City of Cherry Hills Village
Bulk Plane Strategy Report

Cherry Hills Village residents have expressed concern that some newer homes negatively impact the character of their neighborhoods. Specific concerns include losing the traditional semi-rural character of the community, views, solar access, privacy and open space.

In response to these concerns, the City's Residential Development Standards Committee recommended zoning code amendments to address the mass and scale of additions and new construction in residential neighborhoods. Study and implementation of a bulk plane standard is a key Committee recommendation.

This report describes the development of a bulk plane standard. With direction from City Council, the recommended bulk plane standard described in Part 3 may be developed into a proposed zoning ordinance for public consideration.

Report Contents

October 28, 2010

Report Attachments

A series of 11x17 attachments are attached to this report. They facilitate side-by-side comparison of existing conditions, development trends and bulk plane alternatives. Note that the original Existing Conditions and Alternatives working papers include additional attachments.

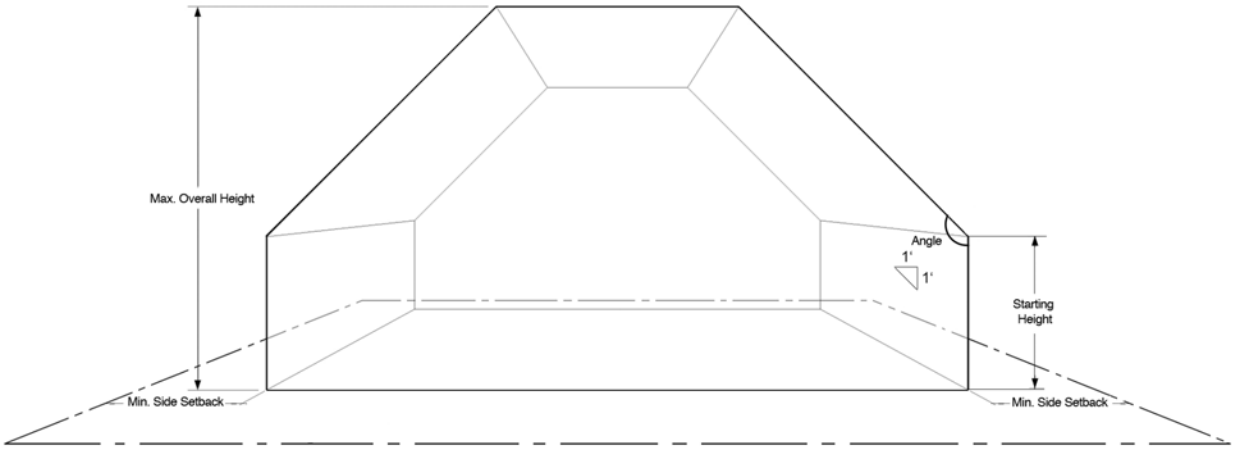
Attachment A: Existing Conditions Illustrated by Context	This sheet includes illustrations of existing conditions in a sample area of each context.
Attachment B: Current Trends Structures Illustrated by Context	This sheet includes illustrations of new construction that conforms to development trends in each context. Existing buildings are illustrated in brown while new construction is shown in tan.
Attachment C: Current Trends Structures Illustrated Within Alternative 1 (RDSC Recommended) Bulk Plane by Context	This sheet illustrates the Alternative 1 (Residential Development Standards Committee recommended) bulk plane superimposed over new construction corresponding with development trends in each context. Building areas that protrude through the bulk plane are highlighted in blue (note that side facing gable roof ends are allowed to protrude). The illustrations on this sheet help demonstrate how the Alternative 1 bulk plane standard would impact current development trends.
Attachment D: Current Trends Structures Illustrated Within Alternative 2 Bulk Plane by Context	This sheet illustrates the Alternative 2 bulk plane superimposed over new construction corresponding with development trends in each context. Building areas that protrude through the bulk plane are highlighted in blue (note that side facing gable roof ends are allowed to protrude). The illustrations on this sheet help demonstrate how the Alternative 2 bulk plane standard would impact current development trends.
Attachment E: Shading Impacts of Alternative Bulk Plane Angles on the Spring/Fall Equinox Illustrated in Context H	This sheet illustrates shading impacts of alternative bulk plane angles on the spring or fall equinox on a lot in Context H (R-4).
Attachment F: Shading Impacts of Alternative Bulk Plane Angles on the Winter Solstice Illustrated in Context H	This sheet illustrates shading impacts of alternative bulk plane angles on the winter solstice on a lot in Context H (R-4).
Attachment G: Current Trends Structures Illustrated Within Recommended Bulk Plane by Context	This sheet illustrates the recommended (preferred alternative) bulk plane superimposed over new construction corresponding with development trends in each context. Building areas that protrude through the bulk plane are highlighted in blue (note that side facing gable roof ends are allowed to protrude). The illustrations on this sheet help demonstrate how the recommended bulk plane standard would impact current development trends.
Attachment H: Current Trends Structures Illustrated with Re-Design to Fit Within Recommended Bulk Plane by Context	This sheet illustrates new construction that has been re-designed to fit completely within the recommended bulk plane in each context. In some cases, the structures illustrated are the same as those in Attachment E, because no re-design was necessary for the structure to fit within the bulk plane.

What is a Bulk Plane?

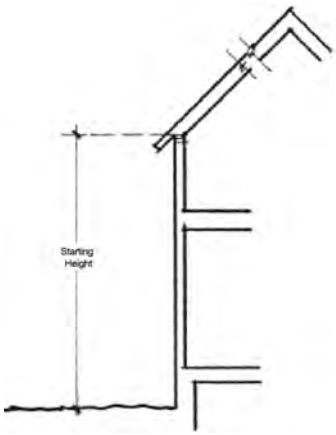
Bulk plane standards lower the permitted height of development near front, side and/or rear property lines by establishing an inclined plane over which buildings may not protrude. By pushing taller building elements towards the center of a lot, a bulk plane may be used to reduce looming impacts on neighboring properties and promote access to light and air.

A bulk plane may be measured from the property line or minimum setback and may start either at ground level or a specified starting height above ground level. From the starting height, the bulk plane projects towards the center of the lot at a specified angle until it intersects the overall height limit or a bulk plane projected from another side of the lot.

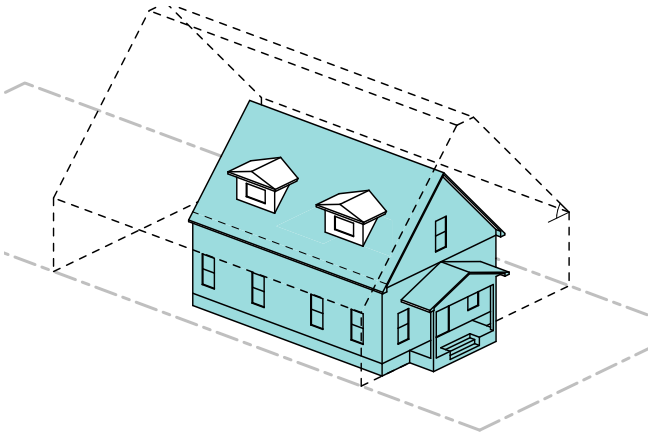
A bulk plane combines with other regulations such as minimum setbacks and overall height limits to define a three-dimensional space where structures may be built on a property. This "building envelope" is illustrated in transparent blue, purple or red throughout the strategy report.



This sketch illustrates a bulk plane measured from the minimum side setbacks with a starting height of 10 feet and an angle of 45˚. The bulk plane projects towards the center of the lot until in intersects with the maximum overall height.



The starting height for a bulk plane determines how tall the portion of a structure may be where the bulk plane begins.



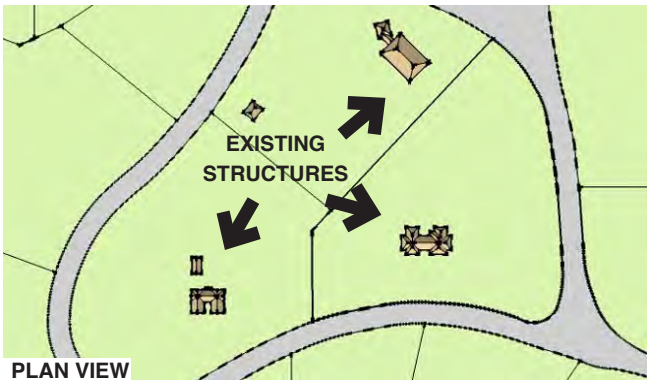
Dormers and other specific building elements may be allowed to protrude through a bulk plane.

Guide to the Model Illustrations

Computer generated images are used throughout this strategy report to demonstrate existing conditions in different neighborhood contexts, development trends and bulk plane standards. Illustrations are presented in plan view (from directly above), bird's eye view (from a point in the air diagonally above), perspective view (from the front), side view (from a point in the air just above the side) and street view (from the viewpoint of a person standing on the street). Key elements of the model illustrations are summarized below.

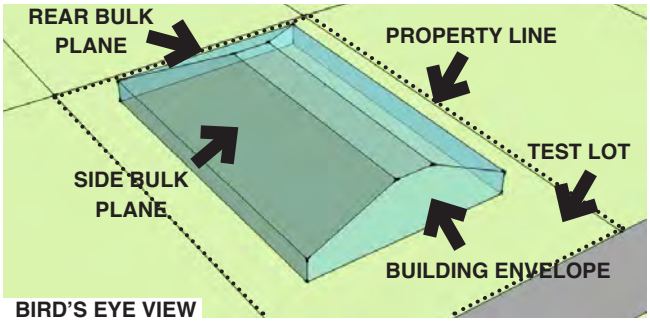
Existing Context

Illustrations of existing context are used to provide a setting for evaluation of existing conditions, current trends in new construction and alternative bulk plane standards. Computer models have been generated to approximate existing conditions in a sample area within each of the nine neighborhood contexts summarized in Part 1.



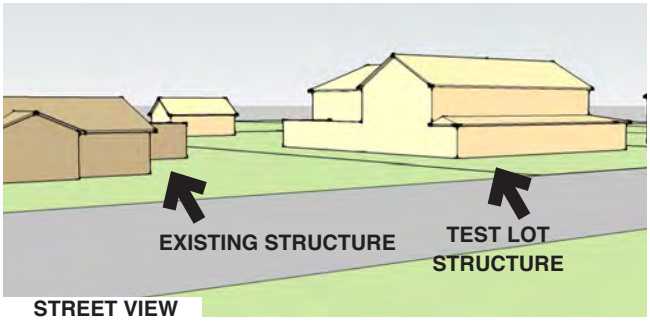
Building Envelope

The building envelope is the three-dimensional area in which buildings may be built. It is shaped by minimum setback, overall height and bulk plane standards. The building envelope generated by different bulk plane alternatives is illustrated in transparent blue, purple or red (depending on the alternative or recommendation) on test lots in each context.



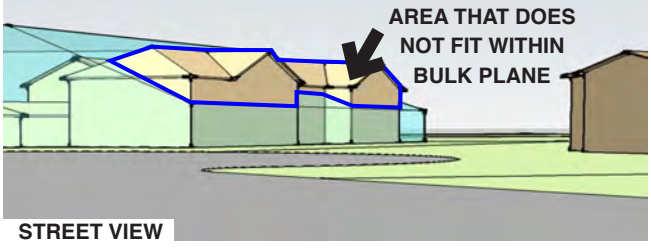
Structures

Hypothetical structures are illustrated on test lots to demonstrate current trends in new construction and designs that will fit into the building envelope produced by each bulk plane alternative. The test lot structure at right has been designed to fit within the building envelope produced by a specific bulk plane alternative.



Structures within a Building Envelope

Hypothetical structures are also illustrated within the building envelope produced by each bulk plane alternative. If the structure does not fit entirely within the bulk plane, the protruding areas are highlighted in blue.



Executive Summary

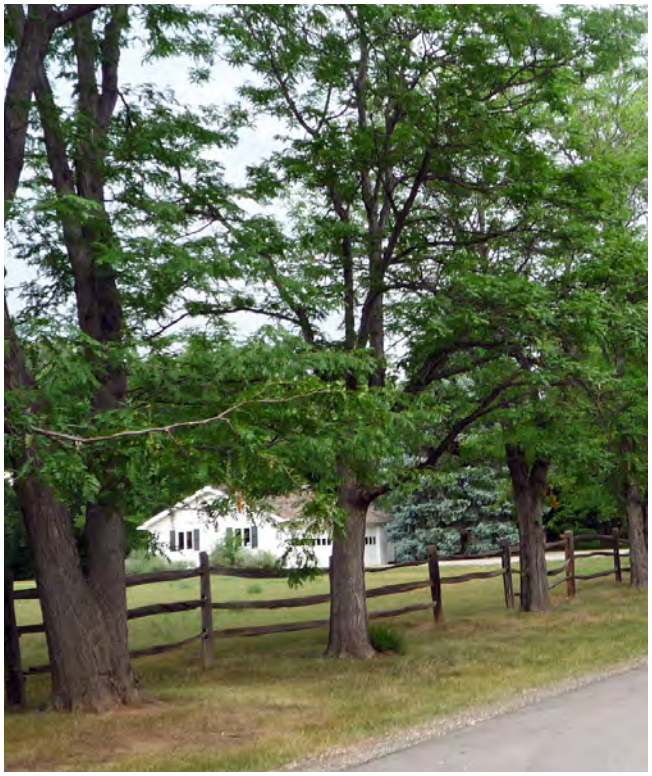
This report provides bulk plane recommendations for Cherry Hills Village. It includes background information on objectives and existing conditions as well as an evaluation of alternative bulk plane standards. With guidance from City Council, the recommendations included in this report will be revised and may provide a blueprint for an ordinance to incorporate a bulk plane standard into Chapter 16 of the City's Municipal Code.

Objectives

Concerns regarding recent development trends support a series of design objectives for residential additions and new construction in Cherry Hills Village. The following objectives are based on public input received by the Residential Development Standards Committee regarding the character of new development in the community:

- Preserve views and an open feel
- Preserve access to sunlight
- Promote privacy
- Reduce 'looming' impacts

The recommended bulk plane is intended to address design objectives for residential additions and new construction.



Design Contexts

Design contexts group neighborhoods or areas with similar features. The nine design contexts identified in Cherry Hills Village provide a base for illustrating and evaluating current development trends, potential issues and bulk plane alternatives. The contexts are organized around the City's six existing residential zone districts, while acknowledging some differing neighborhood features that occur within individual districts.

Terminology

Development Trend: A term used to describe typical patterns for new construction over the last 10 to 20 years.

Looming: A term used to describe a structure that seems to overshadow it's neighbors.

Bulk Plane Alternatives

Alternative bulk plane concepts were evaluated in each of the nine design contexts and in a range of special circumstances (very oddly shaped lots, sloping lots, etc.) The two formal bulk plane alternatives are:

- **Alternative 1:** The bulk plane standard recommended by the Residential Development Standards Committee
- **Alternative 2:** A variation on the Residential Development Standards Committee recommendations allowing for larger building elements at the front of the lot to better accommodate traditional development patterns, and varying some standards by zone district and lot size.

Recommended Bulk Plane

The recommended bulk plane is a variation on the Alternative 2 bulk plane. It simplifies standards across zone districts and lot sizes, uses a more flexible bulk plane angle, and better addresses accessory structures in the R-1 and R-2 Zone Districts. The recommended standard was developed to promote and balance the following criteria:

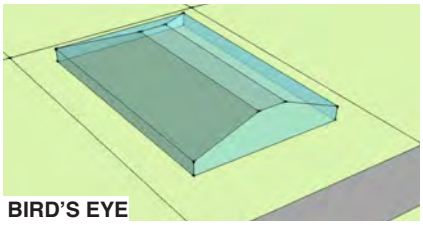
- **Effectiveness**
- **Predictability**
- **Context Sensitivity**
- **Flexibility**

The recommended bulk plane incorporates the following key features:

- Applies in all residential zone districts except R-3A
- Starts at the sides and rear of the lot
- Has a taller starting height towards the front of the lot in all zone districts except R-5 to allow for traditional development patterns
- Incorporates a recommendation to raise the maximum overall height standard to 35 feet in all zone districts except R-5
- Incorporates a recommendation to address the height of accessory structures built outside of the primary structure setbacks in R-1 and R-2
- Rises at a 40° angle to allow flexibility for different roof pitches
- Includes exceptions for dormers, chimneys and gable roof ends to increase flexibility and encourage traditional development patterns

Alternative 1

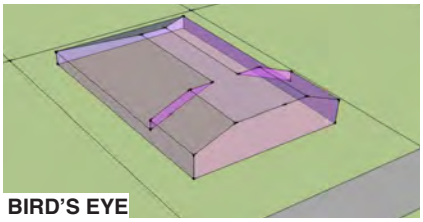
Bulk Plane Alternative 1 projects at a 27° angle from a specified point above the side and rear setbacks as illustrated below.



BIRD'S EYE

Alternative 2

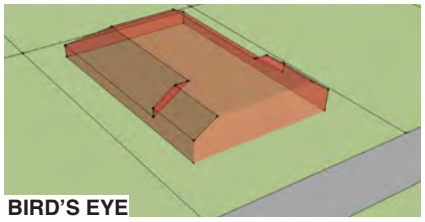
Bulk Plane Alternative 2 projects at a 27° angle from two different heights above the side and rear setbacks to allow greater height towards the front of the lot as illustrated below.



BIRD'S EYE

Recommended

The recommended bulk plane projects at a 40° angle from two different heights above the side and rear setbacks to allow more flexible roof forms and greater height towards the front of the lot as illustrated below.



BIRD'S EYE

Part 1
Existing Conditions

Existing conditions in the city's residential neighborhoods include both physical and regulatory characteristics as well as recent development trends and related issues. Understanding existing conditions is important when evaluating alternative regulatory standards. Such standards should acknowledge existing neighborhood features, promote community objectives, address issues and function efficiently within the current regulatory framework.

This part of the report provides an overview of the existing conditions that inform the alternative bulk plane standards evaluated in Part 2 and the recommended bulk plane described in Part 3. It begins with a description of current regulations and the features that help define different neighborhood contexts, continues with a summary of existing conditions and trends in each identified neighborhood context and concludes with a brief summary of objectives.

Contents

Current Regulations

The Cherry Hills Village Master Plan provides a vision for the future of the Village by establishing the policies that guide land use, parks, trails, open space, transportation, community services and infrastructure. The Cherry Hills Village Municipal Code implements the Master Plan by establishing government procedures and regulations for both public and private development.

Current regulations shape development by establishing the permitted form of buildings in different parts of the city.

Zoning

Chapter 16 of the municipal code describes the zoning standards that provide the basic use and dimensional requirements for development throughout the city. Key zoning standards are listed below.

- **Lot Size:** The minimum size allowed for a lot
- **Height:** The maximum height for buildings and other elements
- **Setbacks:** The minimum distance of buildings and other elements from the front, side and rear property lines
- **Lot Coverage:** The maximum percentage of a lot's surface that may be covered by the primary structure

Zoning standards vary by a series of districts that apply to all land throughout the city. Existing zone districts are briefly described below and summarized in the table on the following page.

- **R-1:** A very low density residential zone district permitting single-family homes and accessory structures on lots with a minimum size of 2 1⁄2 acres
- **R-2:** A low density residential zone district permitting single-family homes and accessory structures on lots with a minimum size of 1 1⁄4 acres
- **R-3:** A low density residential zone district permitting single-family homes and accessory structures on lots with a minimum size of 1 acre
- **R-3A:** A residential zone district intended for master planned development of single-family homes and accessory structures that are buffered from existing neighborhoods and incorporate common open space. Some lots may be as small as 16,000 square feet, but a maximum density standard ensures that lot sizes average around 29,000 square feet
- **R-4:** A residential zone district permitting single-family homes and accessory structures on lots with a minimum size of 1⁄2 acre
- **R-5:** A medium density residential zone district permitting single-family homes and associated accessory structures on lots with a minimum size of 16,000 square feet

Table 1.1: Summary of Existing Standards by Zone District

NEIGHBORHOOD AND SITE	ZONE DISTRICT									
	R-1	R-2	R-3	R-3A					R-4	R-5
LOT SIZE AND COVERAGE STANDARDS										
Lot Size (min sq. feet)[1]	108,900	54,450	43,560	16,000	21,780	43,560	54,450	108,900	21,780	16,000
Lot Coverage (max lot % covered by primary structure)	-	-	-	30%	30%	20%	20%	20%	-	-
Footprint (min lot sq. feet covered by primary structure)[2]	1,800	1,800	16,00	-	-	-	-	-	1,400	1,400
DENSITY STANDARDS										
Density (max units per acre)	-	-	-	1.5	1.5	1.5	1.5	1.5	-	-
PRIMARY STRUCTURE SETBACK STANDARDS										
Front Yard Setback (min)	75’	75’	50’	25’	25’	50’	75’	75’	25’	25’
Side Yard Setback (min either side)	50’	40’	25’	0’	15’	25’	40’	50’	10’	7.5’
Cumulative Side Yard Setback (min total of both sides)	100’	80’	50’	15’	30’	50’	80’	100’	30’	15’
Rear Yard Setback (min)	50’	40’	25’	25’	25’	25’	40’	50’	25’	25’
ACCESSORY STRUCTURE SETBACK STANDARDS										
Front Yard Setback (min)	75’	75’	50’	25’	25’	50’	75’	75’	25’	25’
Side Yard Setback (min)	25’	25’	25’	0’/7.5’	15’	25’	25’	25’	15’	7.5’
Rear Yard Setback (min)	25’	25’	25’	7.5’	15’	25’	25’	25’	15’	7.5’

BUILDING CONFIGURATION	ZONE DISTRICT									
	R-1	R-2	R-3	R-3A					R-4	R-5
HEIGHT STANDARDS										
Primary Structure Height (max)[3]	30’	30’	30’	30’	30’	30’	30’	30’	30’	30’
Accessory Structure Height (max)[3]	30’	30’	30’	30’	30’	30’	30’	30’	30’	30’
ACCESSORY STRUCTURE CONFIGURATION										
Accessory Structures Permitted (max total per lot)	3[4]	3	3	2	3	3	3	3	2	2
Accessory Struct. Floor Area (max total sq. feet per lot)	1,100[4]	750	650	500	500	650	750	1,100	500	500

[1]May include up to 30’ of adjacent public right-of-way
[2]May include up to 200 sq. feet of an attached garage or accessory structure
[3]As measured from the natural grade at the midpoint of the structure to the highest point of the roof surface
[4]Additional accessory structures and increased accessory structure floor area are permitted on lots larger than 217,800 in the R-1 Zone District.

Building Envelope

Zoning regulations such as minimum setbacks, overall height limits and bulk plane standards define a three-dimensional space where structures may be built on a property. This "building envelope" is illustrated in transparent blue, purple or red throughout the strategy report.

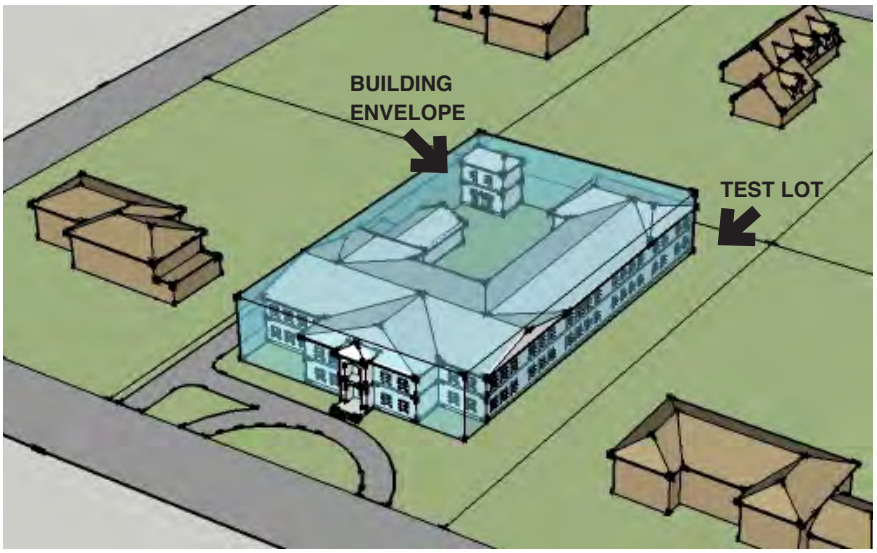
Development Permitted by Current Regulations

Current setback and height regulations define a cube-shaped building envelope where structures may be built on each property in Cherry Hills Village. In most neighborhoods, the building envelope permits primary and accessory structures that are much larger than surrounding traditional development, as shown in the illustration below.

