REPORT TO PLANNING COMMISSION

SUBJECT

Forward a recommendation to the City Council to Introduce an Ordinance to Amend Chapter 19.56 (Alternative Energy Systems) of the Sunnyvale Municipal Code related to the Solar Access Requirements Study Issue (2016-7279), and Find that the Action is Exempt from CEQA.

REPORT IN BRIEF

On October 26, 2015, following the approval of a solar access variance, the Planning Commission sponsored this study issue (**Attachment 2)** to evaluate the current practice of solar access requirements and regulation of solar shading on adjacent parcels.

As stated in the study issue paper, this study is intended to determine whether the threshold for determining solar access regulations should be based on an analysis on December 21st (shortest day of the year) or consider a broader criteria such as a 365-day solar cycle analysis. The purpose of the study was to:

- Examine whether the current regulations are effective for all types of development and improvements being made to properties;
- Look at solar access for an entire parcel, not just roof-top solar access;
- Examine whether certain areas of the City should have different solar access requirements;
- Consider whether shading standards should vary between residential and non-residential buildings.

Sunnyvale is one of only a few cities that regulate solar access. Solar collection systems have both direct and indirect benefits to the City. They contribute to the City meeting the emissions reductions goals enumerated in the Sunnyvale Climate Action Plan (CAP) while also moving community members away from dependence on non-renewable sources of energy.

This report provides options for solar access regulations, describing the pros and cons for each option. Staff recommends that the Planning Commission make the recommendation to the City Council to adopt an ordinance (**Attachment 3**) to amend Chapter 19.56 (Alternative Energy Systems) of the Sunnyvale Municipal Code to amend the solar access requirements to a solar cycle vs. only on the shortest day of the year. This approach would clarify the existing regulation, provide options in determining the potential shading impact that new construction would have on an adjacent parcel, and allow for continued consistency with the Sunnyvale Climate Action Plan's policies on alternative energy.

BACKGROUND

Current Solar Access Requirements

In December 1985, the Planning Commission recommended that the City Council adopt standards

regulating access to solar energy by establishing the concept of a solar envelope. At the 1985 Planning Commission hearing, staff stated that the proposed Ordinance was, “mainly intended for single-family areas where the construction of two-story homes may shade adjacent structures and thus prohibit their neighbors from installing effective solar panels**.”** However, the Ordinance as written applied to all zones in the City, including commercial and industrial. The City Council adopted the Ordinance on January 7, 1986.

The current solar access requirements were adopted when most solar energy systems were used for thermal water heating. The siting and effectiveness of solar hot water installations generally needed to be located on top of the structure where they would be utilized to minimize heat loss during transmission of the heated water. Hot water solar installations collect energy mainly when there is sufficient direct solar availability; the consumer uses the collected energy on-site. Solar hot water systems do not have capacity to store energy for future use. In Sunnyvale, solar hot water systems are mostly used for domestic hot water and for heating the water for swimming pools.

In contrast, current photovoltaic (PV) energy systems collect energy anytime solar access is available (even on cloudy days) and are able to collect more energy than the daily needed amount of the use or building where the system is located. Excess energy is collected and sold back to the utility company to be bought back by the user when needed (called Net Metering). This approach allows constant supply of energy to be available regardless of shading or cloud cover that may be present on certain days of the year. The change in solar system technology and usage means the need is not as absolute for direct and constant solar access at every day throughout the year. Some PV systems also store the energy for future use by charging on-site batteries.

The ordinance adopted in 1986 describes a solar cycle as an entire year, but the language in the Report to the City Council that accompanied the Ordinance focused the analysis on the solar access condition at the shortest day of the year with the lowest sun angle. After the Council adopted the solar energy ordinance in 1986, staff prepared a worksheet describing the use of the shortest day of the year on how to calculate solar shading, representing the extent of solar shading under the worst-case conditions. This approach has created confusion about why the solar cycle was included in the ordinance. Further, the worksheet appears to be intended for use primarily with single-family residential buildings and separate guidance for multi-family residential and nonresidential development was not created.

