ATTACHMENT 18

TITLE-24 COMPARISON

MEMO

Date: October 24, 2014
To: **John Tallman, WPCB, LLC**
Cc: **Kris Steward, Phillips Land Law**
From: Davis Energy Group
Subject: Bickford Ranch 2001 vs 2013 Title-24 Comparison

The Bickford Ranch Specific Plan (BRSP), located between Lincoln and Penryn in Placer County, California, was initially approved in 2004 before being put on hold. An application has been filed by LV Bickford Ranch, LLC with the county to make minor modifications to the land use plan. As part of this filing, LV Bickford Ranch, LLC would like to quantify the impact on home building efficiency as a result of changes in the California Building Energy Standards (Title-24, Part 6) from when the project was approved in 2004 to 2014.

Davis Energy Group used CBECC-Res simulation software, approved for 2013 Title-24 energy code compliance calculations, to compare performance of a home built to 2001 Title-24 prescriptive standards (in effect when the project was approved in 2004) and a current code compliant home (built to the 2013 code). Since building plans are not currently available, a typical 2,700 ft^2 two-story building plan was modeled. It's expected that percent improvement figures will be very similar for other single family home types with different floor area and number for stories[1]. Results are presented in Table 1.

The improvement in compliance margin (based on regulated loads only: space heating, space cooling, ventilation, and water heating) for this project built to 2013 code standards relative to 2001 is estimated to be **45%**. Total house energy use energy use, including lighting, appliances, and plug loads, is reduced by 35% (based on time dependent valuation of energy (TDV)[1]). Prescriptive changes to residential lighting code were applied to estimate lighting savings. Efficiency specifications for both vintage homes are detailed in Table 2.

Table 1. Energy Analysis Results

End-Use	2001 Title-24 Code (kTDV/ft^2/yr)[2]	2013 Title-24 Code (kTDV/ft^2/yr)	% Improvement
Space Heating	32.10	20.31	37%
Space Cooling	94.05	44.13	53%
Ventilation	1.11	1.11	-
Water Heating	11.43	10.88	5%
Compliance Total	**138.69**	**76.43**	**45%**
Lighting	13.02	10.76	17%
Appliances + Plugs	33.99	33.99	-
Building Total	**185.70**	**121.18**	**35%**

[1] Note that while % improvement will be similar, actual energy use figures will be different depending on floor plan.
[2] Title-24 compliance is based on time dependent valuation (TDV) energy which is used as indicator of the societal value of energy and includes fuel conversion, transmission, and distribution.

Table 2. Energy Efficiency Specifications

Building Component Efficiency Feature	**2001 Title-24**	**2013 Title-24[3]**
Envelope		
Exterior Walls	2x6 16"oc Wood Frame w/ R-19	2x4 16"oc Wood Frame w/ R-15+4 or R13+5
Wall to Garage & Kneewalls	2x6 16"oc Wood Frame w/ R-19	2x4 16"oc Wood Frame w/ R-15
Foundation Type & Insulation	Uninsulated slab	
Floor (Above Garage / Cantilever)	R-19	
Roof/Ceiling Insulation & Attic Type	Vented attic, R-38	
Radiant Barrier	Yes	
Window Properties: U-Value / SHGC	0.65 / 0.40	0.32 / 0.25
House Infiltration - Blower Door Test	8.5 ACH50	5 ACH50
HVAC Equipment		
System Type & Description	Split A/C with gas furnace	
Heating Efficiency (AFUE)	78 AFUE	80 AFUE
Cooling Efficiency (SEER/EER)	SEER 10	SEER 14, EER 12.1
Duct Location & Insulation	R-4.2, in attic	R-8, in attic
Duct Leakage Tested < 6% Leakage	6%	
Verified Refrigerant Charge	No	Yes
Verified Cooling Airflow >= 350	No	Yes
Verified Fan Watt Draw <= 0.58	No	Yes
Water Heating Equipment		
System Type & Description	Gas, 50 gal	
Water Heater Efficiency	0.575	0.6

[3] Heating, cooling and water heating efficiencies are based on the minimum federal standards that will be in effect January 2015.