Most new residential development in Cherry Hills Village has not maximized the permitted building envelope. However, in many neighborhoods, the trend has been towards larger and taller structures that fill a greater proportion of the envelope. In some cases, community members have expressed concern that larger structures have a negative impact on surrounding properties and overall neighborhood character. Current trends and issues are discussed in greater detail later in this part of the report.

Figure 1.1: Currently Permitted Development in the R-3 Zone District

	Test Lot
Zone District	R-3
Lot Size (gross)	43,560 sq. feet
Lot Size (net)	38,800 sq. feet
Size of Illustrated Primary Structure	22,350 sq. feet
Size of Illustrated Accessory Structure	650 sq. feet
Total Size of Illustrated Structures	23,000 sq. feet
Total FAR of Illustrated Structures	0.59 sq. feet



Current regulations would permit a primary structure to fill the entire three-dimensional building envelope illustrated on this test lot in the R-3 Zone District. While the structure illustrated does not entirely fill the building envelope, it is close to the maximum size that could realistically be built under current regulations.

Existing Neighborhood Features

Existing conditions are varied throughout residential neighborhoods in Cherry Hills Village. This variation helps define a variety of neighborhood design contexts that may affect the way that new development is perceived. It is important to identify different existing neighborhood conditions that may impact the application of potential bulk plane standards or influence the way that design issues are perceived.

Variations in existing conditions may be used to define contexts that facilitate an evaluation of bulk plane standards in a variety of situations. Such design contexts may be based on differences in existing features at the neighborhood, site and building level.

Neighborhood Level Features

These features relate to the general framework pattern in a residential area, including the existing regulations that guide development. They include:

- Current zoning
- Street pattern
- Block size and shape

Site Level Features

These features relate to the general characteristics that exist on lots in a residential area. They include:

- Lot size
- Building placement and setbacks

Building Level Features

These features relate to the typical form of buildings in a residential area. They include:

- Typical building size
- Typical building height
- Typical building form and massing

Neighborhood, site and building level features were used to identify nine design contexts in Cherry Hills Village. These contexts are organized around the City's six existing residential zone districts, while acknowledging some differing neighborhood features that occur within individual districts. In the following pages, existing conditions, development trends and issues are summarized for each design context.

Neighborhood and site level features in some R-1 zoned areas contribute to a rural atmosphere.

Square and rectangular lots with consistent setbacks are typical site level features in some R-3 zoned areas.

Typical building level features in many R-4 and R-5 zoned areas include moderately scaled structures that are often less than two stories in height.

Development Trends and Issues

In recent decades, many previously stable residential neighborhoods around the country have experienced significant changes. In some cases, these changes have helped to revitalize neighborhoods. In other cases, however, residents have expressed a concern that inappropriate development was negatively impacting the character of their neighborhoods.

In some large lot areas of the R-1 Zone District, the trend is toward the construction of very large homes.

Some newer homes in the R-3 Zone District are much larger than surrounding traditional development.

A review of building permit activity in Cherry Hills Village indicates a trend towards much larger homes. The City's Residential Development Standards Committee reports that, over the past 10-12 years, the average new home in the city has grown to accommodate additional areas including:

- Larger kitchens
- Family and entertainment areas
- A greater number of bedrooms
- Home offices and theaters
- Expanded garages
- Larger storage areas

Although this trend has been particularly strong within some parts of the R-3 Zone District, it has affected the character of most neighborhoods in the city. The current poor condition of the national residential real estate market is likely to slow the trend towards larger homes, but an economic recovery may cause the trend to resume.

The Residential Development Standards Committee concluded that current development trends were leading to additions and new construction that does not "fit" with the character of surrounding established neighborhoods. Specific concerns include:

- Structures that are out of scale with the surrounding context
- Structures that "loom" over their neighbors
- Structures that block sunlight and views of their neighbors

In the following pages, current trends and potential issues are illustrated for each design context. The objectives summarized at the end of this part of the report are intended to address potential issues with current development trends.

Existing Conditions, Trends and Issues by Context

The nine identified design contexts within Cherry Hills Village provide a base for evaluating current development trends and potential issues. Each design context is described and illustrated in the following pages. For each context, existing conditions are illustrated, followed by an illustration of a structure conforming to current development trends in the context. Finally, a description of potential issues related to current development trends is provided for each design context. Attachments A-B provide side-by-side comparisons of existing conditions and trends in all contexts.

Although they may influence the recommended application of bulk plane standards, the design contexts and model blocks introduced in the following pages are primarily intended to establish a range of conditions in which alternative bulk plane standards will be tested.

In Parts 2 and 3 of this report, the model blocks are used to illustrate alternative and recommended bulk plane standards in each design context.

Neighborhood design contexts provide a base for evaluating current development trends and potential issues.

Summary Data and Illustrations

The tables and illustrations on the following pages summarize existing conditions, trends and issues within each identified design context.

A sample area illustrates each design context. Although they are based on existing conditions, the sample areas do not exactly duplicate specific residential areas in the city.

The tables provide data related to existing conditions and current trends based on residential permit activity from 2005 to 2009. Average sizes and floor area ratios (FARs) are approximate, based on a sample of residential areas conforming to each context. Additional definitions are summarized below.

Minimum Conforming Lot Size: The minimum lot size permitted within a zone district

Average Lot Size: The average size of existing lots in the context, not including adjacent open space or right-of-way

Average Structure Size: The average combined above-ground square footage of all structures on a lot

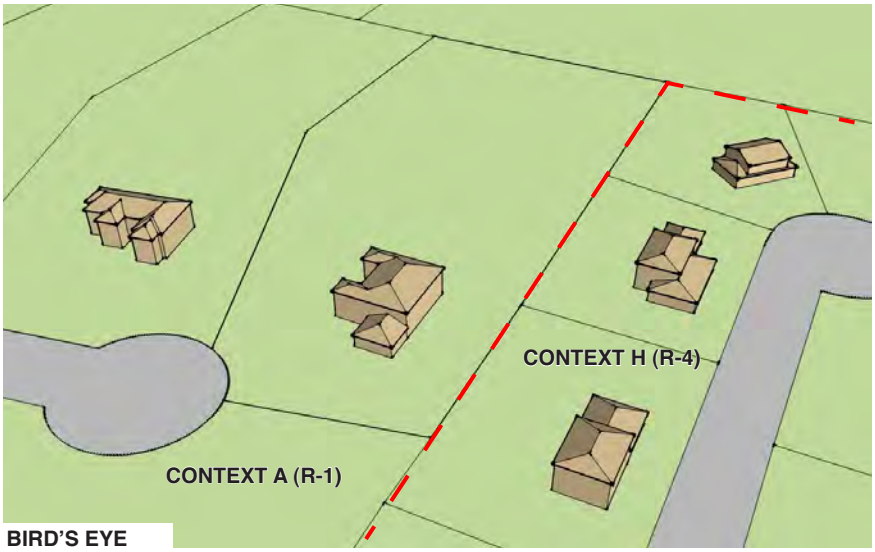
Floor Area Ratio (FAR): The ratio of floor area to lot size calculated by dividing building square footage by lot size (i.e., a 3,000 square foot structure on a 10,000 square foot lot would have a floor area ratio of 0.30).

Context A: Curving Streets with Irregular Lots in R-1

This context recognizes areas within the R-1 Zone District that include irregularly shaped lots along curving streets. Lots vary in size, but are often larger than those in Context 2. The generally rural character includes significant open spaces. Note that illustrations of this context show a boundary between the R-1 and R-4 Zone Districts (Contexts A and H) to help indicate potential issues where large lots may be developed adjacent to areas with smaller lots.

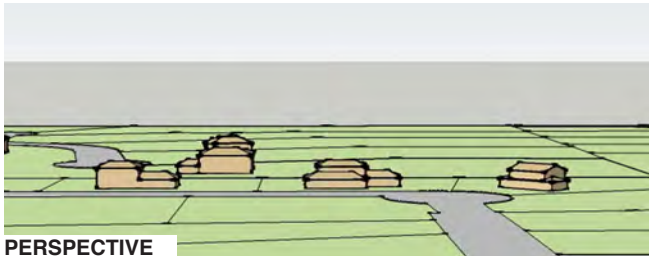
Figure 1.2: Existing Conditions in Design Context A

	Existing
Zone District	R-1
Street Pattern	Curve
Typical Lot Shape	Irregular
Min. Permitted Lot Size	108,900
Average Lot Size	140,000 sq. feet
Average Structure Size	5,500 sq. feet
Average FAR	0.05
Typical Height	2 Story
Sample Areas	Lynn Rd. Sunset Dr. Cherry Hills Park Dr.

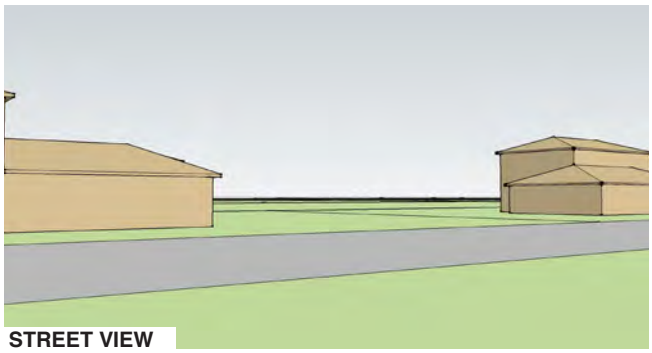


BIRD'S EYE

Large, oddly shaped lots contribute to the generally rural existing character of the context which is illustrated above the blue dashed line. The area below the line would be considered as Context H.

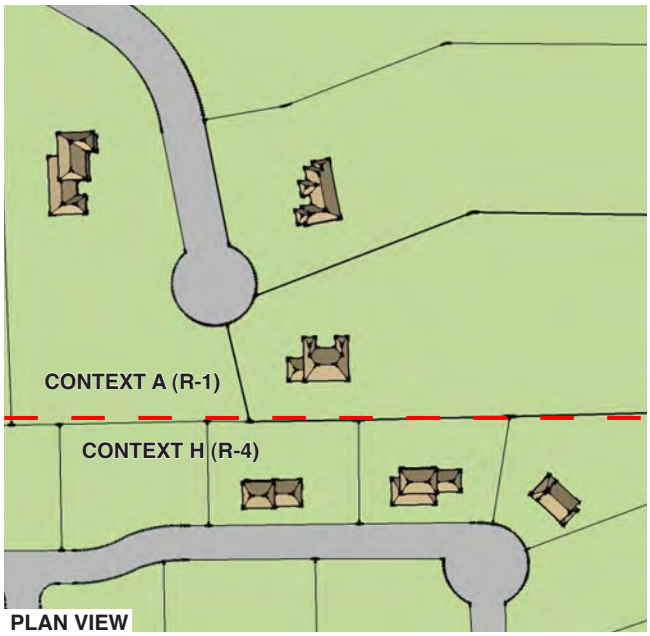


PERSPECTIVE



STREET VIEW

Very large lots and significant setbacks cause structures to be spaced far apart along the street.



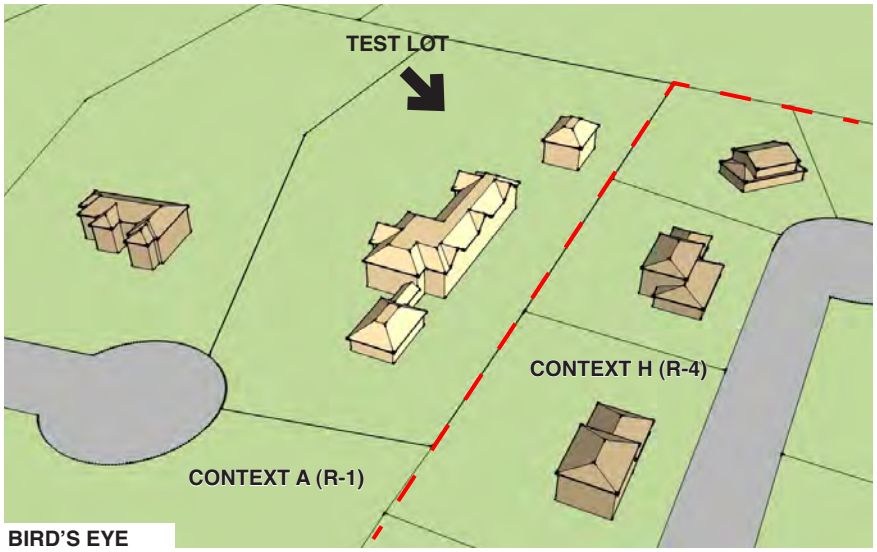
PLAN VIEW

Neighborhood and site level features include irregularly shaped lots along curving streets.

CONTEXT A CONTINUED

Recent redevelopment in this context has typically included structures that are larger than surrounding traditional development. Although the large lot sizes and significant setbacks have limited issues, some residents have expressed a concern that very large structures may diminish the rural character of the context or may loom over adjacent areas with smaller lot sizes and structures, including adjacent zone districts.

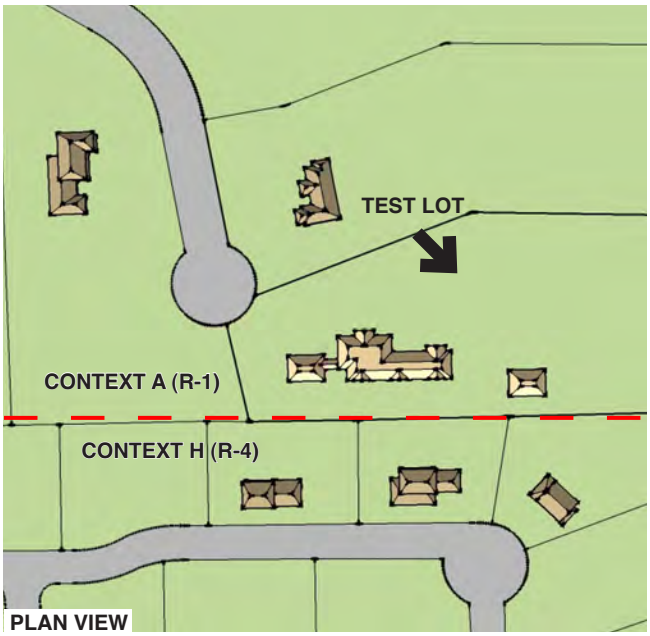
Figure 1.3: Development Trends and Potential Issues in Context A



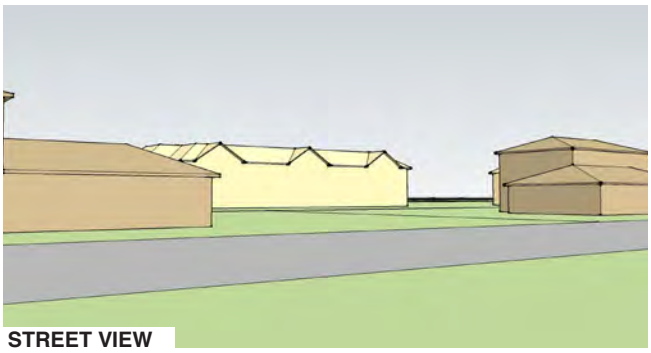
	Trends
Average Total Structure Size for New Construction	11,300 sq. feet
Average FAR for New Construction	0.12

	Test Lot
Test Lot Size	110,250 sq. feet
Test Lot Width	250' at widest
Size of Illustrated Structure	12,700 sq. feet
FAR of Illustrated Structure	0.16

Redeveloped lots often include larger structures than surrounding traditional development.



Although new structures in the context are often very large, they generally do not cover a high percentage of their lots.



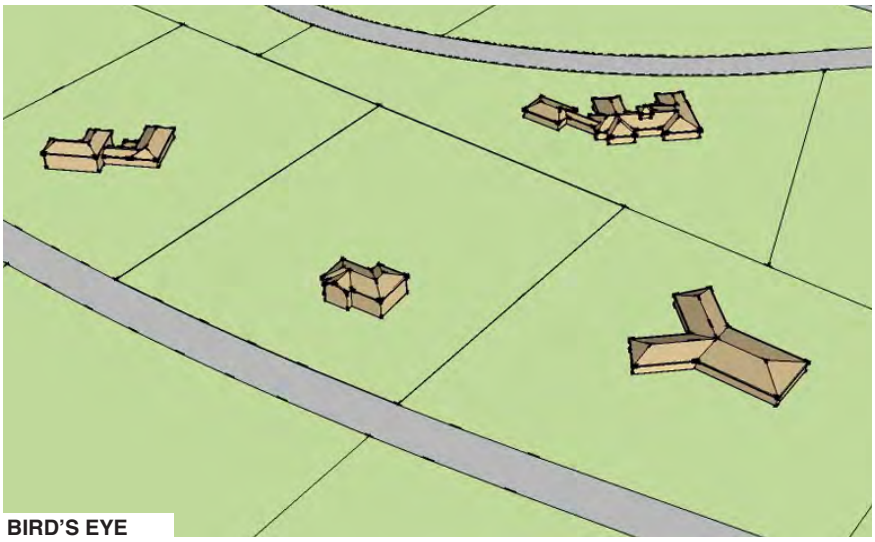
The large size of some newer structures may impact the rural character of the context.

Context B: Linear Grid with Rectangular Lots in R-1

This context recognizes areas within the R-1 Zone District that include square or rectangular lots along streets that are mostly a linear grid, but may be gently curving in some cases. Lots are more consistently sized than in Context A. Existing structures tend to be small relative to their lots and are often one-story.

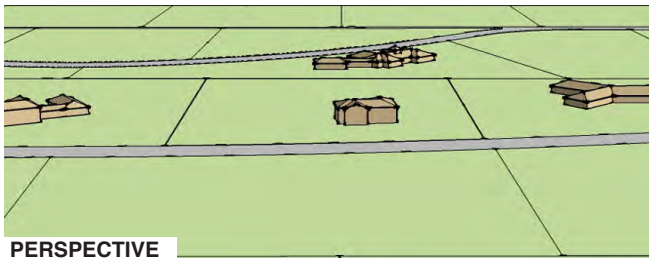
Figure 1.4: Existing Conditions in Design Context B

	Existing
Zone District	R-1
Street Pattern	Linear
Typical Lot Shape	Rectangular
Min. Permitted Lot Size	108,900
Average Lot Size	100,000 sq. feet
Average Structure Size	5,500
Average FAR	0.06
Typical Height	1-2 Story
Sample Areas	S. Gilpin St. Village Rd. Vista Rd.

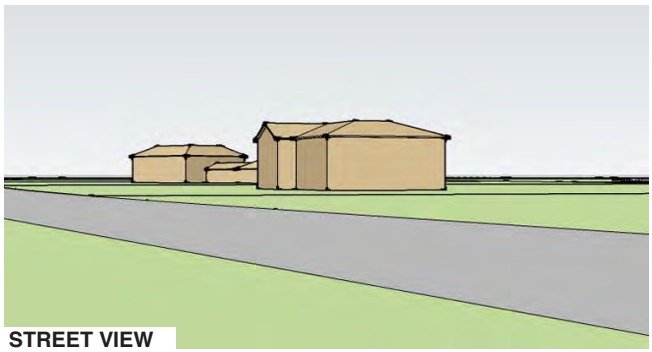


BIRD'S EYE

Although existing traditional development includes very large structures, they generally occupy a relatively small percentage of their lot are. Note that the irregularly shaped lot shown at top would be considered as Context A.

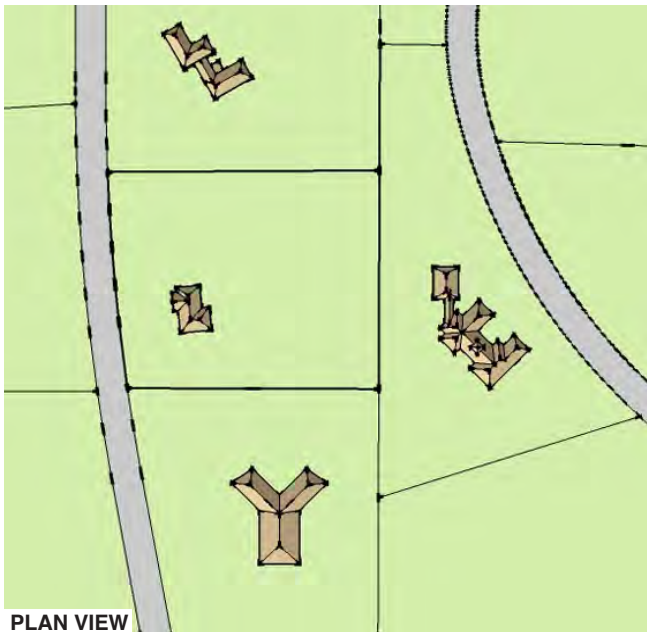


PERSPECTIVE



STREET VIEW

Structures are generally spaced significantly apart along the street.



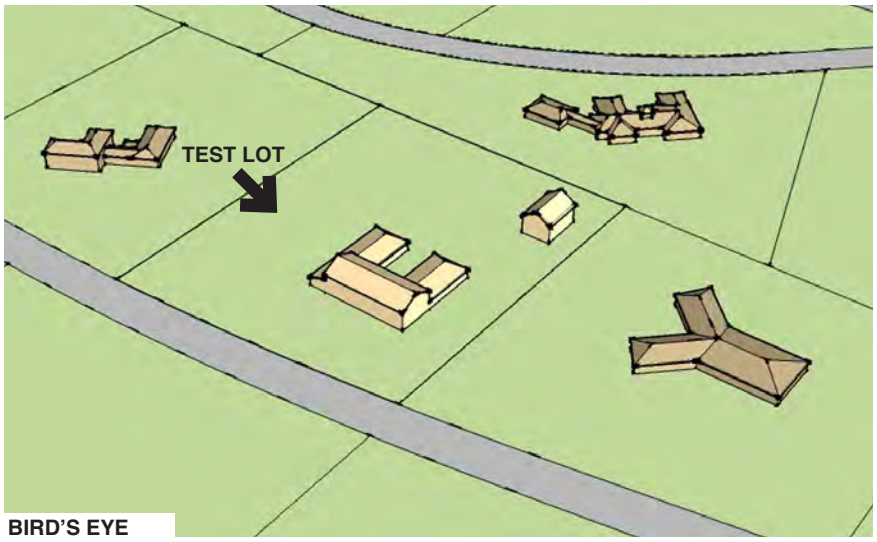
PLAN VIEW

Neighborhood and site level features include large lots with significant setbacks.

CONTEXT B CONTINUED

Recent redevelopment on the large lots in this context has typically included structures that are larger than surrounding traditional development. Some residents have expressed a concern that very large new structures may loom over adjacent areas with smaller lot sizes and structures. This concern is heightened where large new structures are built uphill from adjacent development.

Figure 1.5: Development Trends in Context B

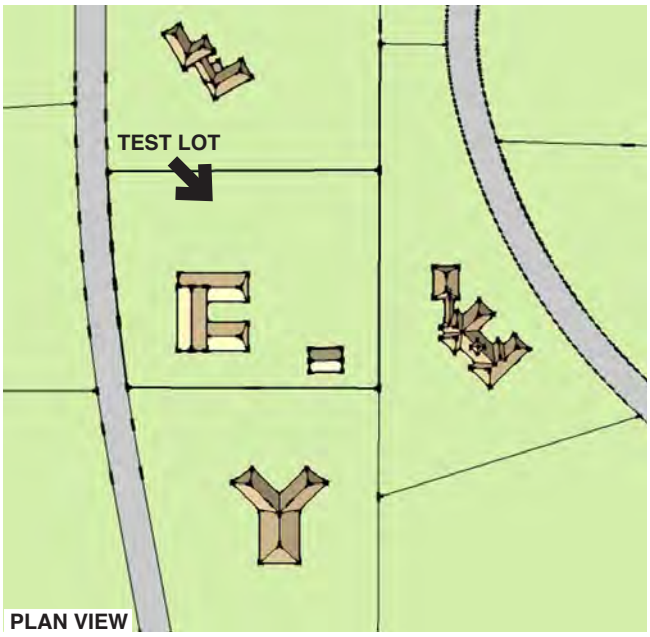


BIRD'S EYE

Redeveloped lots often include much larger structures than surrounding traditional development. Note that the irregularly shaped lot shown at top would be considered as Context A.