Current Solar Access Conditions

Development patterns, buildings heights, proximity of buildings to each other, and solar technology have changed since 1986. While the current standards are still effective for residential uses, they create difficulties for use in redeveloping areas, such as El Camino Real and Downtown. For example, as non-residential properties along El Camino Real redevelop with multiple story buildings, properties on the north side of the proposed buildings are likely to be shaded. But once the older, shorter building redevelops, the solar shading issue no longer exists. This situation makes it more difficult to implement the plan with newer multiple-story buildings due to solar shading issues. To address this issue, the Downtown Specific Plan (DSP) zoning exempts properties in the DSP from the solar access requirements.

On October 12 and 26, 2015, the Planning Commission considered variance applications to the solar access requirements for two separate projects involving redevelopment of two sites into separate five -story hotels on El Camino Real. Analysis of these sites showed that the hotels would inhibit solar

access to the roof of the adjacent properties beyond the allowable level of 10 percent at 9 a.m. and 3 p.m. on December 21st (the current standard of). None of the adjacent structures would be shaded more than 10 percent throughout the solar cycle

On October 26, 2015, following these two variance requests, the Planning Commission sponsored the study issue regarding Solar Access Requirements (see **Attachment 2**) and it was ranked first by the City Council for the Community Development Department's 2016 Study Issues.

The City Council is scheduled to consider this item on August 9, 2016.

EXISTING POLICY

SUNNYVALE CLIMATE ACTION PLAN

Local Renewable Energy Policy

Action EP-2.1 - Require new homes and businesses and major remodels to be "solar ready" by pre-wiring for solar water heating and solar electricity.

Action EP-2.3 - Prevent buildings and additions from shading more than 10% of roofs of other structures.

COUNCIL POLICY MANUAL

Policy 3.5.1 Energy (see **Attachment 4** for complete policy)

It is the purpose of this Energy Policy to:

- Promote economic development
- Maintain a healthy environment
- Maximize limited natural resources
- Encourage alternative forms of transportation
- Encourage cost reduction in City operations

Sunnyvale Municipal Code

Alternative Energy Systems (Chapter 19.56)

19.12.200 (16) "Solar cycle" means a year-long interval, beginning at twelve noon, Pacific Standard Time, December 21st, in any calendar year, and ending at twelve noon, Pacific Standard Time, December 21st of the subsequent calendar year.

19.56.020 - Solar Energy Systems - Impairment of Solar Access by Structures

(a) No building permit shall be issued for any construction that would interfere with solar access to the rooftop of any structure or to any preexisting solar collector on nearby property. Solar access means the blocking or reducing exposure to sun more than 10% daily from 9 a.m. to 3 p.m. throughout any solar cycle.

California State Law

There have been several state laws passed relative to solar access (titles are listed below); summaries of these laws can be found in **Attachment 8.**

- Voluntary Solar Easement Rights
- Solar Easements in Conjunction with the Subdivision Map Act
- Solar Rights Act for Installation of Solar Energy Systems
- Local Government Review Authority of Solar Applications

- Protection of Solar Systems from Vegetative Shading
- Solar Garden Regulations

ENVIRONMENTAL REVIEW

The action being considered does not constitute a "project" within the meaning of the California Environmental Quality Act ("CEQA") pursuant to CEQA Guidelines section 15378(a) as it has no potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment. In addition, the action is exempt from CEQA pursuant to CEQA Guidelines section 15305, minor alterations in land use limitations in which do not result in any changes in land use or density.

Projects that are subject to the requirements of the amended chapters will be evaluated pursuant to CEQA on an individual basis.

