of lights and elevator. No vehicle trips during operations were quantified in this run. Operation was assumed to begin in 2018.

The specific inputs and outputs for these runs are shown in Attachment A, under "Davis Embassy Suites - Proposed Project - Hotel w/o Parking Facilities", "Davis Embassy Suites - Proposed Project - Surface Lots + Circulation Only", and "Davis Embassy Suites - Proposed Project - Parking Structure". Key model inputs and construction schedule for the proposed project are summarized in Table A1 and A2 below. Any model inputs not identified in the tables below used CalEEMod defaults.

Table A1	Proposed Project Model Land Use Inputs	
Project Component	**Value**	**Source/Notes**
Demolition of Existing Facilities		
Building to be Demolished (sqft)	19,364	Existing project site plans
Pavement to be removed (sqft)	51,885	Existing project site plans. All paved areas to be removed.
Depth of Pavement (ft)	0.5	Assumption
Total Pavement Export (CY)	961	Calculated
Pavement Export – Truck Trips	48	Calculated. Assumes a 20 CY truck capacity
Soil Export – Truck Trips	12	City of Davis 2015. Assumes a 20 CY truck capacity
Construction and Operation of Proposed Project		
Total Project Acres	2.83	Project description
Total Hotel Squarefeet	122,919	Project description
Hotel Rooms	132	CalEEMod defines a hotel as a place of lodging that provide sleeping accommodations and supporting facilities such as restaurants; cocktail lounges; meeting and banquet rooms or convention facilities; limited recreational facilities and other retail and service shops.
Hotel Squarefootage	163,448	Proposed Project site plan
Hotel Footprint (sqft)	49,500	Proposed Project site plan
Hotel Daily Trips	1026	Fehr and Peers 2015
Hotel Trip Length (mi/trip)	32	Fehr and Peers 2015
Parking Structure Footprint (sqft)	23,630	Proposed Project site plan
Parking Structure Squarefootage	70,890	Proposed Project site plan
Parking Structure Spaces	166	Proposed Project site plan

Parking Lot Footprint (sqft)	2,400	Proposed Project site plan
Parking Lot Spaces	6	Proposed Project site plan
Parking Lot Painted Surface	139	Assumes 5.8% of paved area is painted. p.41 of CalEEMod Users Guide Appendix E.
On-Site Roads/Circulation (sqft)	47,389	Total project area minus hotel and parking footprints.
On-Site Roads/Circulation Painted Surface (sqft)	2,748	Assumes 5.8% of paved area is painted. p.41 of CalEEMod Users Guide Appendix E.

Sqft = squarefoot

Ft = feet

CY = Cubic yards

City of Davis references based on Hess, pers. comm., 2015

Fehr and Peer references based on Voeller, pers. comm., 2015

Source: CalEEMod Version 2013.2.2, Voeller, pers. comm., 2015, Hess, pers. comm., 2015, Adapted by Ascent Environmental 2015

Table A2	Table Proposed Project Construction Schedule			
Phase	Start	End	Work Days	Source/Notes
Demolition and Site Preparation				
Demolition	1/1/2016	3/11/2016	50	Start date from project description. Duration based on number of hauling trips needed for material removal.
Site Preparation	3/12/2016	5/20/2016	50	Duration based on number of hauling trips needed for material removal.
Parking Lot and Circulation				
Paving	5/21/2016	10/7/2016	100	Scaled proportionally by total paved area based on CalEEMod default assumptions for a six-space parking lot. CalEEMod does not have default assumptions for "User defined paved area"
Architectural Coating	10/8/2016	10/21/2016	10	
Parking Structure				
Building Construction	6/4/2016	3/10/2017	200	CalEEMod default
Paving	3/11/2017	3/24/2017	10	CalEEMod default
Architectural Coating	3/25/2017	4/7/2017	10	CalEEMod default
Hotel				
Building Construction	5/21/2016	3/24/2017	220	CalEEMod default
Paving	3/25/2017	4/7/2017	10	CalEEMod default
Architectural Coating	4/8/2017	6/2/2017	40	Extended from default assumptions to minimize daily emissions.

Source: CalEEMod Version 2013.2.2, Adapted by Ascent Environmental 2015

1.1.2   Solar Energy Generation Calculations

According to the project architect, a total of 3,130 squarefeet of solar panel area would be installed at the project site (Bergerson, pers. comm., 2015). However, no information is currently available as to the solar system size or rating. To quantify the emissions offset due to on-site electricity generation from proposed solar panels, the NREL "PVWatts®" web-based calculator[1] was used (National Renewable Energy Laboratory

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[1] http://pvwatts.nrel.gov/pvwatts.php

2014). NREL's PVWatts® Calculator calculates annual electricity generation based on the location of the solar system, module type, array type, and other factors. At the minimum, the calculator requires the photovoltaic (PV) system size in kW and location to quantify annual electricity generation. NREL assumes that a default PV system size is 4 kW for a 25m² array. Assuming the project would use a default PV system, the planned 3,130 sqft array would be a 47kW system. Subsequently, as shown in Attachment B, the PVWatts® Calculator estimates that this system could generate 70,952 kWh per year. Default PG&E emissions factors and GWP factors used in CalEEMod were used to calculate the offset GHG emissions from the planned solar panels.

1.2   REFERENCES

Bergerson, Tom. Principal. Architects Orange. Orange, CA. June 5, 2015. – E-Mail to Katherine Hess of the City of Davis regarding the estimated total solar panel area on the Davis Embassy Suites project site.

Hess, Katherine. Community Development Administrator. City of Davis. Davis, CA. May 22, 2015. – E-Mail to Dimitri Antoniou of Ascent Environmental regarding the updates to the Davis Embassy Suites project description.

Voeller, Gabby. Transportation Planner. Fehr and Peers. Roseville, CA. May 19, 2015. – Gary Jakobs of Ascent Environmental regarding the updates to the trip generation and daily vehicle miles travelled for the proposed Davis Embassy Suites project.

National Renewable Energy Laboratory. 2014 (September). PVWatts® Calculator. Available: http://pvwatts.nrel.gov/pvwatts.php. Accessed: June 17, 2015. Last Updated: September 2014.