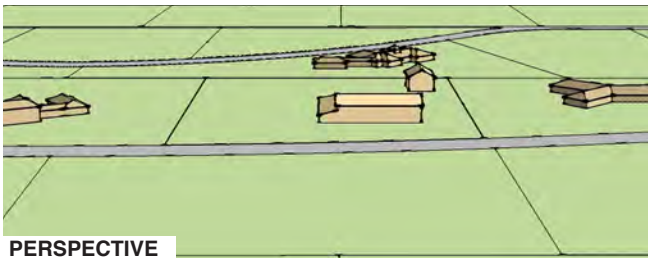
	Trends
Average Total Structure Size for New Construction	9,870 sq. feet
Average FAR for New Construction	0.11

	Test Lot
Test Lot Size	100,000 sq. feet
Test Lot Width	285'
Size of Illustrated Structure	10,000
FAR of Illustrated Structure	0.10

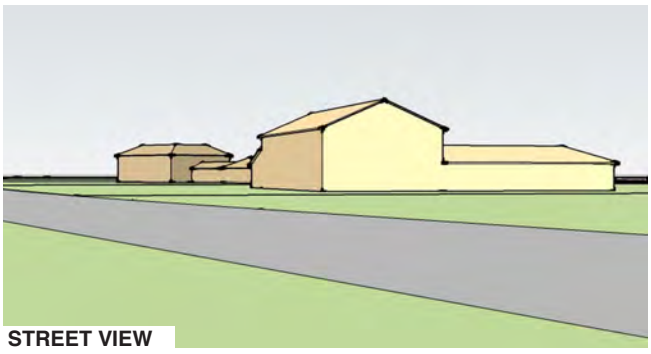


PLAN VIEW

New structures in the context are often large, but generally maintain a high percentage of open space.



PERSPECTIVE



STREET VIEW

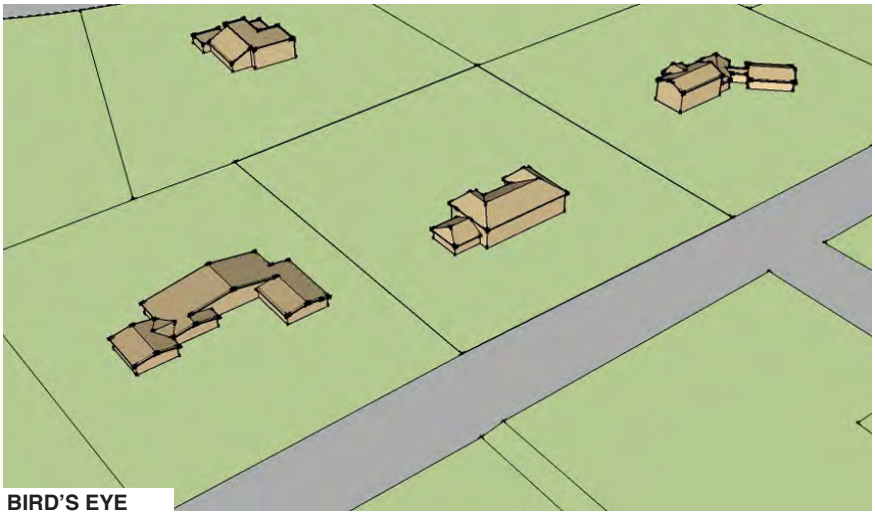
In some cases, redeveloped lots include structures with long walls that may be visible to surrounding traditional development.

Context C: R-2 District

This context includes areas of the city within the R-2 Zone District. The street pattern is generally curving but is linear in some areas. The large lots are square to moderately irregular.

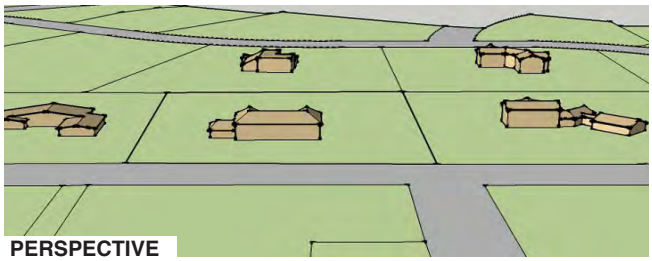
Figure 1.6: Existing Conditions in Design Context C

	Existing
Zone District	R-2
Street Pattern	Curving
Typical Lot Shape	Irregular
Min. Permitted Lot Size	54,450
Average Lot Size	65,000 sq. feet
Average Structure Size	5,560
Average FAR	0.09
Typical Height	1-2 Story
Sample Areas	Sedgwick Dr. Cherry Lane Dr. Carriage Ln.

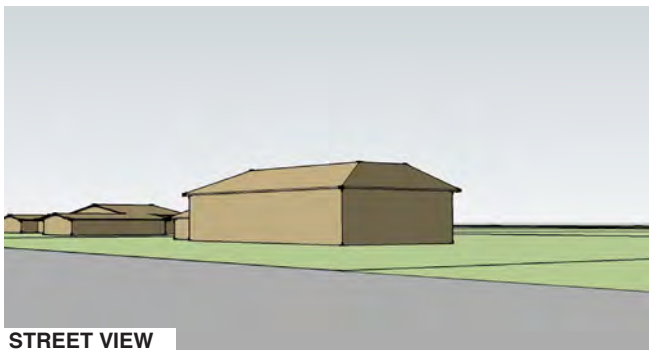


BIRD'S EYE

Although existing traditional development includes very large structures, they generally occupy a relatively small percentage of their lot area.



PERSPECTIVE



STREET VIEW

Structures are generally spaced significantly apart along the street.

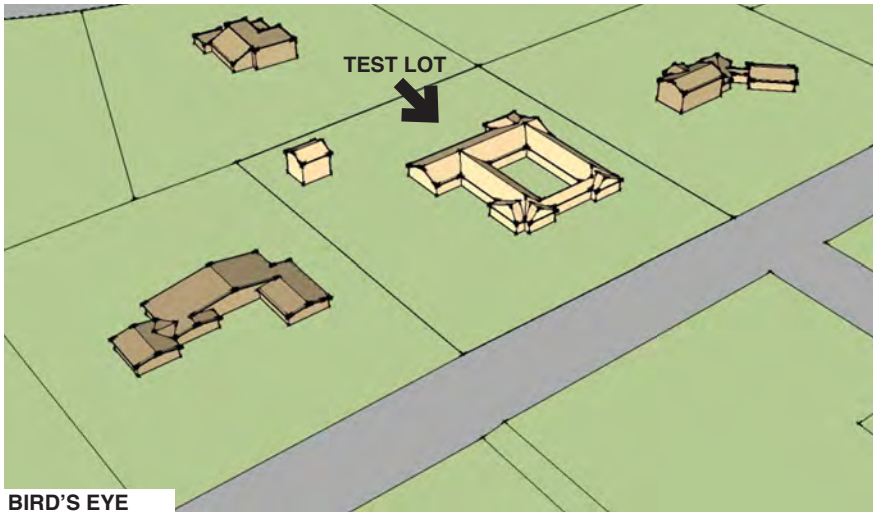
PLAN VIEW

Neighborhood and site level feature include large lots with significant setbacks.

CONTEXT C CONTINUED

Recent redevelopment in this context has typically included structures that are larger than surrounding traditional development.

Figure 1.7: Development Trends in Context C

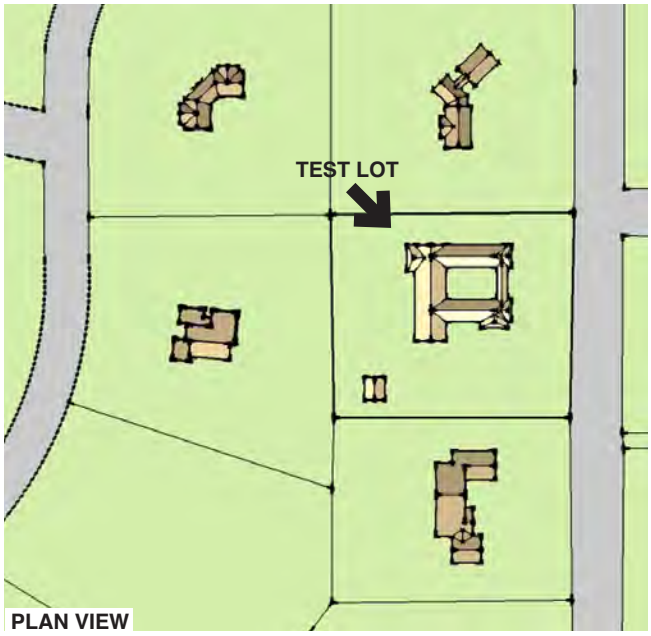


BIRD'S EYE

Redeveloped lots often include much larger structures than surrounding traditional development.

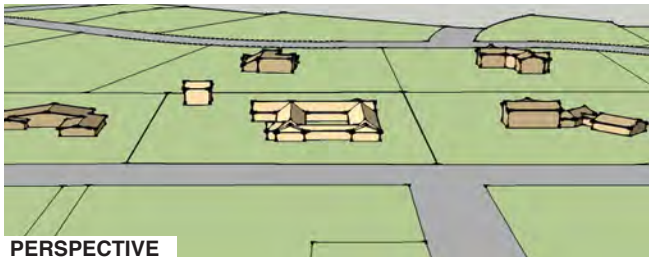
	Trends
Average Total Structure Size for New Construction	8,410 sq. feet
Average FAR for New Construction	0.12

	Test Lot
Test Lot Size	75,000 sq. feet
Test Lot Width	255'
Size of Illustrated Structure	9,000 sq. feet
FAR of Illustrated Structure	0.12

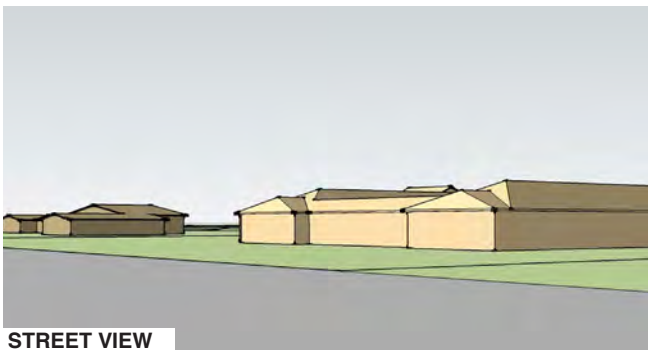


PLAN VIEW

New structures in the context cover a significantly larger percentage of their lots than surrounding traditional structures.



PERSPECTIVE



STREET VIEW

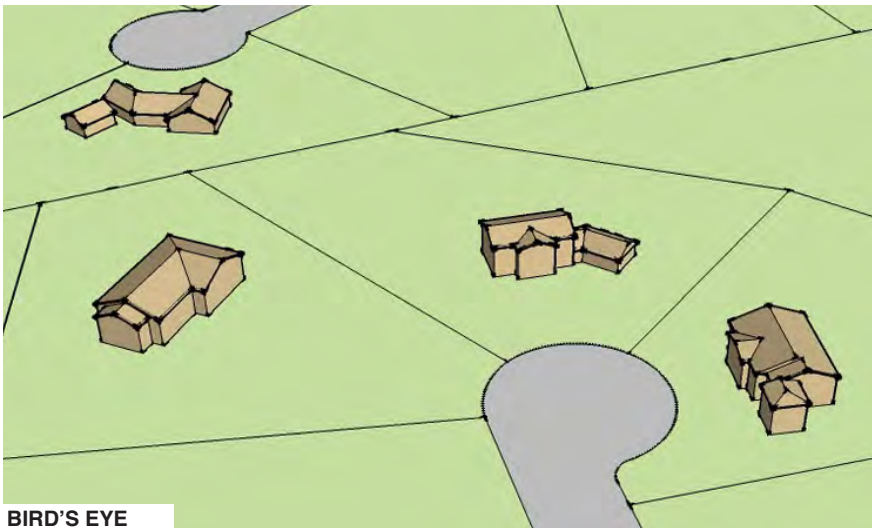
In some cases, redeveloped lots include structures with longer walls that may be visible to surrounding traditional development.

Context D: Curving Streets with Irregular Lots in R-3

This context recognizes areas within the R-3 Zone District with irregularly-shaped lots on curving, dead-end streets with a pattern of especially narrow lots. Existing structures tend to be somewhat smaller than those on lots in Contexts E and F while lot sizes are larger, allowing for a larger percentage of open space.

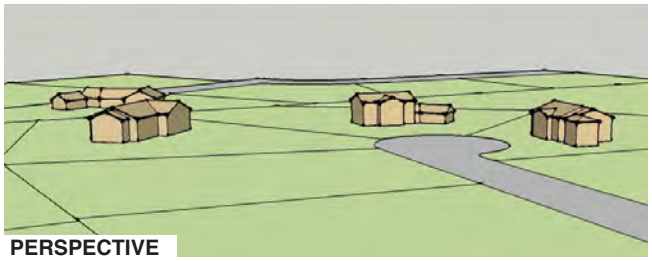
Figure 1.8: Existing Conditions in Design Context D

	Existing
Zone District	R-3
Street Pattern	Curving
Typical Lot Shape	Irregular
Min. Permitted Lot Size	43,560
Average Lot Size	44,000 sq. feet
Average Structure Size	4,000
Average FAR	0.09
Typical Height	1-2 Story
Sample Areas	S. Elizabeth Ct. Martin Ln.

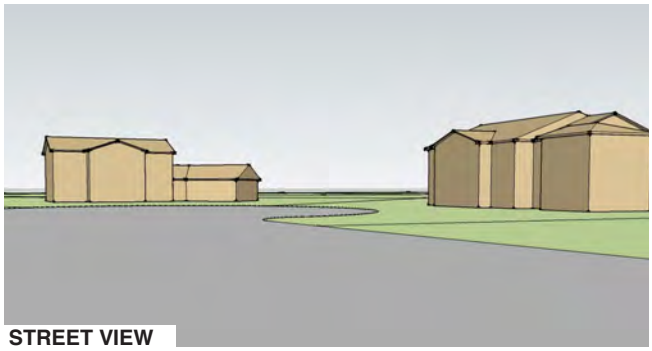


BIRD'S EYE

Existing traditional development varies from one to two-stories and there is generally a higher percentage of open space then in Contexts E and F.

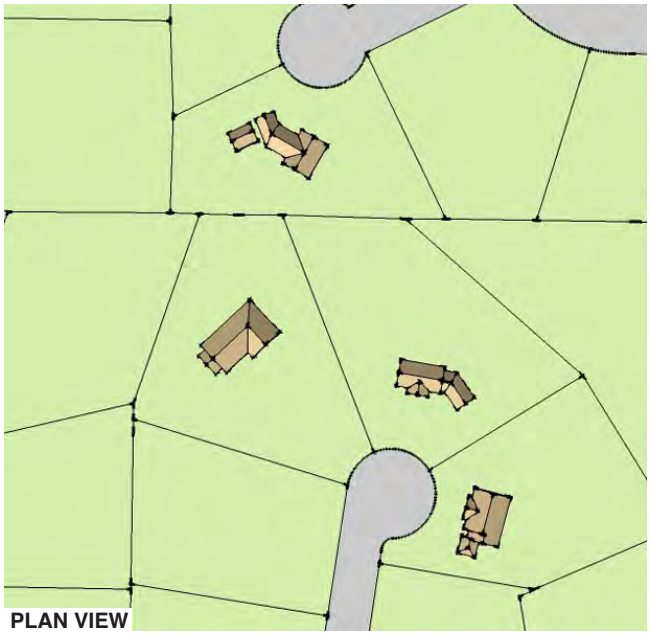


PERSPECTIVE



STREET VIEW

For a limited depth, a two-story tall wall is sometimes built near one or more of the minimum side setbacks..



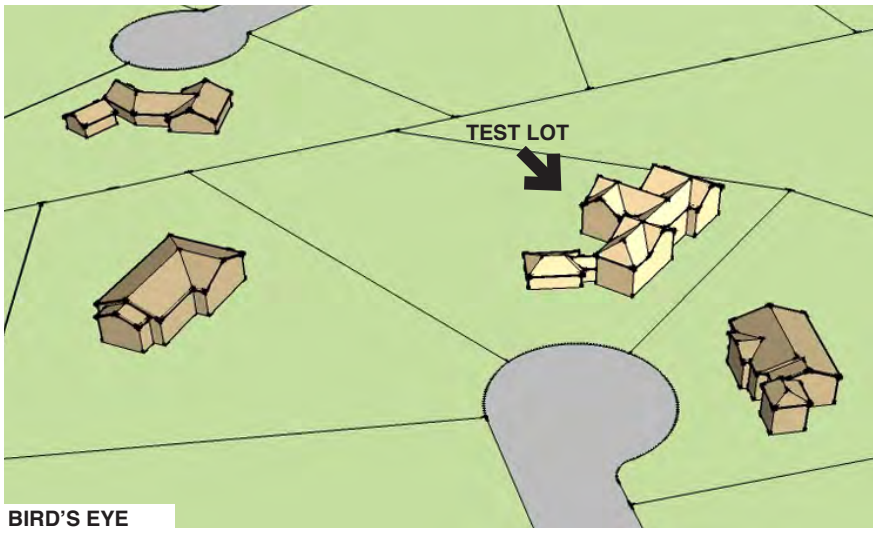
PLAN VIEW

Neighborhood and site level features include very irregularly shaped lots along curving, dead-end streets.

CONTEXT D CONTINUED

Recent redevelopment in this context has typically included structures that are larger than surrounding traditional development. Although these areas within the R-3 Zone District have experienced less new development than has occurred in Contexts E or F, some residents have expressed a concern that very large new structures may loom over neighboring structures.

Figure 1.9: Development Trends and Potential Issues in Context D

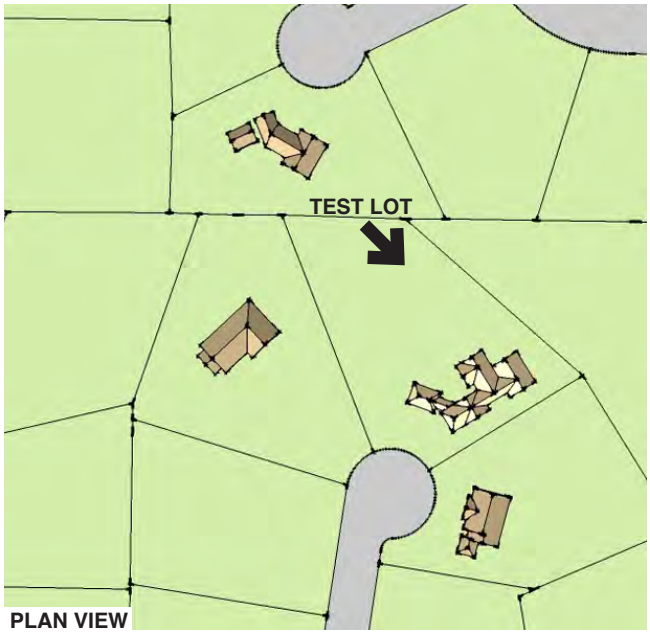


BIRD'S EYE

Redeveloped lots often include structures that are larger than surrounding traditional development.

	Trends
Average Total Structure Size for New Construction	8,420 sq. feet
Average FAR for New Construction	0.20

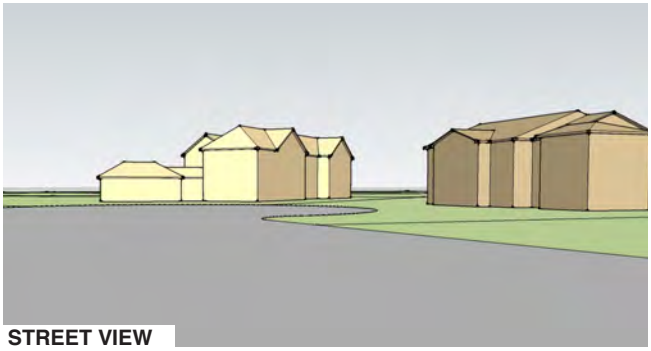
	Test Lot
Test Lot Size	53,300 sq. feet
Test Lot Width	65' - 380'
Size of Illustrated Structure	8,500
FAR of Illustrated Structure	0.16



PLAN VIEW

Large new structures are often located near one or more of the minimum side setbacks.

PERSPECTIVE



STREET VIEW

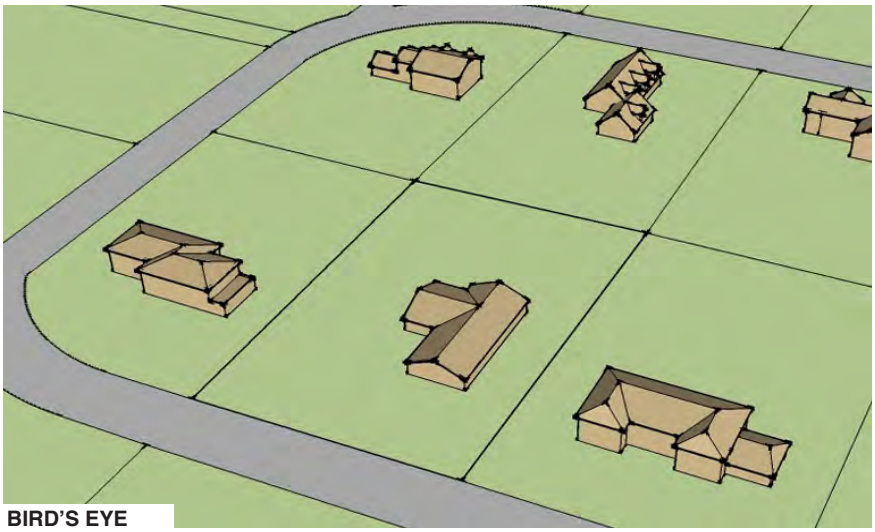
Some redeveloped lots include structures with long, tall walls that may loom over surrounding traditional development.

Context E: Linear Grid with Rectangular Lots in R-3

This context recognizes areas within the R-3 Zone District with a pattern of mostly square and rectangular lots on a linear street grid. In some cases, streets gently curve to produce slightly irregular lots. The existing development pattern includes a relatively high number of recently built structures. A band of open space is generally preserved to the rear of properties throughout the context.

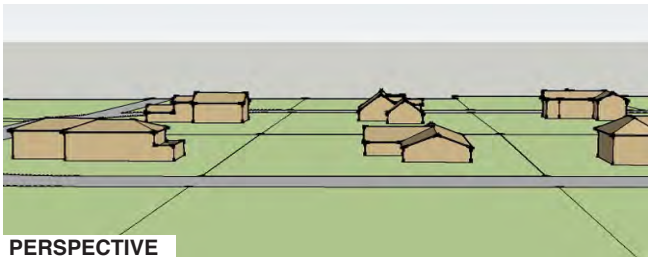
Figure 1.10: Existing Conditions in Design Context E

	Existing
Zone District	R-3
Street Pattern	Linear
Typical Lot Shape	Rectangular
Min. Permitted Lot Size	43,560
Average Lot Size	39,000 sq.feet
Average Structure Size	5,500
Average FAR	0.14
Typical Height	1-2 Story
Sample Areas	S. Lafayette St. Viking Ln.