DISCUSSION

Overview

Solar access protection laws recognize the importance of guaranteeing consumers the financial value of solar access on their property for already installed solar systems and potential future systems. Shading from nearby structures or foliage can significantly impact the financial value of a solar collector system through lost energy production. Conserving energy and improving energy efficiency in the built environment is a priority for the City, and includes shifting energy consumption that cannot be reduced through energy efficiency away from traditional electricity and natural gas to renewable energy sources. Solar collection systems are one way the City of Sunnyvale can reduce greenhouse gas emission and encourage the transition from traditional electricity production and natural gas sources to on-site renewable sources.

Chapter 19.56 (Alternative Energy Systems) of the Sunnyvale Municipal Code is intended to protect the rooftop of structures or existing active solar collectors from interference of solar access. Solar Access means the blocking or reducing exposure to the sun to an extent greater than 10 percent daily during the hours between 9 a.m. to 3 p.m. throughout any solar cycle. The City has historically implemented this code using the definition that shading of solar access can be no more than 10 percent at 9 a.m. and 3 p.m. on the shortest day of the year, December 21st.

Subsequent to the adoption of the current ordinance, staff has received applications for approximately 13 variances to solar access requirements. From 1989 to 1999, the applications were only for properties within low-density and medium-low density zoning districts and resulted in a few denials. More recently (2000-2016), the variance applications have shifted to non-residential uses. As of July 2016, there are three pending solar access variance applications, two related to commercial and office development proposals and one related to a single-family second story addition. The need for the variance is based on interpretation of the code using the shortest day of the year, December 21st at 9 a.m. and 3 p.m.

The proposed study is to make a more precise definition of the context of solar shading (shortest day of the year or a yearly average) and to find a fair balance between the interest in allowing older buildings and properties to redevelop in accordance with City plans and in protecting solar access to lower scale buildings.

Calculation of Solar Access

There are several factors to consider when selecting an appropriate solar access requirement:

- **Time at Which Solar Shading is Measured**
  - Since the location of the sun in relation to a property varies over the course of the day (and over the course of the year) it is important to remember that shading is most extreme at the beginning and end of the of the daylight hours and is even more extreme in winter where the sun is lower in the sky at the beginning and end of the day. A shading threshold calculated on the shortest day of year is what has been used by Sunnyvale and appears to be the most common approach found in other cities ordinances.
  - While solar access varies extensively day by day, the electricity provided to the grid by solar systems in California are metered over the course of an entire year not a single day. To gain a better sense of what shading threshold is appropriate, staff contacted local solar PV installers. In general, these local providers indicated that solar access on the area of the property available for installation should be 85% or greater in the entire annual solar cycle (or no more than 15% shading).
- **Prescriptive vs Discretionary**
  - While most solar access ordinances have specific shading thresholds established, it is possible to allow for a discretionary approach where staff analyzes potential shading issues for each development in coordination with a solar expert to decide whether solar access can be optimized and development can still occur.
- **Rooftop Protections vs Whole Property Protections**
  - Solar shading requirements can be applied to building rooftops or on the property as a whole. In general, analyzing shading effects on an existing rooftop is more restrictive, although this is dependent on the location of the shaded structure on the neighboring property and its relationship to the proposed project. Additionally, in medium and high density residential zoning districts it is more likely that existing older structures will be re-developed and at similar heights to adjacent residential uses as compared with single-family and low-medium density developments where the difference between one and two stories could potentially create shading on adjacent structures.

Other Cities

Staff researched how other cities regulate solar access and generally found no jurisdictions near Sunnyvale have ordinances specific to solar shading to protect solar access from adjacent structures. The City Attorney's office reached out to colleagues statewide but did not get any responses, probably because relatively few cities regulate solar access.

The search was broadened to beyond Santa Clara County; a handful of jurisdictions in the state and country have solar regulations that were relevant to the study; however, none were found that regulated access in a similar fashion as the City of Sunnyvale. The regulations are described in more detail in **Attachment 9, along with links to the full text of each.**

Options to Consider

There are several different ways to address the solar access issue, including the following:

Option A (Staff Recommendation):

Amend the code to follow the year long solar-cycle approach

1. This option requires minimal changes to the zoning code, but would result in a change of

practice in how solar access requirements are evaluated by establishing the following steps for solar access review: Require applicants to demonstrate the percent of shading on adjacent roofs on the shortest day of the year (December 21st). If shading does not exceed 10% of the roof, no further solar shading review is necessary.