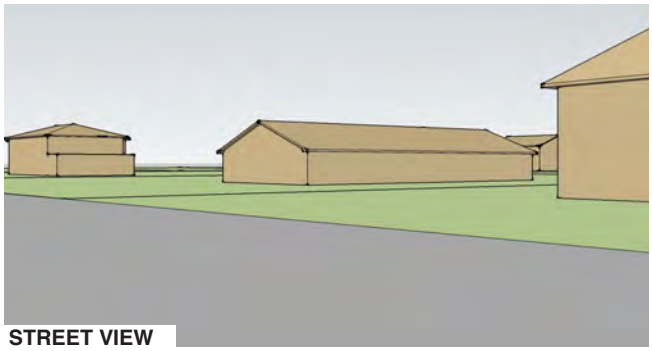


BIRD'S EYE

Existing traditional development is mostly two stories with some one-story structures.

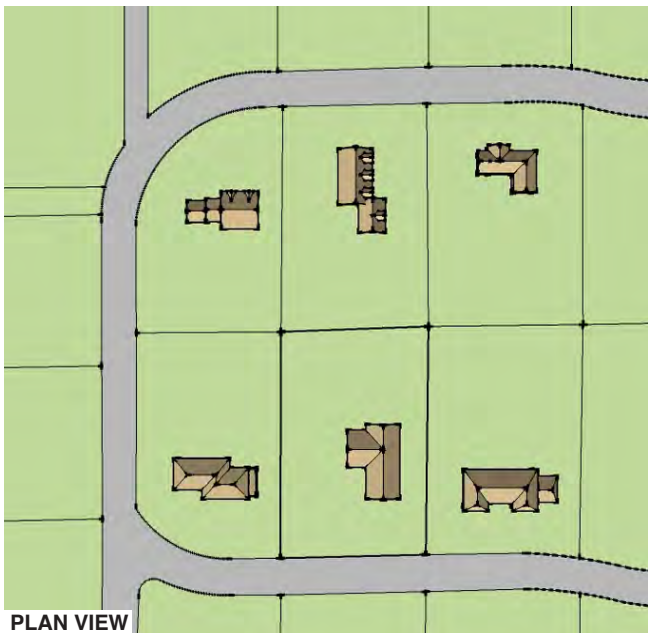


PERSPECTIVE



STREET VIEW

Although existing structures sometimes have long side-walls, they often have one-story elements near one or both of the minimum side setbacks.



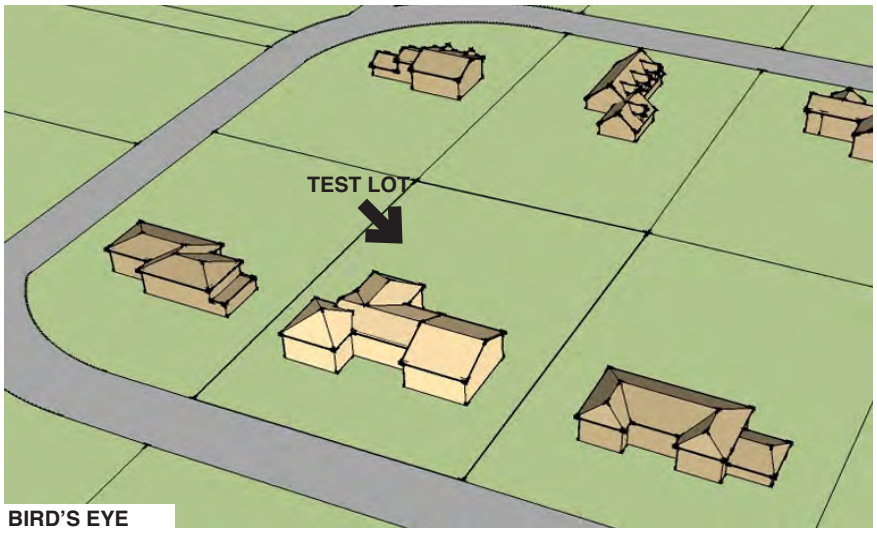
PLAN VIEW

Neighborhood and site level features include square and rectangular lots along a linear to gently curving street grid.

CONTEXT E CONTINUED

This context has experienced significant redevelopment in recent years, often including structures that are much larger than surrounding traditional development. Residents have expressed the concern that some new development includes long, tall walls that loom over neighbors and may be out of character with the scale of the neighborhood.

Figure 1.11: Development Trends and Potential Issues in Context E

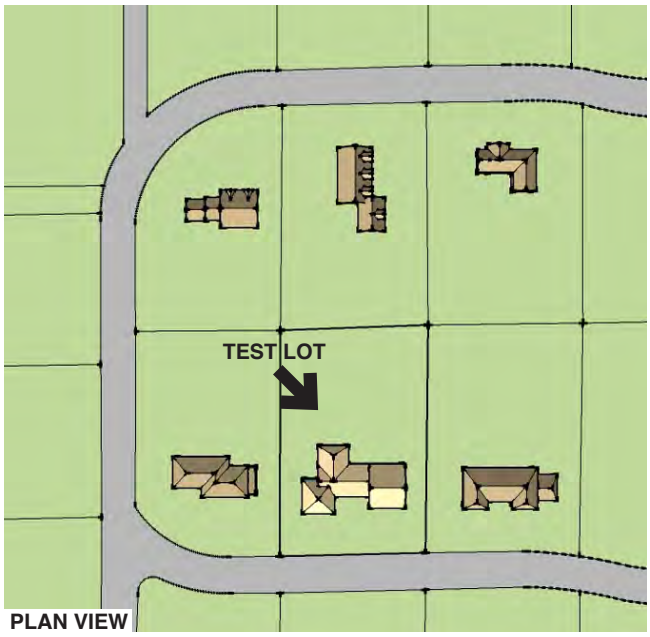


BIRD'S EYE

Redeveloped lots often include structures that are significantly larger than surrounding traditional development.

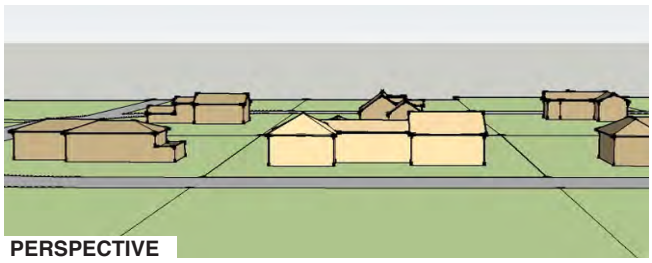
	Trends
Average Total Structure Size for New Construction	8,775 sq. feet
Average FAR for New Construction	0.22

	Test Lot
Test Lot Size	38,850 sq. feet
Test Lot Width	155'
Size of Illustrated Structure	9,000
FAR of Illustrated Structure	0.23

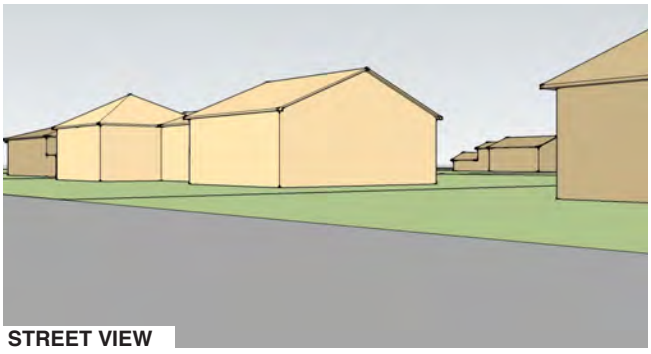


PLAN VIEW

New structures generally cover a moderately higher percentage of their lots than surrounding traditional development.



PERSPECTIVE



STREET VIEW

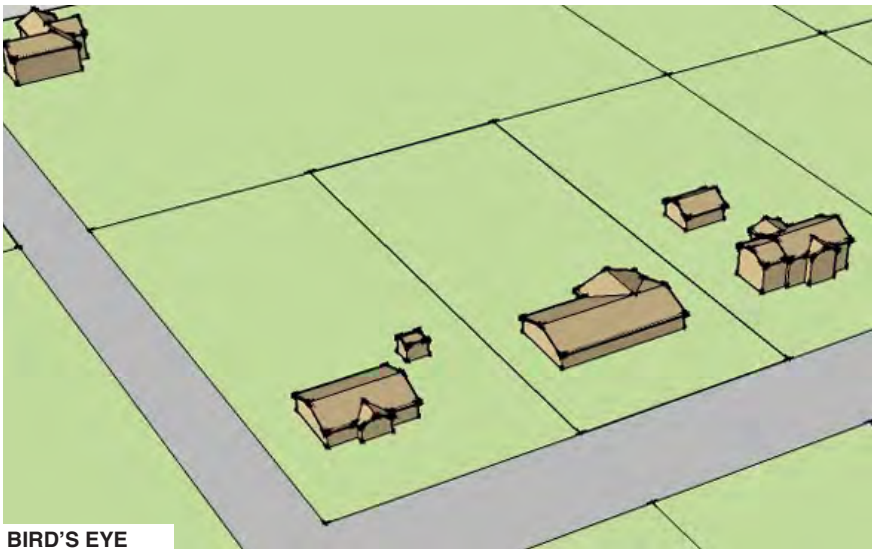
In some cases, redeveloped lots include structures with two-story walls that may loom over surrounding traditional development.

Context F: Linear Grid with Narrow Lots in R-3

This context recognizes areas within the R-3 Zone District with a pattern of especially narrow lots. It is similar to Context E, but has more rectangular lots with a perpendicular orientation towards the linear street grid. The existing development pattern includes a relatively high number of recently built structures resulting in vary in height and size.

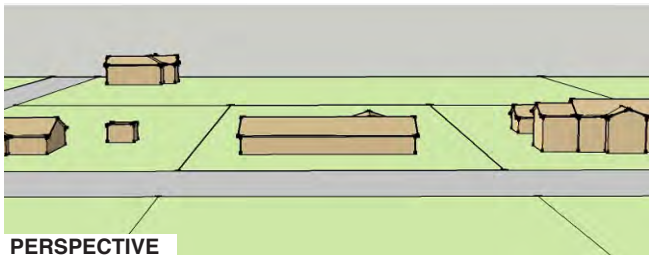
Figure 1.12: Existing Conditions in Design Context F

	Existing
Zone District	R-3
Street Pattern	Linear
Typical Lot Shape	Rectangular
Min. Permitted Lot Size	43,560
Average Lot Size	36,000 sq.feet
Average Structure Size	5,500
Average FAR	0.14
Typical Height	1-2 Story
Sample Areas	S. Ogden St.

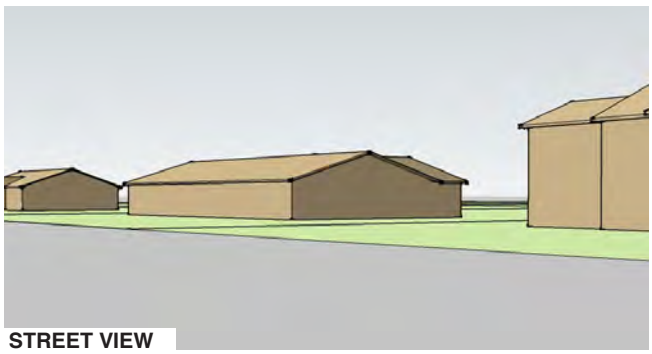


BIRD'S EYE

Existing traditional development includes both one and two story structures on narrow lots.



PERSPECTIVE



STREET VIEW

For a limited depth, a two-story wall is sometimes built near one or more of the minimum side setbacks..

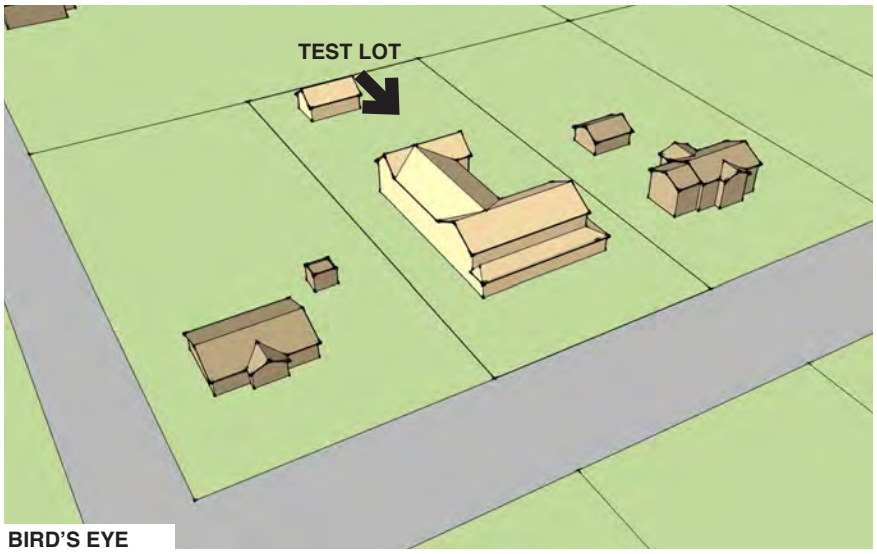
PLAN VIEW

Neighborhood and site level features include narrow, rectangular lots along a linear street grid.

CONTEXT F CONTINUED

This context has experienced significant redevelopment in recent years, often including two-story structures that are much larger than surrounding traditional development. Residents have expressed the concern that some new development includes long, tall walls that loom over neighbors and may be out of character with the scale of the neighborhood.

Figure 1.13: Development Trends and Potential Issues in Context F

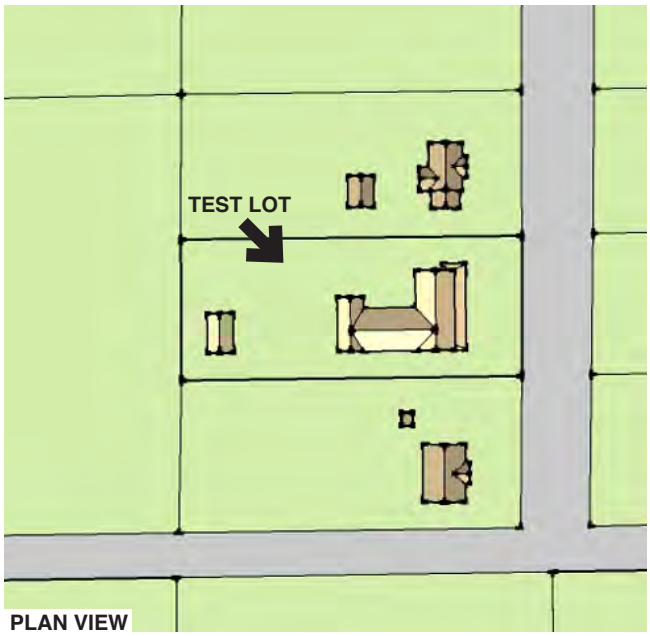


BIRD'S EYE

Redeveloped lots often include structures that are significantly larger than surrounding traditional development.

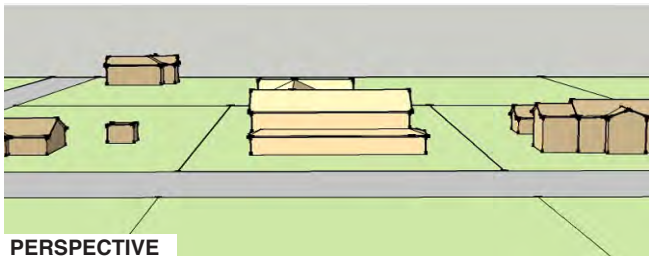
	Trends
Average Total Structure Size for New Construction	8,750 sq. feet
Average FAR for New Construction	0.24

	Test Lot
Test Lot Size	36,545
Test Lot Width	124'
Size of Illustrated Structure	9,000
FAR of Illustrated Structure	0.25

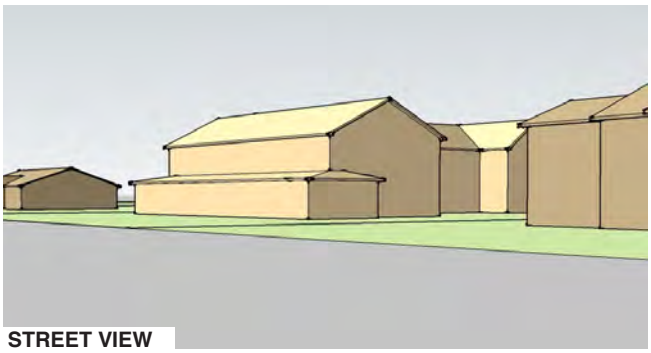


PLAN VIEW

Redevelopment on narrow lots may include structures that extend significantly into the rear yard.



PERSPECTIVE



STREET VIEW

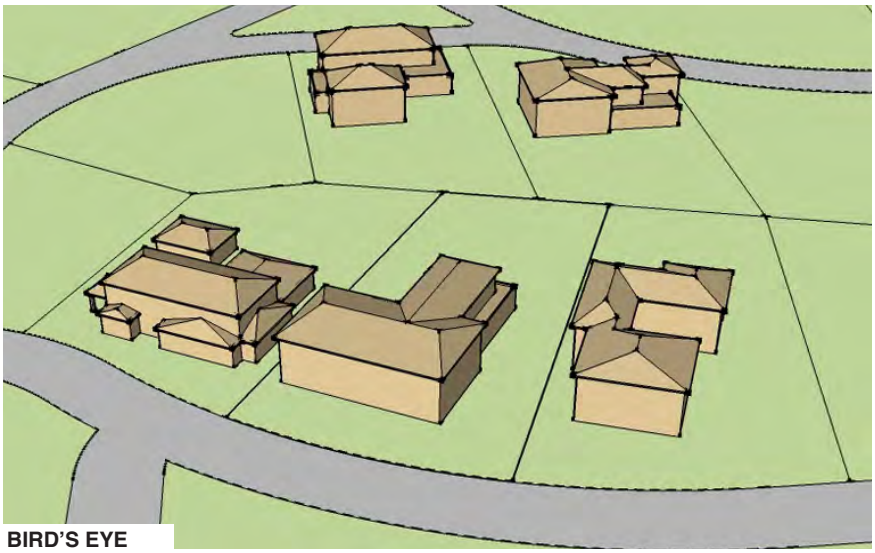
In some cases, redeveloped lots include structures with long, tall walls that may loom over neighbors.

Context G: R-3A District

This context includes areas of the city within the R-3A Zone District. Existing conditions are diverse with lots varying in size from about 16,000 sq. feet to 70,000 sq. feet. Structures tend to be large relative to lot size and are generally two stories in height. The area is generally subject to neighborhood design covenants.

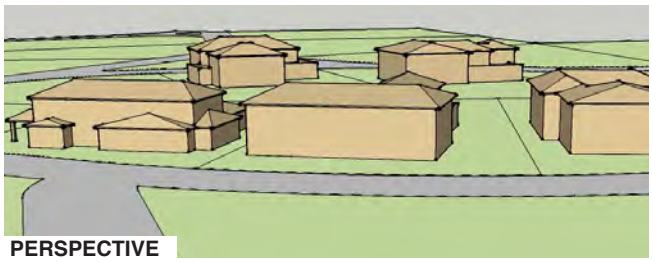
Figure 1.14: Existing Conditions in Design Context G

	Existing
Zone District	R-3A
Street Pattern	Curve
Typical Lot Shape	Irregular
Min. Permitted Lot Size	16,000
Average Lot Size	26,150 sq.feet
Average Structure Size	6,195 sq. feet
Average FAR	0.29
Typical Height	2 Story
Sample Areas	Foxtail Cir. Covington Dr.

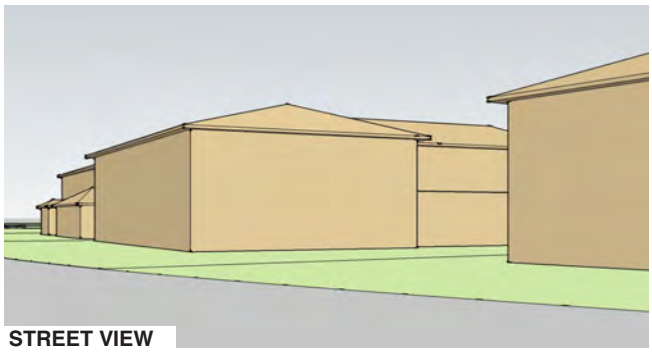


BIRD'S EYE

Irregularly shaped lots are located along curving streets. Structures tend to be large relative to lot size.



PERSPECTIVE



STREET VIEW

The typical existing development pattern includes structures with two-story walls very near the side setbacks.

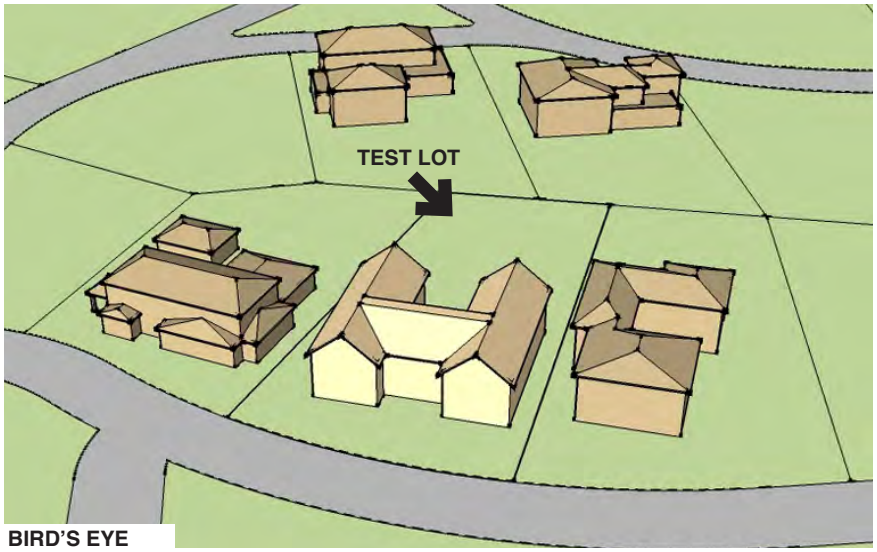
PLAN VIEW

Neighborhood and site level features include irregularly shaped lots along curving streets.

CONTEXT G CONTINUED

Because most structures in this context are relatively new, there has been little recent redevelopment. New structures are typically only moderately larger than surrounding development. Residents have expressed few issues with recent development.

Figure 1.15: Development Trends and Potential Issues in Context G

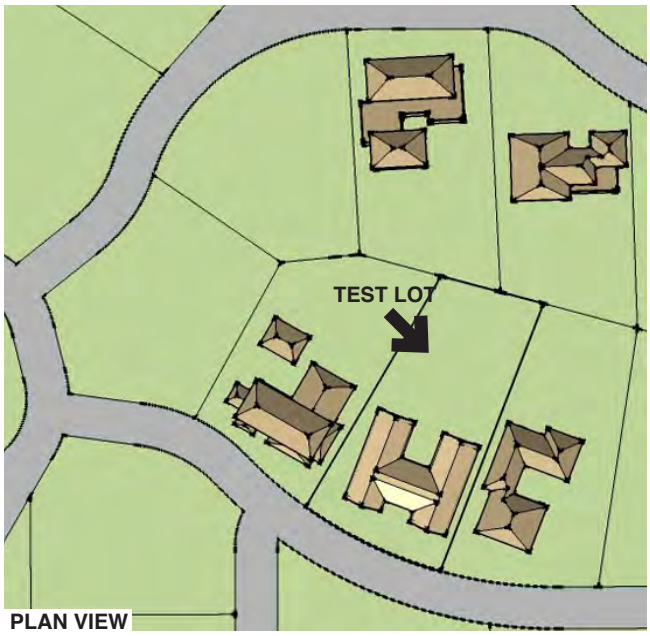


BIRD'S EYE

Redeveloped lots generally include structures that are only moderately larger than the surrounding traditional development.

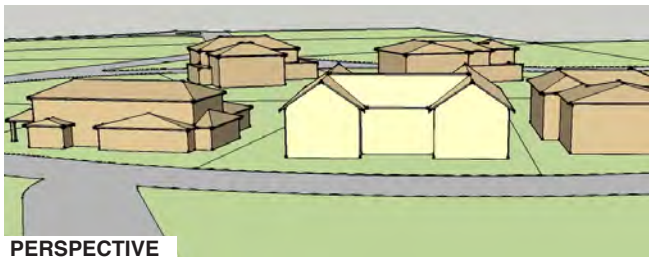
	Trends
Average Total Structure Size for New Construction	7,200 sq. feet
Average FAR for New Construction	0.31

	Test Lot
Test Lot Size	18,000 sq. feet
Test Lot Width	110'
Size of Illustrated Structure	7,500 sq. feet
FAR of Illustrated Structure	0.42



PLAN VIEW

New structures generally cover a moderately higher percentage of their lots than surrounding development.



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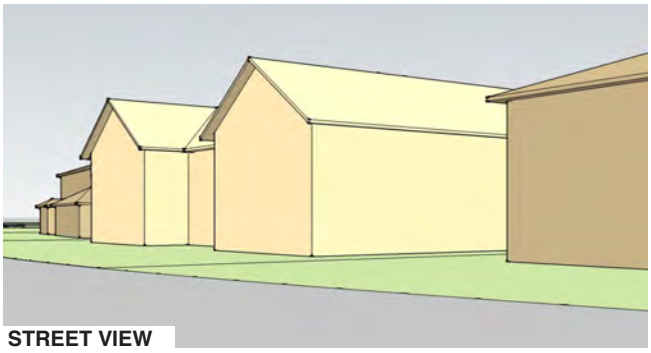


STREET VIEW

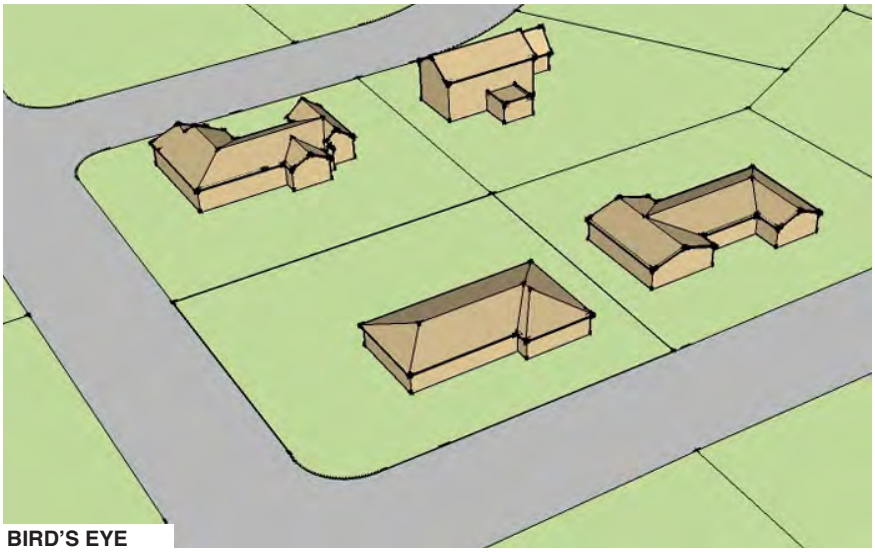
Both existing and new structures in the context often have tall walls located near one or more minimum side setback.

Context H: R-4 District

This context includes areas of the city within the R-4 Zone District. The street pattern is generally curving but is linear in some areas. Lots are square to moderately irregular. Structures tend to be modestly scaled and are often one-story.

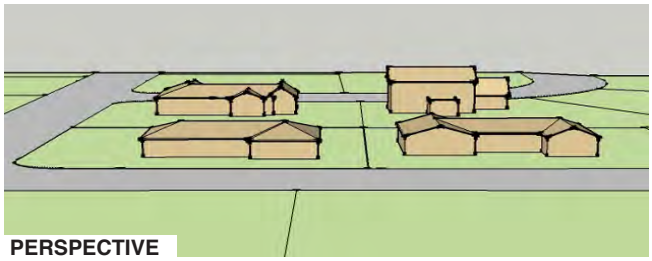
Figure 1.16: Existing Conditions in Design Context H

	Existing
Zone District	R-4
Street Pattern	Curve
Typical Lot Shape	Irregular
Min. Permitted Lot Size	21,780
Average Lot Size	21,600 sq.feet
Average Structure Size	3,925 sq. feet
Average FAR	0.19
Typical Height	1-2 Story
Sample Areas	E Oxford Ave. E Princeton Cir.



BIRD'S EYE

A general pattern of mostly one-story structures includes some traditional two-story structures.



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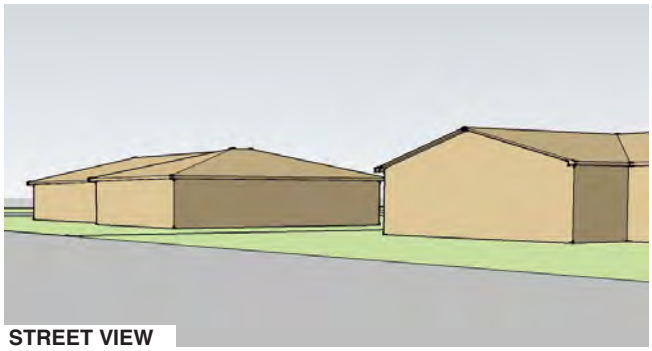
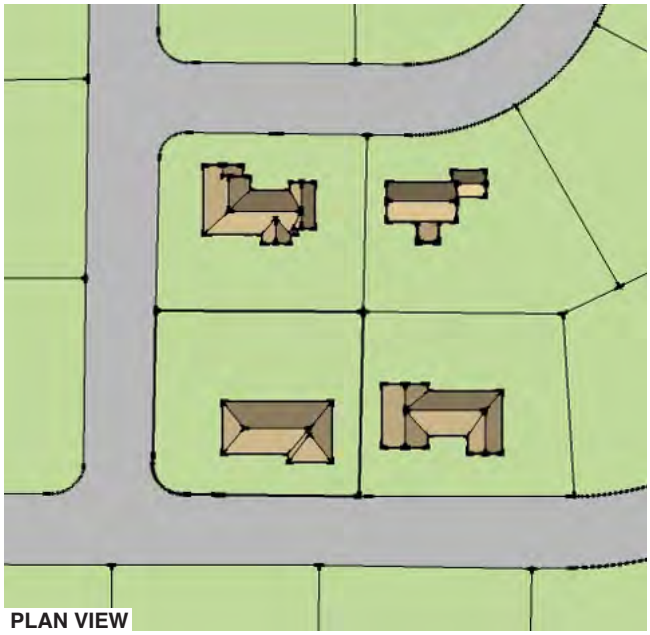


STREET VIEW

Although structures are often built near the minimum side setbacks, side walls are typically low.



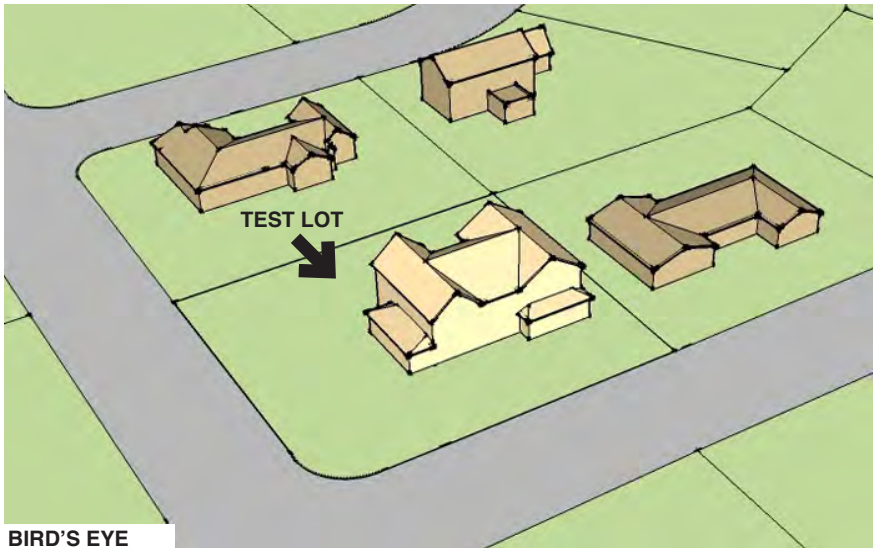
PLAN VIEW

Neighborhood and site level features include square to moderately irregular lots within a street pattern that varies from curving to linear.

Context H

Recent redevelopment in this context has typically included two-story structures that are larger than surrounding traditional development. Residents have expressed the concern that some new development includes long, tall walls that may loom over neighbors.

Figure 1.17: Development Trends and Potential Issues in Context H

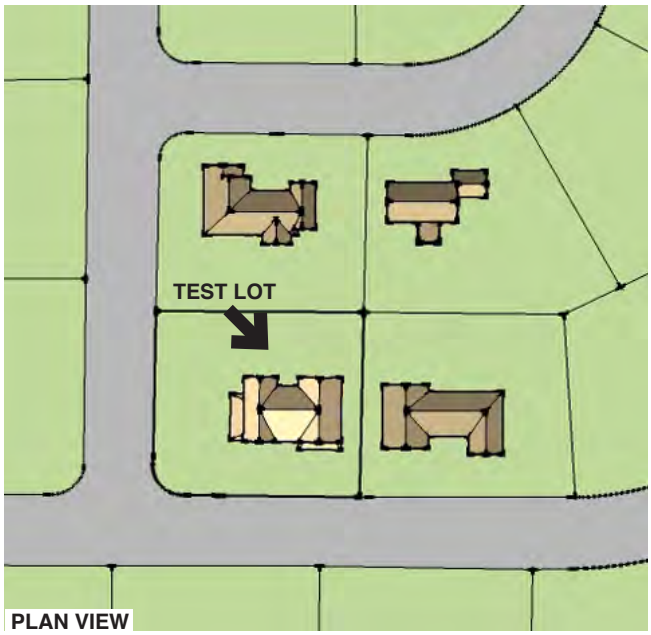


BIRD'S EYE

Redeveloped lots often include structures that are significantly larger than surrounding traditional development.

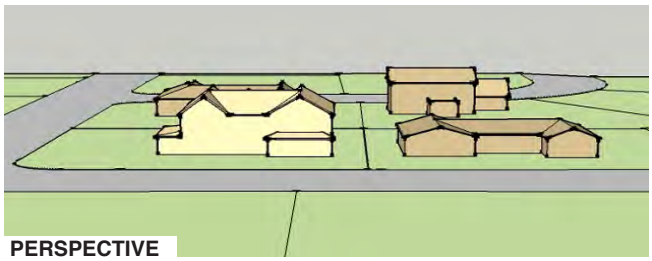
	Trends
Average Total Structure Size for New Construction	5,550 sq. feet
Average FAR for New Construction	0.27

	Test Lot
Test Lot Size	20,635 sq. feet
Test Lot Width	125'
Size of Illustrated Structure	5,600 sq. feet
FAR of Illustrated Structure	0.27



PLAN VIEW

Redeveloped lots often include structures that cover a moderately higher percentage of the lot than surrounding homes.



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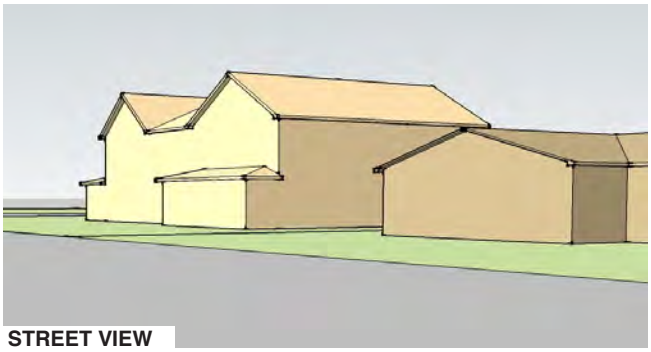


STREET VIEW

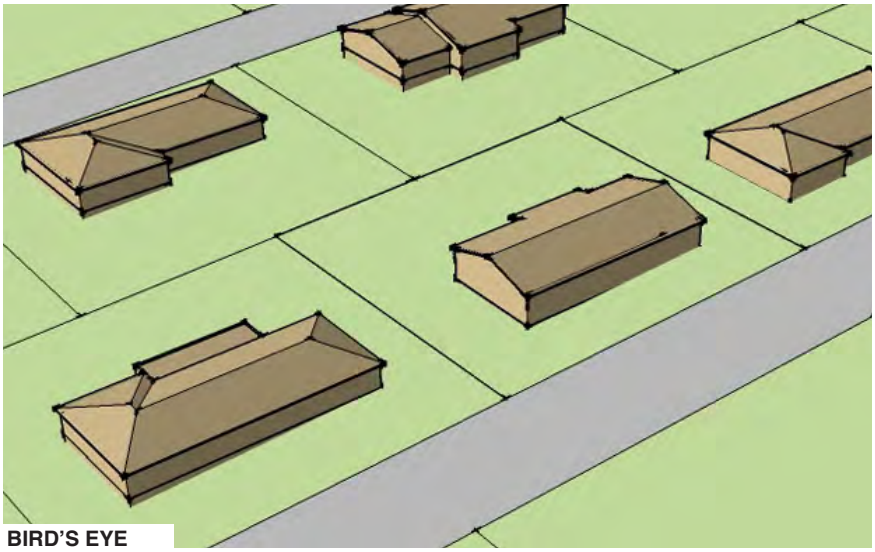
In some cases, large new structures have been built near one or more of the minimum side setbacks. The resulting long, tall walls may loom over surrounding traditional development.

Context I: R-5 District

This context includes the one area of the city within the R-5 Zone District. Lots along the grid of streets are relatively small and have a consistent rectangular shape, with a parallel orientation towards the street. Existing neighborhood design covenants limit height to one story or split level on most lots.

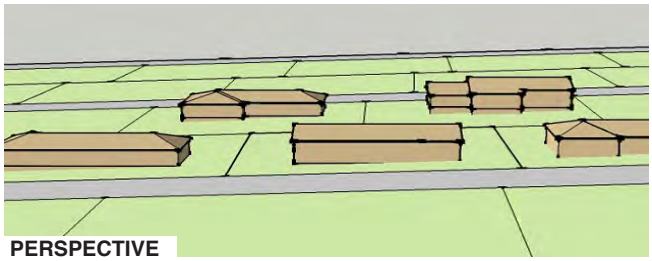
Figure 1.18: Existing Conditions in Design Context I

	Existing
Zone District	R-5
Street Pattern	Grid
Typical Lot Shape	Rectangle
Min. Permitted Lot Size	16,000
Average Lot Size	16,980 sq.feet
Average Structure Size	3,385 sq. feet
Average FAR	0.20
Typical Height	1-Story
Sample Areas	S Bellaire St. Claremont St. S Dexter St.



BIRD'S EYE

Most existing structures are modestly scaled one-story ranch-style homes oriented parallel to the street.



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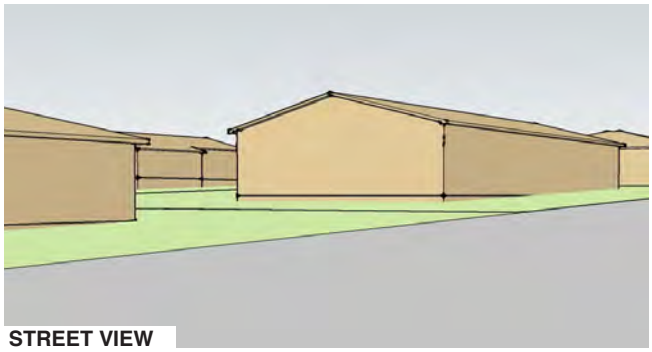
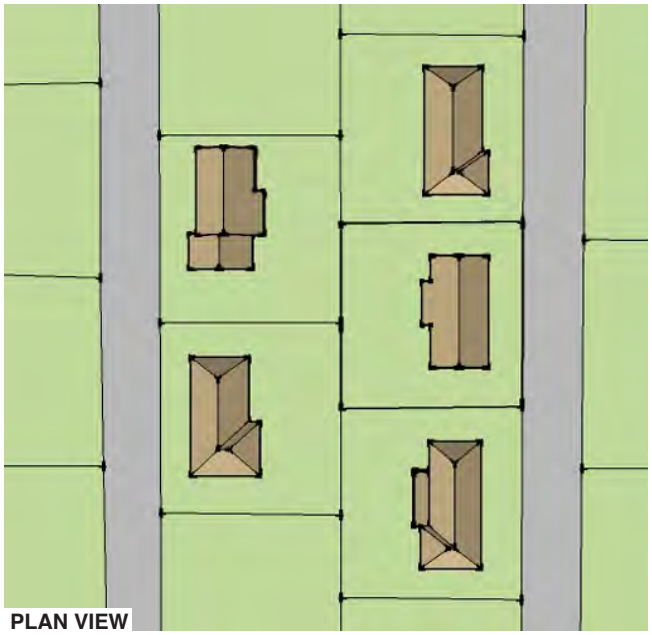


STREET VIEW

Because most existing structures are oriented parallel to the street, the side wall facing neighboring properties is typically short.



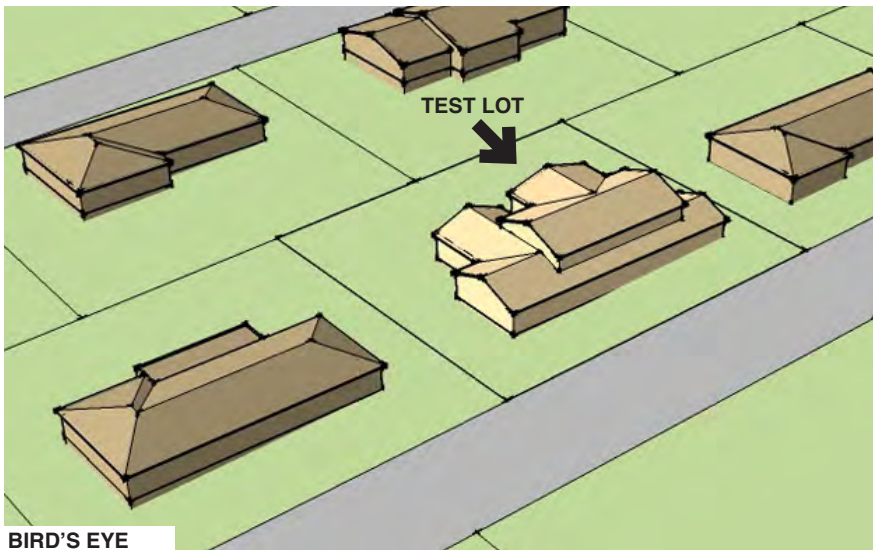
PLAN VIEW

Neighborhood and site level features include small square and rectangular lots along a linear street grid.

CONTEXT I CONTINUED

There has been little recent redevelopment in this context with new structures typically being only moderately larger than surrounding development. Residents have expressed few issues with recent development.

Figure 1.19: Development Trends and Potential Issues in Context I

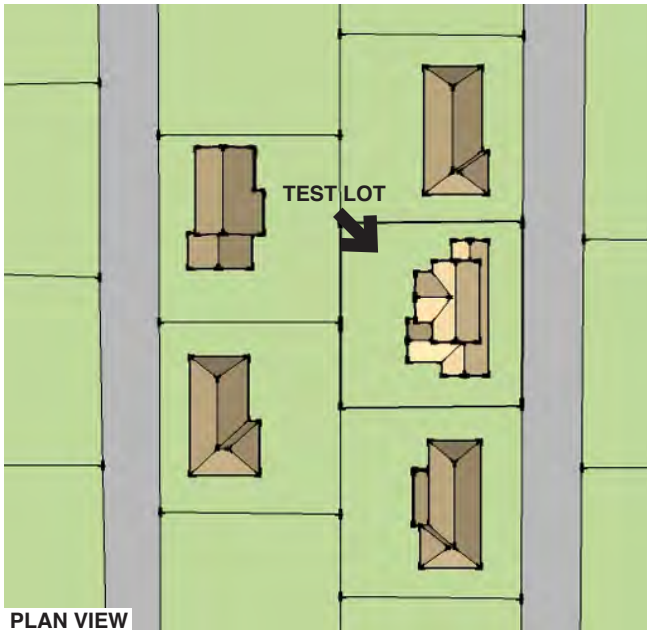


BIRD'S EYE

Although structures on redeveloped lots are often moderately larger than surrounding homes, they generally maintain compatible massing.

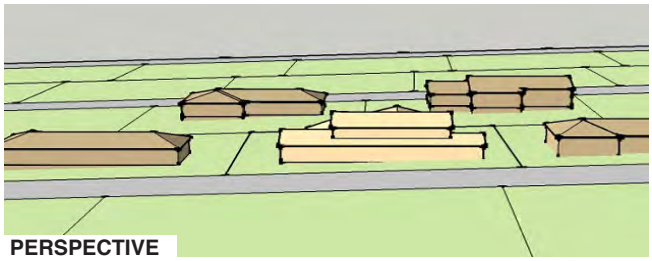
Trends	
Average Total Structure Size for New Construction	4,470 sq. feet
Average FAR for New Construction	0.27

Test Lot	
Test Lot Size	16,950 sq. feet
Test Lot Width	130'
Size of Illustrated Structure	4,545 sq. feet
FAR of Illustrated Structure	0.27

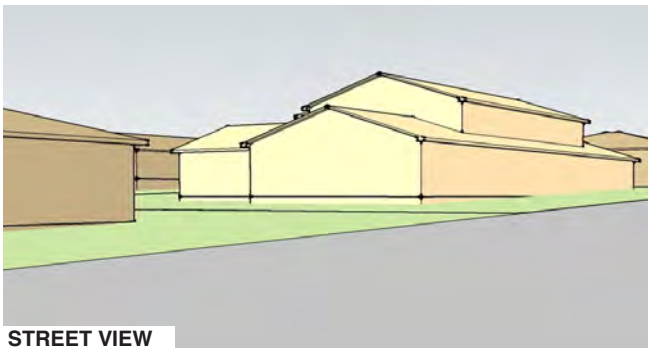


PLAN VIEW

Redeveloped lots often include structures that cover a moderately higher percentage of the lot than surrounding homes.



PERSPECTIVE



STREET VIEW

Where new two-story structures or second floor additions have been built, they often step back from the side setback.

Objectives for New Construction

Concerns regarding recent development trends support a series of design objectives for residential additions and new construction in Cherry Hills Village. These objectives are based on public input received by the City's Residential Development Standards Committee (RDSC) regarding the character of new development in the community. The bulk plane alternatives described in Part 2 are intended to support objectives for new construction by shaping the character of new development to address issues and promote compatible design.

Citywide objectives seek to preserve views, access to sunlight and privacy.

Citywide Objectives

Although new construction has been concentrated in certain areas of the city (especially those areas described by Contexts B, F and E), recent development trends have raised common issues throughout the city's neighborhoods. Citywide objectives seek to:

- Preserve views and an open feel
- Preserve access to sunlight
- Promote privacy
- Reduce 'looming' impacts

Current development trends have raised issues that make citywide objectives especially relevant in Context E (R-3).

Context-Specific Considerations

Citywide objectives apply to all areas of the city. However, it is important to recognize that existing conditions vary and that current regulations may already adequately promote objectives in certain areas. Specific considerations by context include:

- **Context A and B (R-1):** Current setback regulations and the existing pattern of large lots may adequately promote citywide objectives in many cases, but looming impacts and preservation of views could still be an issue, especially where lots abut higher density zone districts.
- **Context C (R-2):** Although development trends have raised fewer issues than in the R-3 Zone District, additional measures may be necessary to adequately promote citywide objectives.
- **Context D, E and F (R-3):** Current development trends have raised issues that make citywide objectives especially relevant to these contexts.
- **Context G (R-3A):** The existing pattern of larger structures within this context reduces the relevance of citywide objectives.
- **Context H (R-4):** A trend towards large new structures on smaller lots has raised issues that make citywide objectives especially relevant to this context.
- **Context I (R-5):** Although existing covenants may adequately promote citywide objectives within this context, additional measures may be appropriate.

The existing pattern of larger structures on relatively small lots reduces the relevance of the citywide goals and objectives within Context G (R-3A Zone District).

Part 2
Bulk Plane Alternatives

A variety of alternative bulk plane standards could address issues and support objectives for compatible residential development in Cherry Hills Village. While the City's Residential Development Standards Committee has developed a preliminary concept, City Council has indicated that additional evaluation and exploration of alternative bulk plane standards should be conducted prior to development of formal regulations.