2. If the shading study determines there is more than 10% shading on December 21st, a more detailed evaluation must be prepared to show the amount of shading over a solar cycle (365 days).
3. If it can be shown that the adjacent property is not shaded by more than 10% throughout the solar cycle, no further study is required.
4. If shading exceeds 10% throughout the solar cycle the project must be redesigned to show compliance with the code. Alternatively an applicant could pursue other measures (such as solar easements) or a Variance must be approved to allow the project to move forward.

This option codifies the practice that has been used since the regulations were adopted in 1986, and clarifies the use of the solar cycle to evaluate shading.

Pros:

- Calculation of solar access as described in this option may provide a more accurate depiction of the solar access needs of a property.
- It would be consistent with the methods for calculation used by many solar installers and net metering policies of California investor owned utilities.
- Evaluation in this manner may provide a better balance between the rights to solar access and property rights.
- Retain consistency with the policies in the Sunnyvale Climate Action Plan.
- Clarifies the process by adding specific language to the ordinance on the requirements for solar shading analysis.
- Most applicants can use the existing solar shading analysis because the majority of projects do not shade an adjacent roof more than 10% on the shortest day of the year. A solar-cycle analysis would likely be required for few applications.

Cons:

- The year-round calculation of shading is more complex than the method currently in process. Single-day shading calculations are completed by most architects, but year-round analysis may require on-site modeling using an electronic device, such as a Solar Pathfinder.
- Use of this threshold may require applicants that cannot meet the shortest day of the year threshold to retain a qualified solar consultant to complete the solar cycle analysis.
- Overall solar access may be decreased to some extent by changing the standard way of analyzing solar access.

Option B:

Retain shortest day threshold for single-family residential zoned properties

This option would maintain the same thresholds and procedures as Option A for low and low-medium density residential zoning districts which consist of mainly single-family and duplex-style housing units (i.e. less than 14 units per acre: R-1, R-0, R-1.5, R-1.7 and R-2 zoning districts), but allows the year-long solar cycle to be used for medium and higher density residential and non-residential properties.

In this option, shading of the low and low-medium density zoning districts would be based on the shading analysis performed at 9 a.m. and 3 p.m. on December 21st and not the solar cycle. The application of this regulation would be based on the adjacent property's zoning designation so a commercial parcel that was adjacent to a low-density residentially zoned parcel would calculate shading based on the regulations required for the low-density residential parcel.

Pros:

- For medium density and higher residential zoning districts, the pros would be similar to those listed above in Option A.
- For low and low-medium density zoning districts, retention of an easy approach to calculating solar shading.

Cons:

- For medium density and higher residential zoning districts, the cons would be similar to those listed above in Option A.
- It could be confusing to have two sets of standards.

Option C: Other Options to Consider

The following options were considered but not recommended (additional details can be found in **Attachment 5).**

- Evaluate Shading in accordance with Option A for Low-Density and Low-Medium Density Residential Zoning Districts but Determine an Appropriate Percentage of the Site that could be Shaded for Other Zoning Districts.
- Evaluate Shading on December 21st only and Average the Results between 9 a.m. and 3 p.m. or Increase the Allowable Percentage of Neighboring Rooftop to be Shaded.
- Evaluate Shading in accordance with Option A for Low-Density and Low-Medium Density Residential Zoning Districts and have no Solar Access Requirements for other Zoning Districts.

Option D: Maintain the Status Quo

This option would maintain the existing method used by staff to determine compliance with the solar access requirements. If this option is selected, it would be important to clarify the practice and regulation by amending the ordinance to remove the reference to a solar cycle. The Planning brochure on Solar Access and Shadow Analysis reflects the current practice (**Attachment 7)**.