This part of the report provides an evaluation of alternative bulk plane standards and potential implementation options. It begins with illustrated descriptions of two alternative bulk plane concepts, continues with side-by-side comparisons of the alternatives and concludes with a description of potential implementation options.

With City Council direction, the recommendations included in this report will be revised and may provide a blueprint for an ordinance to incorporate a bulk plane standard into Chapter 16 of the City's Municipal Code.

Summary of Alternatives

Two alternative bulk plane standards have been evaluated for use in Cherry Hills Village. They are:

- **Alternative 1:** RDSC Recommendations (the bulk plane standard recommended by the Residential Development Standards Committee)
- **Alternative 2:** Front and Rear Areas (a variation on the RDSC recommended bulk plane allowing for taller structures near the side setbacks in the front area of the lot)

Each alternative is described and illustrated in the following pages. The alternatives are presented for discussion only and do not constitute recommendations.

Contents

Bulk Plane Alternative 1: RDSC Recommendations

The City's Residential Development Standards Committee (RDSC) developed a preliminary bulk plane concept for residential neighborhoods in Cherry Hills Village. For this report, the RDSC concept is referred to as Bulk Plane Alternative 1. It is summarized and illustrated in the following pages. Potential modifications and refinements to the RDSC concept are also discussed.

Description

The Alternative 1 bulk plane rises at a 27° angle to a maximum overall building height of 35 feet, which is 5 feet greater than the existing 30 foot height limit. In the R-1, R-2 and R-3 Zone Districts, it begins at ground level at the side and rear property lines. In the R-4 and R-5 districts, it begins 12.5 feet above the existing minimum setbacks. The RDSC indicates that a bulk plane may not be appropriate for the R-3A District.

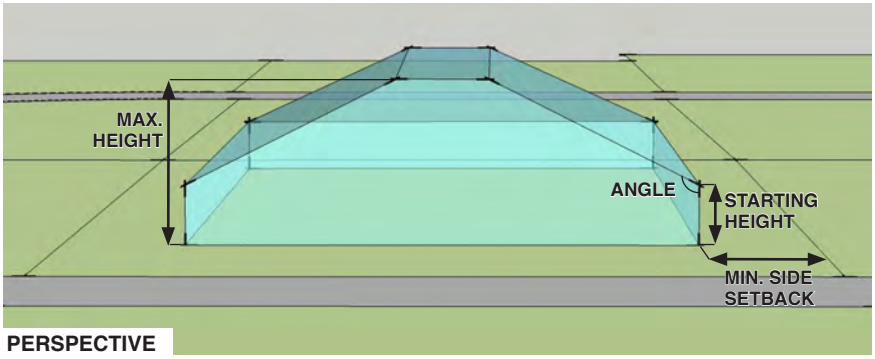
Figure 2.1: Summary of Alternative 1

	Bulk Plane
Projected From	Side, Rear
Measured From	Min. Setback*
Starting Height	12.5'**
Angle	27°
Height (max)	35'
Potential Exceptions	-Roof Eaves -Dormers -Gable Roof Ends -Bay Windows -Chimneys

	Test Lot
Context	E
Zone District	R-3
Test Lot Size	38,850 sq. feet
Test Lot Width	155'

*For purposes of this report, all starting heights are measured from a point above the minimum setbacks. The starting height has been adjusted to preserve the effect of the original RDSC recommendations which measure some starting heights from the property line.

**The starting height at the minimum setbacks would be 25 feet in the R-1 District and just over 20 feet in the R-2 District (measuring where a bulk plane starting at the property line would intersect the minimum setback).



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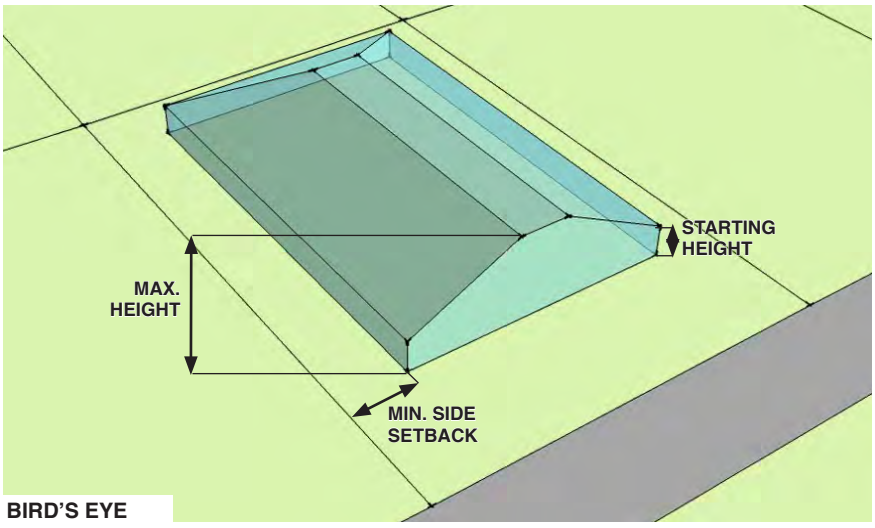


BIRD'S EYE

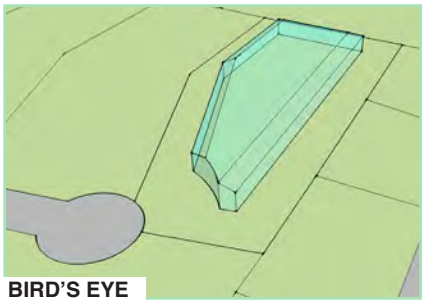
As illustrated in Context E (R-3), the Alternative 1 bulk plane starts at 12.5 feet above the minimum 25 foot side and rear setbacks and continues towards the interior of the lot at a 27° angle until reaching a height of 35 feet

Bulk Plane Alternative 1 CONTINUED

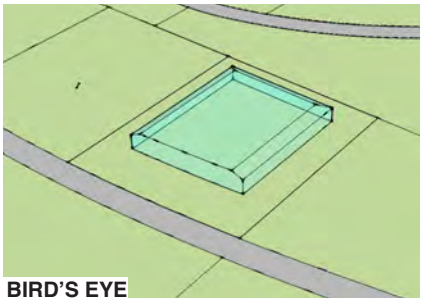
Variations by Context

The effect of the Alternative 1 bulk plane would vary depending on existing setback standards in the city's six residential zone districts and on the size and shape of individual lots. In R-3, R-4 and R-5, the bulk plane would allow for 12.5 foot one-story construction at the minimum side and rear setbacks. In R-1 and R-2, the bulk plane allows for taller walls at the greater 50 and 40 foot setbacks. The building envelope produced by the Alternative 1 bulk plane is illustrated in each context below.

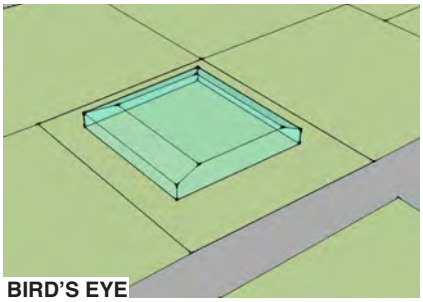
Figure 2.2: Alternative 1 Bulk Plane Illustrated by Context



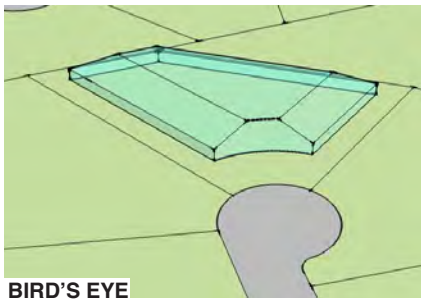
***Context A (R-1)**. The bulk plane limits height to 25 feet at the 50 foot side and rear setbacks.*



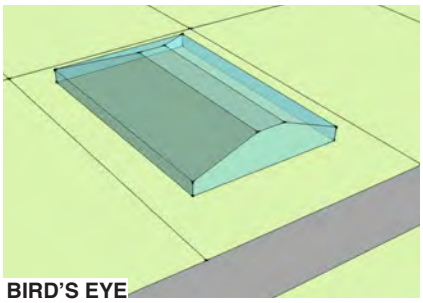
***Context B (R-1)**. The bulk plane limits height to 25 feet at the 50 foot side and rear setbacks.*



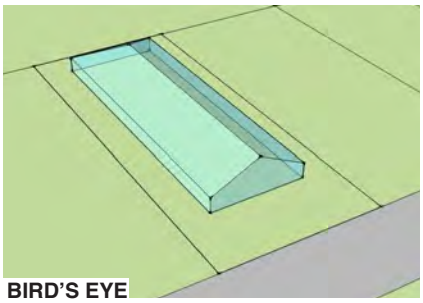
*In **Context C (R-2)**. The bulk plane limits height to 20 feet at the 40 foot side and rear setbacks.*



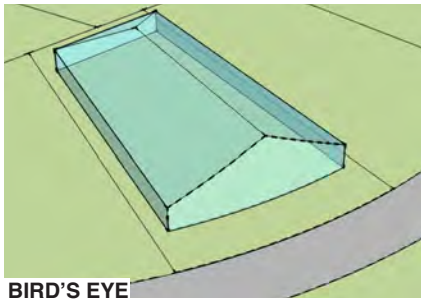
***Context D (R-3)**. the bulk plane limits its height to 12.5 feet at the 25 foot side and rear setbacks, providing a limited building area at the front of the irregular lot illustrated.*



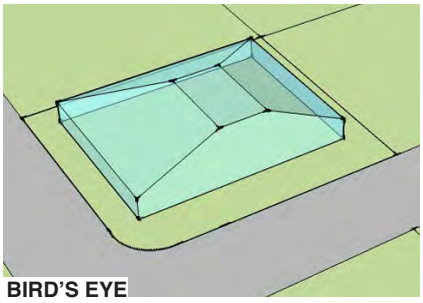
***Context E (R-3)**. The bulk plane limits height to 12.5 feet at the 25 foot side and rear setbacks.*



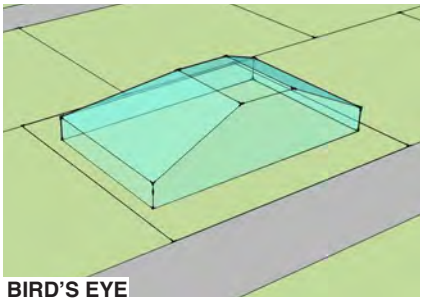
***Context F (R-3)**. The bulk plane limits height to 12.5 feet at the 25 foot side and rear setbacks and limits its height to 31 feet at the center of the 124 foot lot illustrated.*



***Context G (R-3A)**. If applied, the bulk plane would limit height to 12.5 feet at the 7.5 foot side and rear setbacks.*



***Context H (R-4)**. The bulk plane limits height to 12.5 feet at the 10 foot side and rear setbacks.*



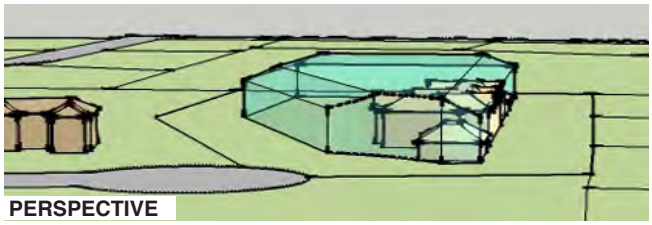
***Context I (R-5)**. The bulk plane limits height to 12.5 feet at the 7.5 foot side and rear setbacks.*

BULK PLANE ALTERNATIVE 1 CONTINUED

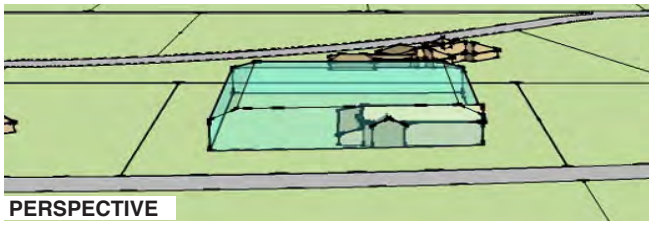
Relationship to Design of Current Trends Structures

The Alternative 1 bulk plane would accommodate most new construction in the R-1, R-2 and R-5 Zone Districts, but would have a significant impact on structures being built under current trends in R-3 and R-4, where it would limit height to one story at the minimum side setback. The figures below and on the following pages illustrate the effect of the Alternative 1 bulk plane on the design of structures in selected contexts (see Attachment C for side-by-side comparisons in all contexts). Portions of the illustrated structures that protrude from the transparent blue building envelope would not be allowed.

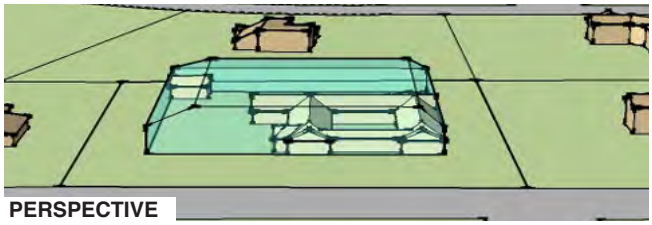
Figure 2.3: Current Trends Structures Illustrated Within Alternative 1 Bulk Plane in Selected Contexts



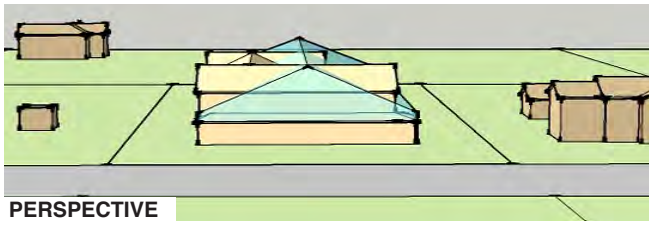
***Context A (R-1)**. Large lot sizes and the 25 foot starting height for the bulk plane would accommodate structures being built under current trends. A gable roof end would be allowed to protrude through the bulk plane as illustrated. Application of the bulk plane in Context A produces a similar result.*



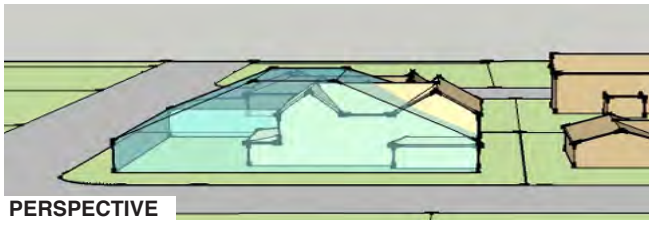
***Context B (R-1)**. Large lot sizes and the 25 foot starting height for the bulk plane would accommodate structures being built under current trends. A gable roof end would be allowed to protrude through the bulk plane as illustrated.*



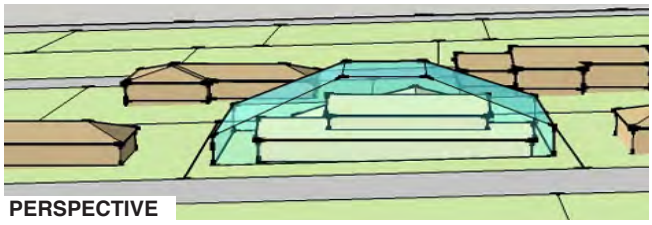
***Context C (R-2)**. Large lot sizes and the just over 20 foot starting height for the bulk plane would accommodate most structures being built under current trends.*



***Context F (R-3)**. The bulk plane would not accommodate two-story building elements built at or near the minimum side setbacks. A significant number of structures on narrow lots would not conform with the bulk plane.*



***Context H (R-4)**. The bulk plane would not accommodate two-story building elements built at or near the minimum side setbacks.*

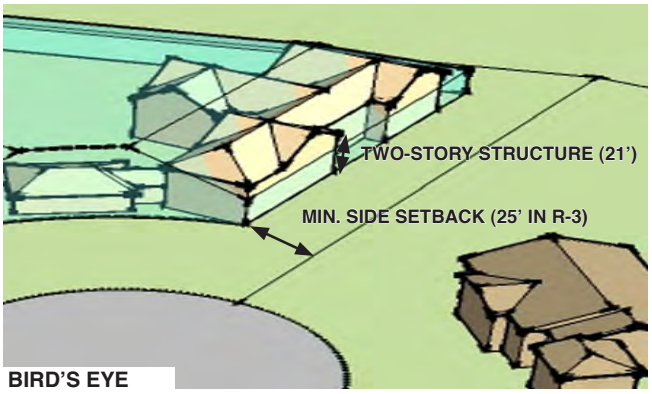


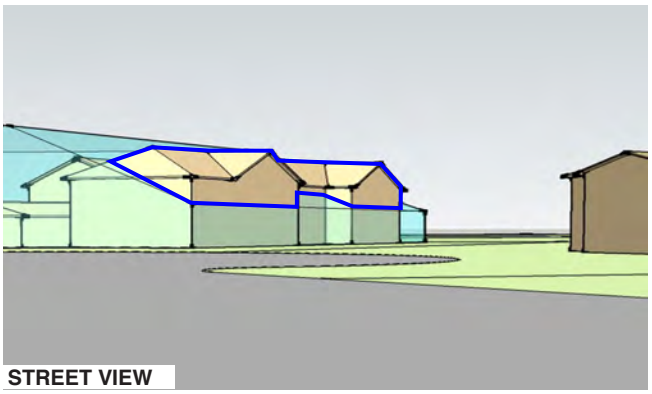
***Context I (R-5)**. Only a small number of two story structures may be built because of existing neighborhood covenants. The bulk plane would accommodate most two-story structures that are built because the second floor is often stepped back as illustrated.*

BULK PLANE ALTERNATIVE 1 CONTINUED

Figure 2.4: Design Impact of Alternative 1 Bulk Plane in Context D

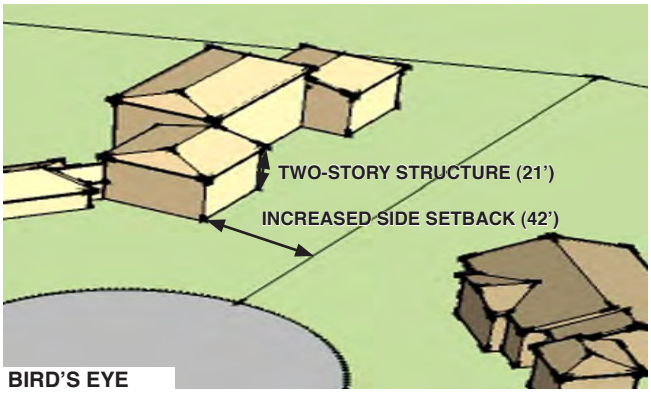
Alternative 1 Bulk Plane Applied to Current Trends Structure

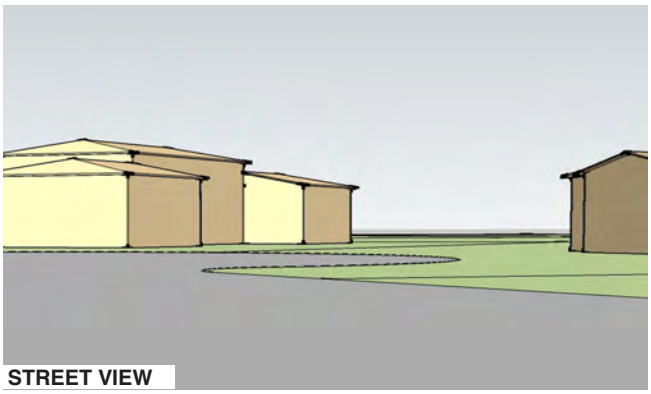




Not Permitted by Alternative 1: *As illustrated in Context D (R-3), the Alternative 1 bulk plane would not accommodate a two-story structure at the minimum side setback. The red highlighted portion of the 8,500 sq. foot structure illustrated above that protrudes through the bulk plane would not be permitted (see Attachment C for side-by-side illustrations of current trends structures within the Alternative 1 bulk plane in all contexts).*

Current Trends Structure Redesigned to fit within Alternative 1 Bulk Plane



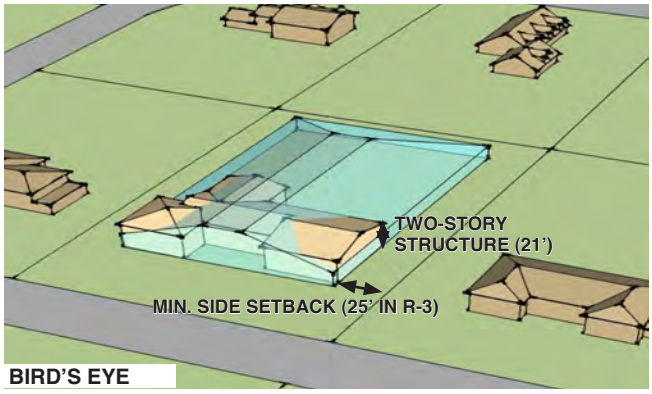


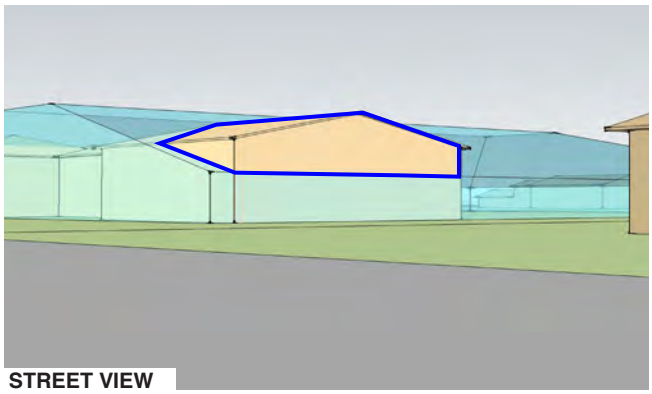
Permitted by Alternative 1: *The 8,500 sq. foot structure illustrated above has been redesigned to fit within the Alternative 1 bulk plane in Context D (R-3), requiring an additional side setback to accommodate the two story portion of the building. The central portion of the building is built to three stories, taking advantages of the 35' overall height limit.*

BULK PLANE ALTERNATIVE 1 CONTINUED

Figure 2.5: Design Impact of Alternative 1 Bulk Plane in Context E

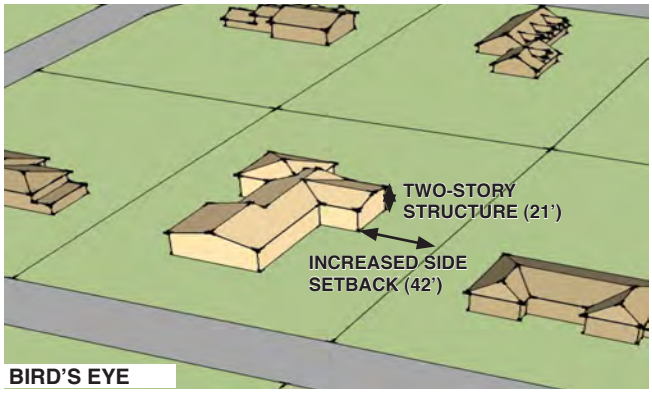
Alternative 1 Bulk Plane Applied to Current Trends Structure

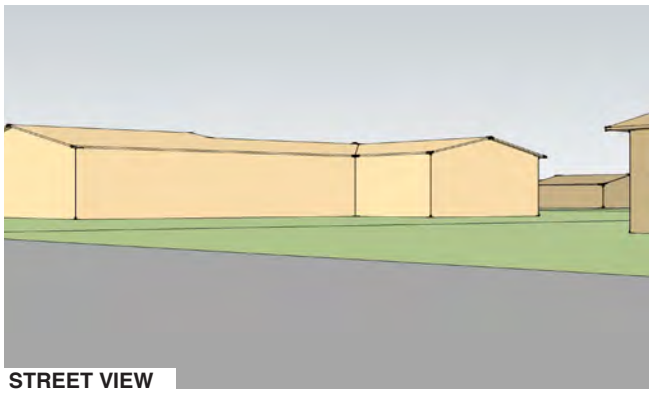




Not Permitted by Alternative 1: *As illustrated in Context E (R-3), the Alternative 1 bulk plane would not accommodate a two-story structure built to the minimum side setbacks. The red highlighted portion of the 9,000 sq. foot structure illustrated above that protrudes through the bulk plane would not be allowed.*

Current Trends Structure Redesigned to fit within Alternative 1 Bulk Plane





Permitted by Alternative 1: *The 9,000 sq. foot structure illustrated above has been redesigned to fit within the Alternative 1 bulk plane. Although the building is built at a greater side setback, is also extends further into the rear yard area and has longer side walls.*

Bulk Plane Alternative 1 CONTINUED

Potential Benefits

Potential benefits of Alternative 1 include:

- The bulk plane clearly promotes objectives to reduce looming impacts and address privacy (see Figure 2.4 on page 2-5).
- A consistent approach is used across zone districts and lot sizes.
- The 27° angle permits sun to fall on all parts of neighboring properties at all times of the year with the exception of the R-4 and R-5 Districts where the plane is measured from a reduced setback.

Projecting a bulk plane from the sides of the lot promotes objectives to reduce looming impacts and promote privacy.

Potential Disadvantages

Potential disadvantages of Alternative 1 include:

- Existing traditional structures with two-story side walls at the minimum side setback are not accommodated in areas such as contexts E, F and H (see Figure 2.4 on page 2-5 and Figure 2.5 on page 2-6).
- Development on some irregular, narrow or small lots such as those seen in contexts E, F and H may be overly restricted (see Figure 2.4 on page 2-5).
- The bulk plane could shift development towards the rear of lots (see Figure 2.5 on page 2-6).

Projecting a bulk plane from the rear of the lot ensures that impacts on all adjacent properties are addressed.

Observations

The Alternative 1 bulk plane offers a consistent, straightforward approach and directly promotes neighborhood objectives. However, it would not accommodate some existing conditions and could be overly restrictive in areas with irregular, narrow or small lots.

The Alternative 1 bulk plane directly addresses potential looming and shading impacts by effectively requiring a greater setback for two-story construction along the side and rear edges of a lot. By consistently pushing the mass of buildings towards the center of the lot, however, the bulk plane would not accommodate existing conditions where two story (often gable ended) structures are located at or near the minimum side setbacks towards the front of the lot. By consistently pushing the mass of buildings inward towards the center of the lot, the bulk plane may also promote buildings that extend further to the rear, which may produce unintended privacy and open space impacts. This is especially relevant on irregular, small or narrow lots.

Existing traditional structures and current trends structures with two-story side walls at the minimum side setback would not be accommodated.

Bulk Plane Alternative 2: Front and Rear Areas

This alternative divides the bulk plane into two parts for most lots to accommodate a wider range of existing conditions and provide greater flexibility for new construction. It is summarized and illustrated in the following pages. Potential modifications and refinements are also discussed. Note that the recommended bulk plane described in Part 3 of this report is based on this alternative.

Description

As in Alternative 1, the Alternative 2 bulk plane rises at a 27° angle to a maximum overall building height of 35 feet, which is 5 feet greater than the existing 30 foot height limit. With the exception of very large lots in R-1 and all lots in R-5, this alternative divides each lot into front and rear areas. In the front area, the bulk plane is measured from a two story-height above the minimum side setbacks. In the rear area, the bulk plane is measured from a one-story height above the side and rear setbacks. The single area that applies to large lots in R-1 and all lots in R-5 measures the bulk plane from a one-story height above the minimum side and rear setbacks.

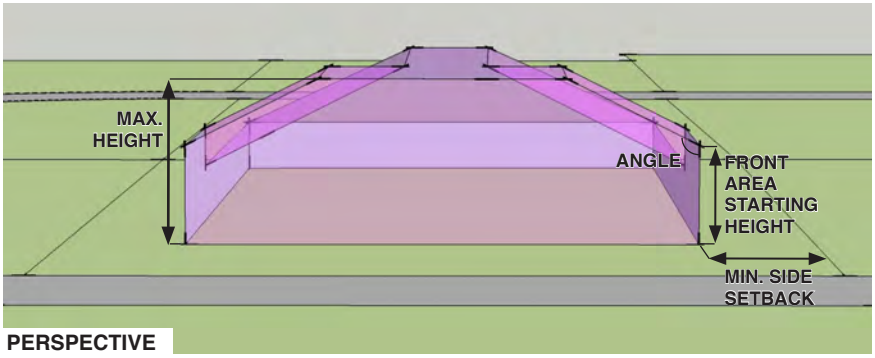
Figure 2.6: Summary of Alternative 2

	Bulk Plane Front Area
Front Area Depth	40-45'*
Projected From	Side
Measured From	Min. Setback
Starting Height	21'
Angle	27°
Height (max)	35'
Potential Exceptions	-Roof Eaves -Dormers -Gable Roof Ends -Bay Windows -Chimneys

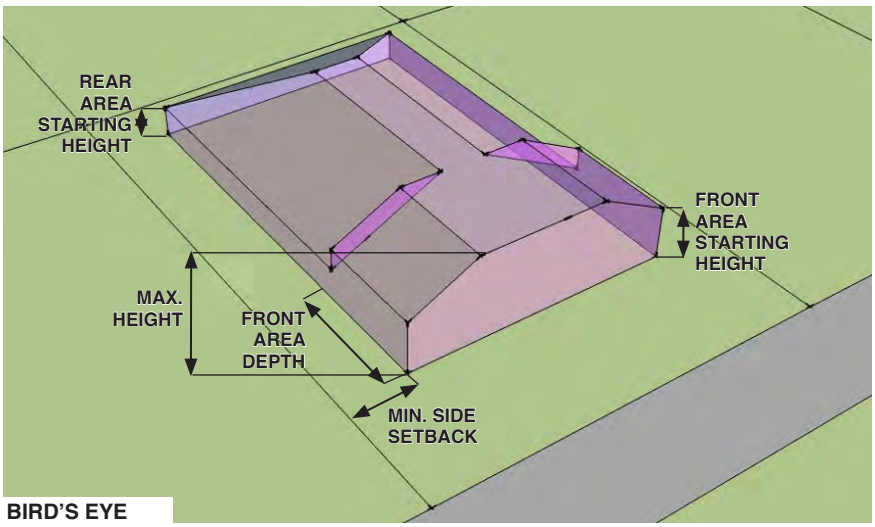
	Bulk Plane Rear Area
Projected From	Side, Rear
Measured From	Min. Setback
Starting Height	12.5'
Angle	27°
Height (max)	35'
Potential Exceptions	-Same as front

	Test Lot
Context	E
Zone District	R-3
Test Lot Size	38,850 sq. feet
Test Lot Width	155'

*As measured from front setback. Depth varies by zone district.



PERSPECTIVE



BIRD'S EYE

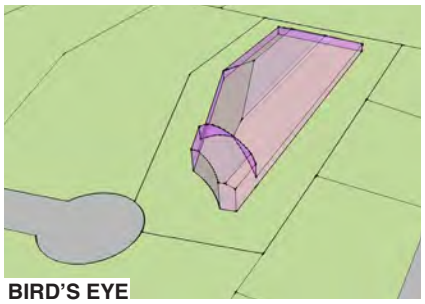
As illustrated in Context E (R-3), the Alternative 2 bulk plane starts at 21 feet above the minimum 25 foot setbacks in the front area (the first 45 feet of lot depth as measured from the front setback), and at 12.5 feet above the minimum side and rear setbacks in the rear area (the remaining depth of the lot) and continues towards the interior of the lot at a 27° angle until reaching a height of 35 feet

BULK PLANE ALTERNATIVE 2 CONTINUED

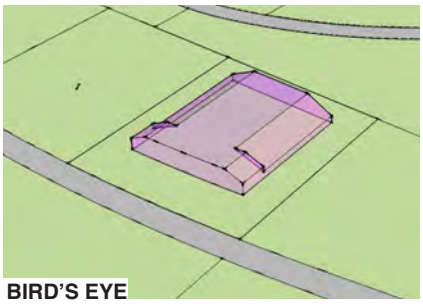
Variations by Context

The effect of the Alternative 1 bulk plane would vary depending on existing setback standards in the City's six residential zone districts and on the size and shape of individual lots. In R-1, R-2, R-3 and R-4, a two part bulk plane would apply as described on the previous page. On very large lots in R-1 and on all lots in R-5, the bulk plane would have one area, allowing for one-story construction at the minimum side setback.

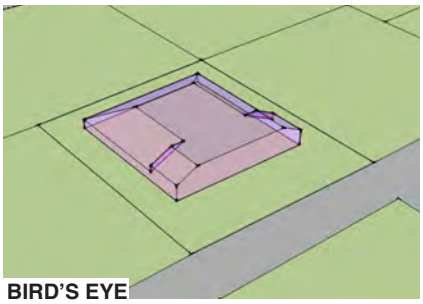
Figure 2.7: Alternative 2 Bulk Plane Illustrated by Context



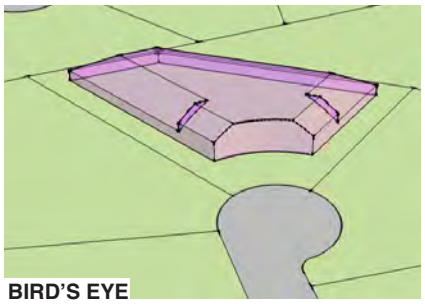
***Context A (R-1)**. The bulk plane limits height to 21 feet at the side setbacks in the front area (45 feet from the front setback) and 12.5 feet at the side and rear setbacks in the rear area.*



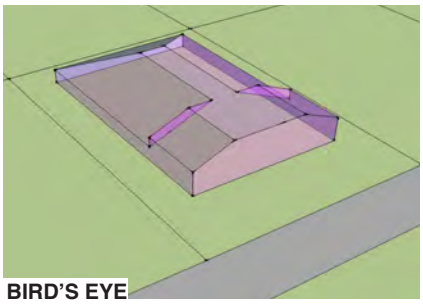
***Context B (R-1)**. The bulk plane is measured as in Context A, allowing for a larger building mass towards the front of the lot.**



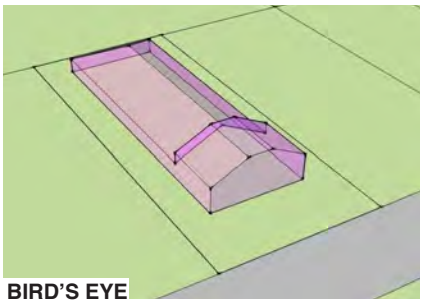
***Context C (R-2)**. The bulk plane is measured as in contexts A and B, allowing for a larger building mass towards the front of the lot.*



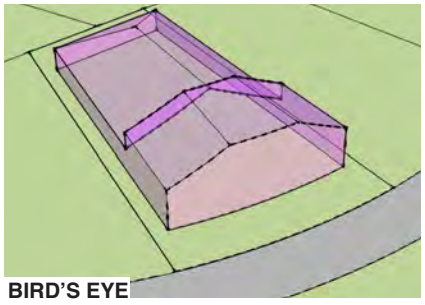
***Context D (R-3)**. The bulk plane is measured as in contexts A-C, allowing for a less contained area at the front of the irregular lot illustrated.*



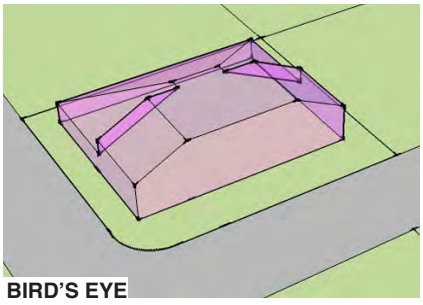
***Context E (R-3)**. The bulk plane is measured as in contexts A-D, allowing for two stories at the minimum side setbacks in the front area of the lot.*



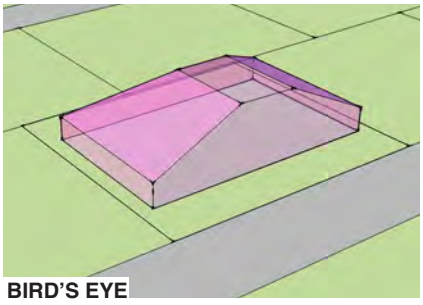
***Context F (R-3)**. The bulk plane is measured as in contexts A-E, allowing for two stories at the minimum side setbacks in the front area of the lot.*



***Context G (R-3A)**. If applied, the bulk plane would be measured as in contexts A-E*



***Context H (R-4)**. The bulk plane is measured as in contexts A-F, but the front area is measured as the first 40 feet from the front setback.*



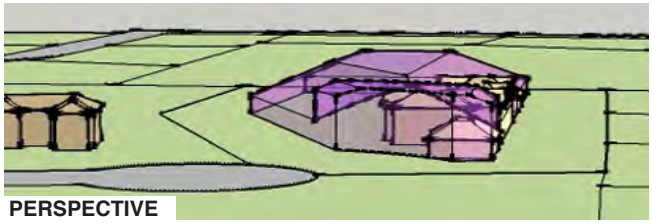
***Context I (R-5)**. The bulk plane limits its height to 12.5 feet at the 7.5 feet minimum side and rear setbacks in both the front and rear of the lot.*

BULK PLANE ALTERNATIVE 2 CONTINUED

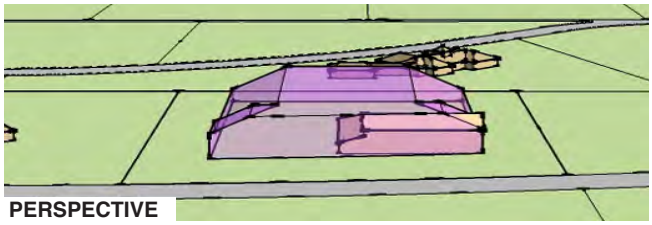
Relationship to Design of Current Trends Structures

The Alternative 2 bulk plane would accommodate most new construction but would not allow long, two-story walls located at or near the side setback. The figures below illustrate the effect of the Alternative 2 bulk plane on the design of structures in selected contexts (see Attachment D for side-by-side comparisons in all contexts). Other than side-facing gable roof ends, portions of the illustrated structures that protrude from the transparent purple building envelope would not be allowed. Part 3 of this report includes additional illustrations of the design impact of a two-part bulk plane.

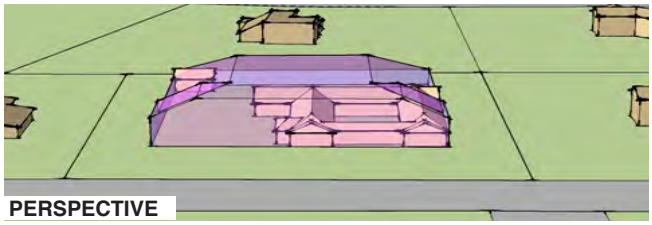
Figure 2.8: Current Trends Structures Illustrated Within Alternative 2 Bulk Plane in Selected Contexts



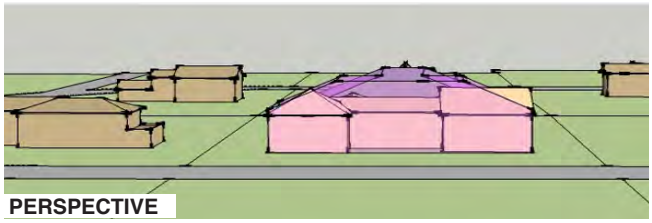
***Context A (R-1)**. The 21 foot starting height for the bulk plane in the front area of the lot would accommodate most structures built under current trends while not allowing for long two-story walls at the side setback.*



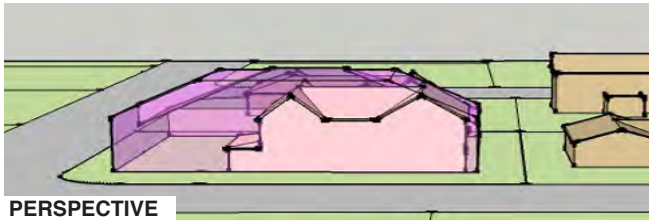
***Context B (R-1)**. The 21 foot starting height for the bulk plane in the front area of the lot would allow most structures built under current trends but would not allow long two-story walls at the side setback. The illustrated gable roof end would be allowed to protrude through the bulk plane.*



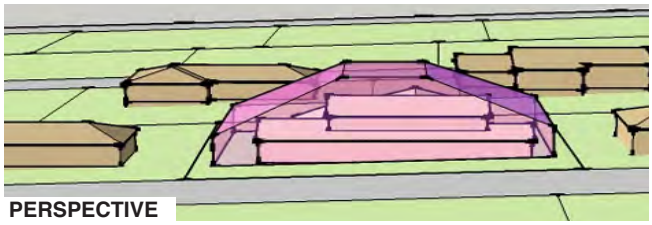
***Context C (R-2)**. The 21 foot starting height for the bulk plane in the front area of the lot would accommodate most structures built under current trends while not allowing for long two-story walls built at the side setback.*



***Context E (R-3)**. The 21 foot starting height for the bulk plane in the front area of the lot would accommodate most structures built under current trends. The illustrated gable roof end would be allowed to protrude through the bulk plane.*



***Context H (R-4)**. The 21 foot starting height for the bulk plane in the front area of the lot would allow the two-story portion of the structure illustrated at the side setback towards the front of the lot. In the rear area of the lot, portions of the structure built at the minimum side yard setback would be limited to two stories.*



***Context I (R-5)**. Only a small number of two-story structures may be built because of existing neighborhood covenants. The bulk plane would accommodate most two-story structures that are built because the second floor is often stepped back as illustrated.*

Bulk Plane Alternative 2 CONTINUED

Potential Benefits

Potential benefits of Alternative 2 include:

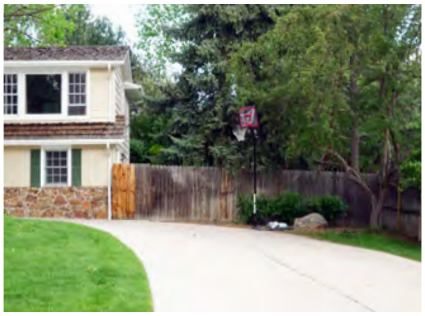
- The bulk plane promotes objectives to reduce looming impacts and promote privacy while allowing greater flexibility to accommodate existing traditional structures and new construction with a limited length of two-story wall at the minimum side setback towards the front of the lot.
- The bulk plane could help preserve rear yard areas by allowing greater building mass towards the front of lots.
- A similar approach is used across most zone districts and lot sizes.

Although a limited portion of two-story building could be located near the side setback, long, two-story walls would not be permitted by Alternative 1.

Potential Disadvantages

Potential disadvantages of Alternative 1 include:

- The allowance for two stories at the side setback towards the front of the lot would allow that portion of the building to cast a limited shadow on adjacent lots in the R-3 and R-4 zone districts at some times of year and some times of day (see Attachments E-F).
- A two part bulk plane may be more difficult to calculate and administer.



Observations

Alternative 2 addresses some potential disadvantages of the Alternative 1 bulk plane by allowing for two story construction at or near the minimum side setbacks towards the front of a lot. The two part bulk plane would accommodate traditional two-story side-facing gable roof forms on existing structures and would allow for construction of new structures that incorporate traditional patterns. The allowance for greater flexibility, however, does permit two-story construction to be located closer to neighboring properties than would be permitted by Alternative 1, which would produce limited looming and shading impacts in some cases (see Attachments E-F).

The two part bulk plane creates a limit on the length of two-story walls at or near the side setback. A two-story wall could extend 40 to 45 feet (depending on the zone district) to the rear of the front setback before having to step down or in towards the center of the lot. This would allow for traditional construction with two-story side gables while limiting larger structures with long two-story walls at or near the minimum side setback. Allowing for a more permissive building envelope towards the front of a lot may also discourage structures that extend significantly into the rear yard area.

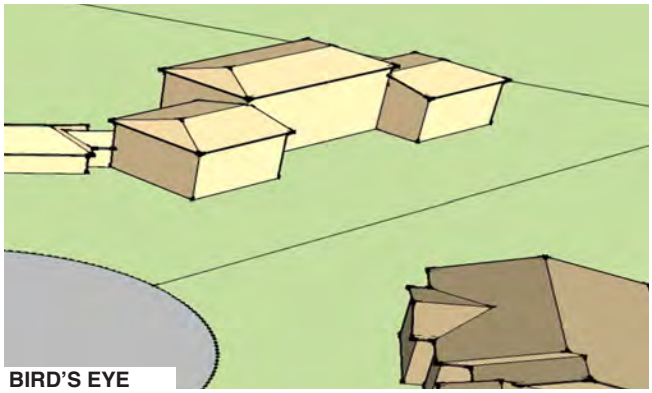
Alternative 2 allows greater flexibility to accommodate existing traditional structures and new construction with a limited length of two-story wall at the minimum side setback towards the front of the lot (often a side facing gable end).

Comparison of Alternatives

The following pages include side-by-side illustrations of structures designed to fit within the Alternative 1 and Alternative 2 bulk planes. It is important to note that the elements of each alternative may be adjusted, refined or re-combined to produce additional variations on a bulk plane standard.