Pros:

- This method can be interpreted to be consistent with the Sunnyvale Climate Action Plan.
- The calculation required for single day analysis of shading at two time points is simpler than some other thresholds.
- Does not affect the majority of new construction applications.

Cons:

- This threshold may be unnecessarily strict, not providing fair balance with interests of neighboring property owners and solar access needs.
- May lead to further confusion and questions on the meaning of this ordinance.
- May result in more variance requests, which typically can be interpreted as an unrealistic code

requirement.

FISCAL IMPACT

The proposed modifications to the Sunnyvale Municipal Code associated with the solar access requirements study issue would have no fiscal impacts.

PUBLIC CONTACT

Public contact regarding this item was made through the following ways:

1. Posting the Agenda for Planning Commission on the City's official-notice bulletin board outside City Hall and by making the agenda and report available at the Sunnyvale Public Library and on the City's website;
2. Publication in the *Sun* newspaper, at least 10 days prior to the hearing;
3. E-mail notification of the hearing dates sent to all interested parties and neighborhood associations; and
4. One community outreach meeting held to discuss the study issue on April 7, 2016.

Planning Commission Study Session

A study session with the Planning Commission was held on March 28, 2016 with all seven of the commissioners in attendance. The Commission was interested in simplifying the solar shading analysis process as much as possible, while maintaining its effectiveness in promoting alternative energy systems. In addition to the solar access requirements as described in the Study Issue Paper (**Attachment 2**), the Planning Commissioners also discussed a topic that went beyond the original scope of this study issue, solar rights and rights to sunlight in respect to individual property rights. In an effort to address this comment, a memo from the Office of the City Attorney is included (**Attachment 6)** to further explain this concept.

A few members of the public also attended the study session and spoke about their interest in preserving the right of property owners to solar access and alternative energy systems. One member of the public also mentioned an interest in allowing for advancements in solar technology.

Community Outreach Meeting

Staff conducted an outreach meeting on April 7, 2016. Two people attended the meeting, one from the development community and one community member.

The individual from the development community re-iterated interest that the solar access ordinance be modified to allow for some additional flexibility, and with analysis requirements that are clear and relatively easy to complete.

The community member shared a concern that modifications to the solar ordinance may unfairly limit solar access and that analyzing shading percentage over the course of the year rather than the shortest day would not be consistent with current practices and may not protect solar access rights. In addition, the community member stated that the City should look at solar rights generally for an entire property (or based on use) while also evaluating a best and fair alternative for implementing Sunnyvale Municipal Code Chapter 19.56.

ALTERNATIVES

Recommend to City Council:

1. Introduce an Ordinance to Amend Chapter 19.56 (Alternative Energy Systems) of the

Sunnyvale Municipal Code that allows solar access to be calculated based on a full 365 day solar cycle.
2. Introduce and ordinance with modifications to the staff recommendation.
3. Do not amend Chapter 19.56 (Alternative Energy Systems) of the Sunnyvale Municipal Code and make no changes to the current standard of practice for solar access requirement evaluation.

RECOMMENDATION

Recommend to the City Council Alternative 1: to introduce an Ordinance to Amend Chapter 19.56 (Alternative Energy Systems) of the Sunnyvale Municipal Code that allows solar access to be calculated based on a full 365 day solar cycle.

The recommended modifications to the Sunnyvale Municipal Code will help clarify the existing solar access requirements and also provide more flexibility to balance property owners' solar access, for the purpose of PV installation, with property owners' rights (e.g. the potential to build to heights allowed in the Sunnyvale Municipal Code).

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ATTACHMENTS

1. *Not Used (for use with Report to Council)*
2. Study Issue Paper
3. Draft Ordinance
4. Full Text of Council Policy 3.5.1 (Energy)
5. Information on Other Options to Consider
6. City Attorney Office Memo Regarding Solar Access Rights
7. Solar Access and Shadow Analysis Handout
8. Summary of California State Laws Related to Solar Access
9. Other Jurisdiction's Solar Access Regulations