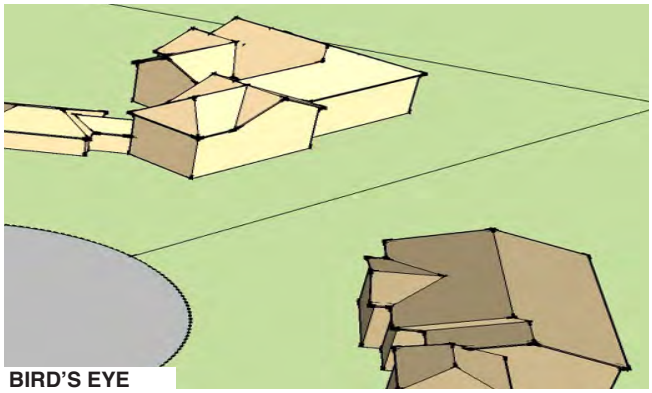
Figure 2.9: Comparison of Structures Accommodated Within Alternative 1 and 2 Bulk Planes in Context D (R-3)

Alternative 1



Permitted by Alternative 1: *The bulk plane does not allow a two-story structure located at or near any portion of the minimum side setback, pushing the building mass towards the center of the lot (also see Figure 2.4 on page 2-5).*

Alternative 2



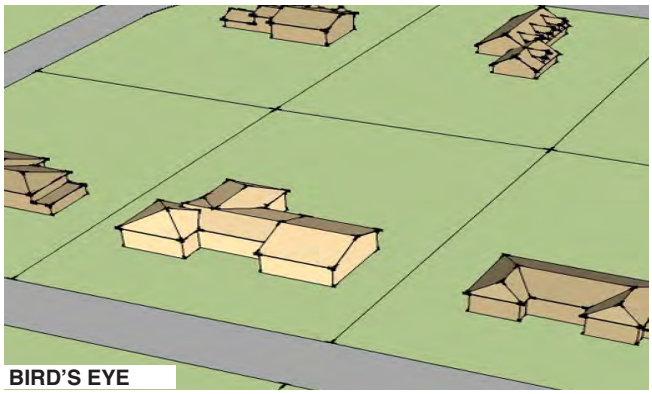
Permitted by Alternative 2: *The bulk plane allows a two-story structure located at the minimum side setback toward the front of the lot, providing for greater flexibility.*

Figure 2.10: Comparison of Structures Accommodated Within Alternative 1 and 2 Bulk Planes in Context E (R-3)

Alternative 1

Permitted by Alternative 1: *The bulk plane does not allow a two-story structure located at or near any portion of the minimum side setback, pushing the building mass towards the center and rear of the lot (also see Figure 2.5 on page 2-6).*

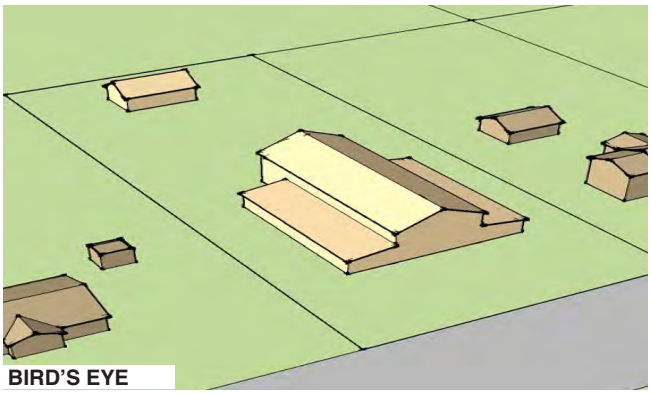
Alternative 2



Permitted by Alternative 2: *The bulk plane allows a two-story structure located at the minimum side setback toward the front of the lot, allowing a structure with a parallel orientation to the street as is typical of the surrounding traditional context.*

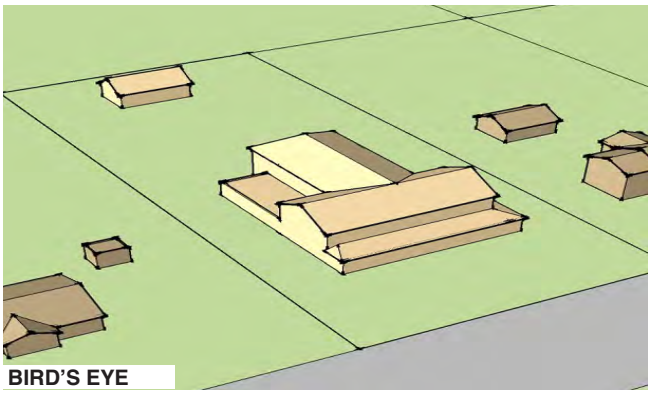
Figure 2.11: Comparison of Structures Accommodated Within Alternative 1 and 2 Bulk Planes in Context F (R-3)

Alternative 1



Permitted by Alternative 1: *The bulk plane does not allow a two-story structure located at or near any portion of the minimum side setback, pushing the building mass towards the center of the lot.*

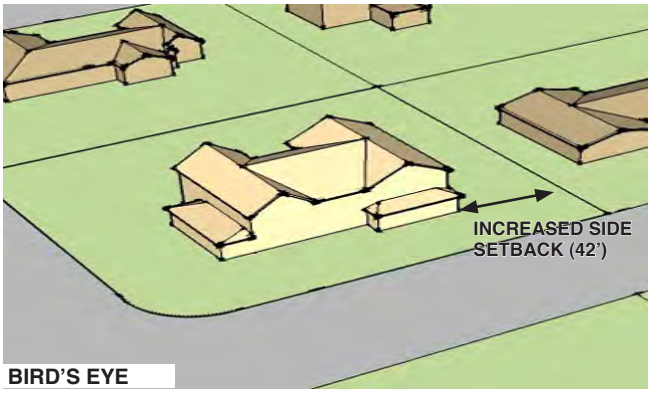
Alternative 2



Permitted by Alternative 2: *The bulk plane allows a two-story structure located at the minimum side setback toward the front of the lot, allowing a structure with a side facing gable roof form as is typical of the surrounding traditional context.*

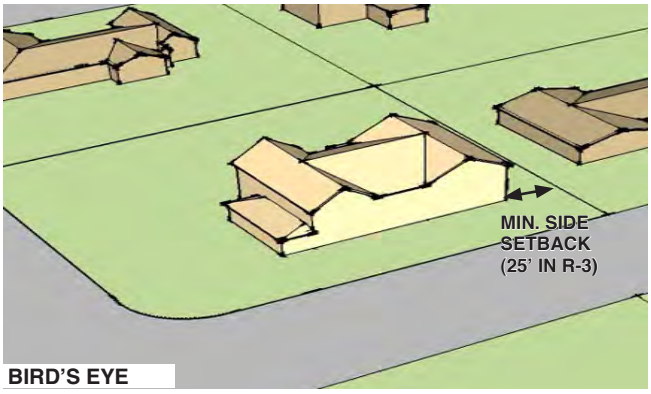
Figure 2.12: Comparison of Structures Accommodated Within Alternative 1 and 2 Bulk Planes in Context H (R-3)

Alternative 1



Permitted by Alternative 1: *The bulk plane does not allow a two-story structure located at or near any portion of the minimum side setback, pushing the building mass towards the center of the lot.*

Alternative 2



Permitted by Alternative 2: *The bulk plane allows a two-story structure located at the minimum side setback toward the front of the lot.*

Implementation Options

Implementation is the specific method by which a new bulk plane standard would be integrated into the development regulations for Cherry Hills Village. It will determine how a bulk plane standard is used and how it may vary for different zone districts, neighborhoods or lots.

The way in which a bulk plane standard is implemented will help determine how it may accommodate variations in existing conditions among zone districts, neighborhoods or lots.

Zoning overlays could be used to apply a bulk plane standard only to those neighborhoods or areas where significant new construction is likely to occur.

As described below, several potential approaches may be considered for implementation of a bulk plane standard. The recommended implementation approach is described in Part 3 of this report.

Implement Standards by Zone District

Existing zone districts provide the most direct approach for implementation of a bulk plane standard. Potential variations include:

- A single standard applies to all lots in all zone districts
- A single standard applies to all lots in some zone districts
- A single standard applies based on lot size or width in all or some zone districts (i.e., the same standard applies to all 110,000 sq. foot lots but is different for all 55,000 sq. foot lots)
- A standard that varies based on zone district (i.e., the same standard applies to all lots in R-1 and R-2 but a different standard applies to all lots in R-3, R-4 and R-5). The recommendations in Part 3 use this implementation approach.
- A standard that varies based on zone district and lot size (i.e., the same standard applies to a 110,000 sq. foot lot in R-1 and R-2 but differs for the same lot size in R-3 and R-4)

Implement Standards Using Zoning Overlays

Zoning overlays could be used to implement a bulk plane standard on a neighborhood-by-neighborhood basis. A zoning overlay applies in addition to, or may modify, underlying zoning regulations. Potential variations include:

- A standard applies only to some neighborhoods or areas (i.e., the standard only applies to some neighborhoods in R-3)
- A standard that varies for different neighborhoods (i.e., standards vary for different neighborhoods within R-3).

Note that application of a bulk plane standard by zoning overlay would be more complex and would require further development of the neighborhood contexts described in Part 1 of this report.

Part 3
Recommended Bulk Plane

A strategy to promote compatible residential development in Cherry Hills Village should address concerns regarding recent development trends and promote both citywide and context-specific objectives for new construction and additions. The strategy should also consider the need to maintain flexibility for property owners and ensure that existing homes remain in compliance with zoning standards.

This part of the report summarizes a recommended bulk plane standard for Cherry Hills Village. It begins with a description of the criteria used to develop the recommendation, continues with a description and illustrations of the recommended bulk plane and concludes with implementation recommendations.

With City Council direction, the recommendations included in this report will be revised and may become the basis of an ordinance to incorporate a bulk plane standard into Chapter 16 of the City's Municipal Code.

Objectives

The recommended bulk plane is intended to address the objectives for residential additions and new construction as described in Part 1 of this report. Citywide objectives seek to:

- Preserve views and an open feel
- Preserve access to sunlight
- Promote privacy
- Reduce 'looming' impacts

Additional objectives also seek to address context-specific considerations that may exist in some neighborhoods.

Contents

Criteria for Development of a Recommended Bulk Plane

The recommended bulk plane standard is based on an evaluation and refinement of the alternative bulk plane standards described in Part 2. The criteria listed below were used to select and refine an alternative to best meet the objectives for residential additions and new construction.

1. Effectiveness

A bulk plane standard should directly address concerns and promote objectives for residential additions and new construction.

2. Predictability

The impact of a bulk plane standard should be predictable and easily understood. Property owners should be able to understand what can be built, City staff should be able to easily interpret the standards, and residents should have a reasonable understanding of the scale of buildings that could occur on neighboring properties.

A bulk plane standard should respond to differences in existing context while remaining as simple and straightforward as possible.

3. Context Sensitivity

A bulk plane standard should respond to differences in existing context while remaining as simple and straightforward as possible.

4. Flexibility

A bulk plane standard should allow as much flexibility as possible. Property owners should be able to respond to changing needs and utilize creative design solutions.

5. Interface with Existing Regulations and Unintended Consequences

A bulk plane standard should complement existing regulations with as little overlap as possible. It should also address unintended consequences such as unduly restricting development on irregular lots or producing non-conforming status for existing structures.

Recommended Bulk Plane

A refinement of the Alternative 2 bulk plane described in Part 2 of this paper is recommended for implementation in Cherry Hills Village. The recommended bulk plane has these key features:

- Applies in the R-1, R-2, R-3, R-4 and R-5 zone districts
- Starts at the sides and rear of the lot
- Has a taller starting height in towards the front of the lot in all zone districts except R-5 to allow for traditional development patterns where buildings tend to be massed towards the front
- Raises the maximum overall height standard to 35 feet in all zone districts except R-5 to promote flexibility by allowing greater building mass towards the center of a lot
- Rises at a 40° angle to allow flexibility for different roof pitches
- Includes a special bulk plane standard for accessory structures built outside of the setbacks for primary structures in the R-1 and R-2 Zone Districts
- Includes exceptions for dormers, chimneys and gable roof ends to increase flexibility and encourage traditional development patterns

The table below outlines the recommended bulk plane standard and associated height recommendations.

Table 3.1: Recommended Standards by Zone District and Lot Width

	ZONE DISTRICT		
	R-1 R-2	R-3 R-4	R-5
HEIGHT STANDARDS			
Primary/Accessory Structure Height (max)	35'	35'	30'[1]
Primary/Accessory Structure Stories (max)	2 Stories	2 Stories	2 Stories[1]
Accessory Structure Height Outside Primary Structure Setbacks (max)[2]	21'	na[3]	na[3]
Accessory Structure Stories Outside Primary Structure Setbacks (max)[2]	1 Story	na[3]	na[3]
BULK PLANE STANDARDS			
Angle	40°	40°	40°
Standards for Front Lot Area			
Front Area Depth	42'	42'	na[4]
Starting Height Above Side and Rear Setback (Front Area)	21'	21'	na[4]
Standards for Rear Area (Remaining Lot Area)			
Starting Height Above Side and Rear Setback (Rear Area)	12.5'	12.5'	12.5'
Special Accessory Structure Bulk Plane Standard for R-1 and R-2[5]			
Starting Height Above Accessory Structure Side and Rear Setback	12.5'	na[2]	na[2]

[1]Note that existing covenants limit structures to one-story in height in the R-5 Zone District without special approval

[2]The maximum overall height for an accessory structure built outside of the minimum setbacks required for primary structures in R-1 and R-2. For example, in the R-1 zone district where the minimum side yard setback for primary structures is 50 feet and the minimum side yard setback for accessory structures is 25 feet, accessory structures with a side setback from 25 to 50 feet would be limited to a maximum overall height of 21 feet. Note that the maximum overall height for an accessory structure built within the minimum setbacks for the primary structure is the same as the maximum overall height for the primary structure.

[3]Not applicable in the R-3, R-4 and R-5 zone districts where accessory structures must be built within the minimum setbacks for the primary structure.

[4]Front lot area standards would not apply in the R-5 zone district.

[5]Special bulk plane standard for accessory structures built outside of the minimum primary structure setbacks in R-1 and R-2 See page 3-7.

Recommended Bulk Plane CONTINUED

Description

The recommended bulk plane rises at a 40˚ angle from a specified starting height above the minimum side and rear setbacks to a maximum overall building height of 30 (R-5) or 35 (R-1, R-2, R-3 and R-4) feet. In all zone districts excepts R-5, the bulk plane would have a two-story starting height at the front of the lot and a one-story starting height in the rear. In the R-5 zone district, the bulk plane would have a one-story starting height in both the front and the rear of the lot. The recommended bulk plane would not apply in the R-3A zone district.

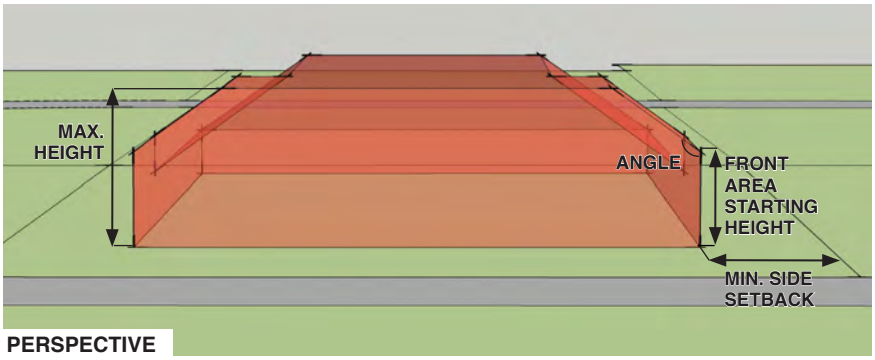
Figure 3.6: Summary of the Recommended Bulk Plane

	Bulk Plane Front Area R-1 R-2 R-3 R-4	R-5
Front Area Depth	42'*	na
Starting Height	21'	na
Angle	40°	na
Height (max)	35'	na
Stories (max)	2 Stories	na
Projected From	Side	na
Measured From	Setbacks	na

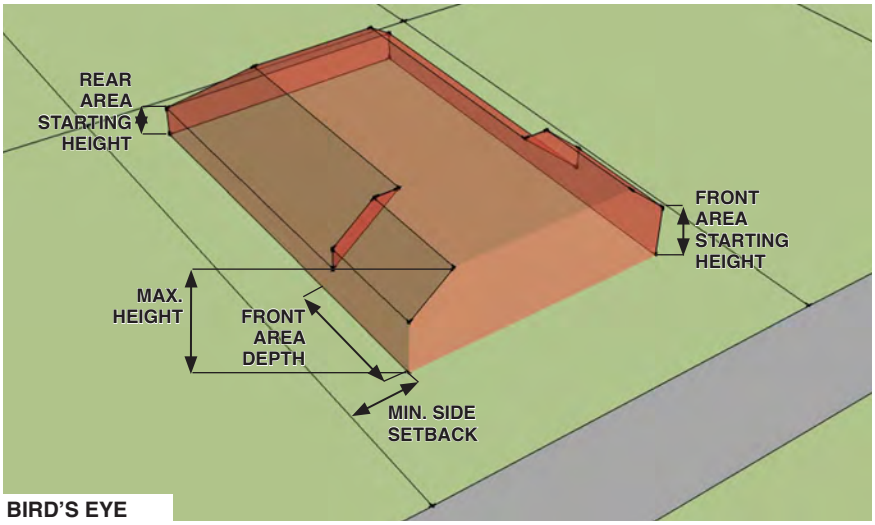
	Bulk Plane Rear Area R-1 R-2 R-3 R-4	R-5
Starting Height	12.5'	12.5'
Angle	40°	40°
Height (max)	35'	30'
Stories (max)	2 Stories	
Projected From	Side, Rear	
Measured From	Setbacks	

	Test Lot
Context	E
Zone District	R-3
Test Lot Size	38,850 sq. feet
Test Lot Width	155'

*As measured from front setback.



PERSPECTIVE



BIRD'S EYE

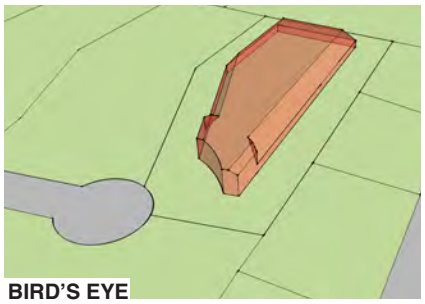
As illustrated in Context E (R-3), the recommended bulk plane starts at 21 feet above the minimum 25 foot setbacks in the front area (the first 42 feet of lot depth as measured from the front setback), and at 12.5 feet above the minimum side and rear setbacks in the rear area (the remaining depth of the lot) and continues towards the interior of the lot at a 40° angle until reaching the maximum overall height of 35 feet

RECOMMENDED BULK PLANE CONTINUED

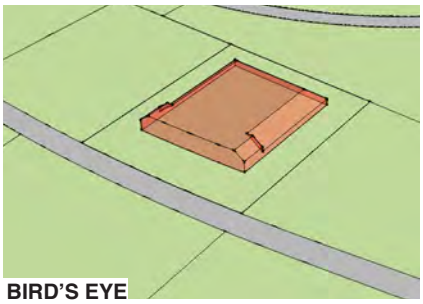
Variations by Context

The effect of the recommended bulk plane would vary depending on existing setbacks and lot sizes/shapes. The figure below illustrates the building envelope produced by the recommended bulk plane in each context. For Context G, existing regulations are illustrated because the recommended bulk plane would not apply in the R-3A Zone District.

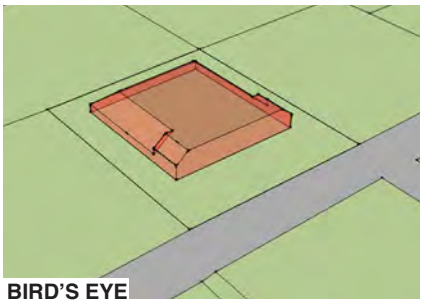
Figure 3.7: Recommended Bulk Plane Illustrated by Context



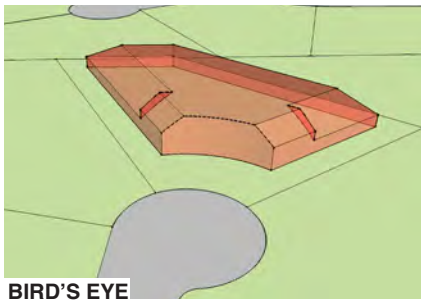
***Context A (R-1)**. Primary structures must fit within the illustrated bulk plane. Note that accessory structures may be built outside of the illustrated bulk plane as discussed on page 3-7.*



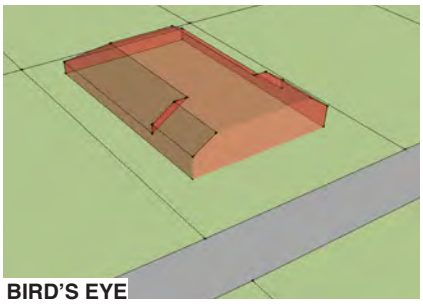
***Context B (R-1).** Primary structures must fit within the illustrated bulk plane. Note that accessory structures may be built outside of the illustrated bulk plane as discussed on page 3-7.*



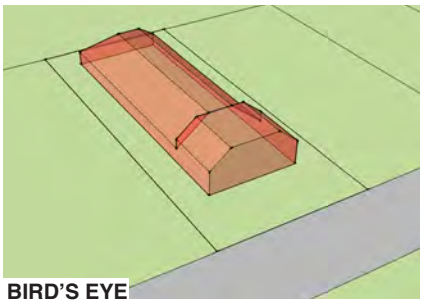
***Context C (R-2)**. Primary structures must fit within the illustrated bulk plane. Note that accessory structures may be built outside of the illustrated bulk plane as discussed on page 3-7.*



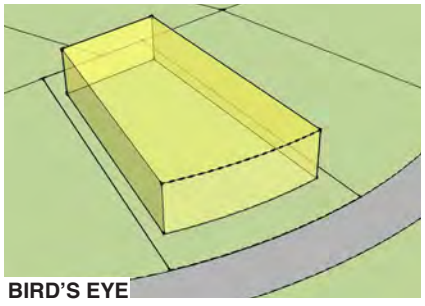
***Context D (R-3)**. All structures must fit within the illustrated bulk plane.*



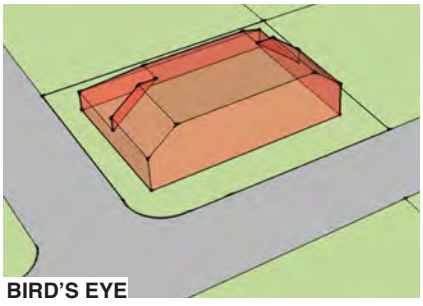
***Context E (R-3)**. All structures must fit within the illustrated bulk plane.*



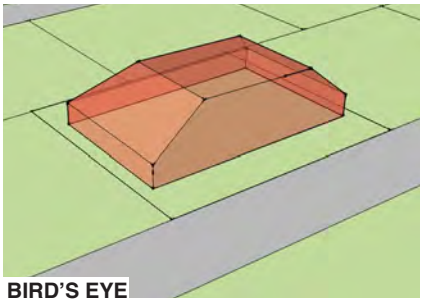
***Context F (R-3)**. All structures must fit within the illustrated bulk plane.*



***Context G (R-3A)**. A bulk plane standard is not recommended. The yellow building envelope illustrates existing height and setback standards.*



***Context H (R-4)**. All structures must fit within the illustrated bulk plane.*



***Context I (R-5)**. All structures must fit within the illustrated bulk plane. Note that the bulk plane is not divided into two areas as in the other contexts.*

RECOMMENDED BULK PLANE CONTINUED

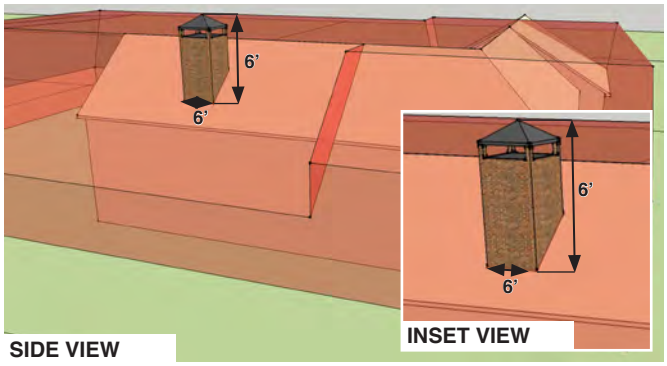
Recommended Exceptions

The recommended bulk plane standard includes exceptions for specific building elements to provide flexibility and promote a variety of building forms. Recommended standards for bulk plane exceptions are illustrated below. Note that building elements that fit within the bulk plane would not be subject to these standards (i.e., a dormer that does not project through the bulk plane would not be subject to a maximum width or minimum inset requirement and a gable roof end that does not project through the bulk plane would not be subject to a maximum width or height standard).

Figure 3.8: Bulk Plane Exceptions

Chimney/Wind Turbines/Antennae

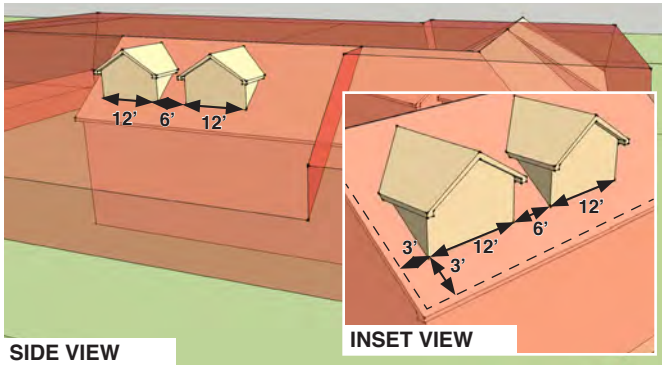
Max. Height Exception	6’
Max. Width	6’



Dormers

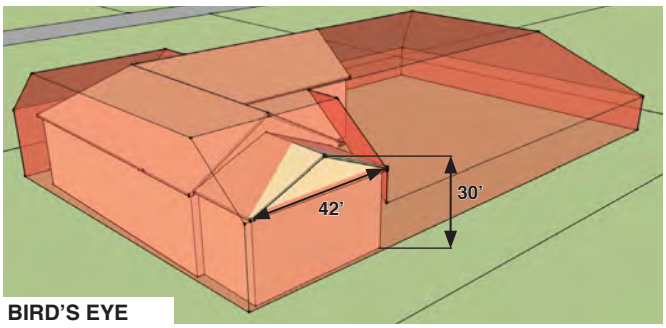
Max. Dormer Width	12’
Min. Width Between Dormers	6’
Max. Width All Dormers	50% of Roof Ridge Length
Min. Inset from Building Wall[1]	3’

[1]The minimum distance from the edge of a dormer to the point where a building wall meets the roof as indicated by the dashed line in the illustration at right.



Side-facing Gable Roof Ends

Max. Width	42’
Max. Height from Grade	30’
Number Allowed	1 per side



Recommended Bulk Plane CONTINUED

Special Accessory Structure Bulk Plane Standard for the R-1 and R-2 Districts

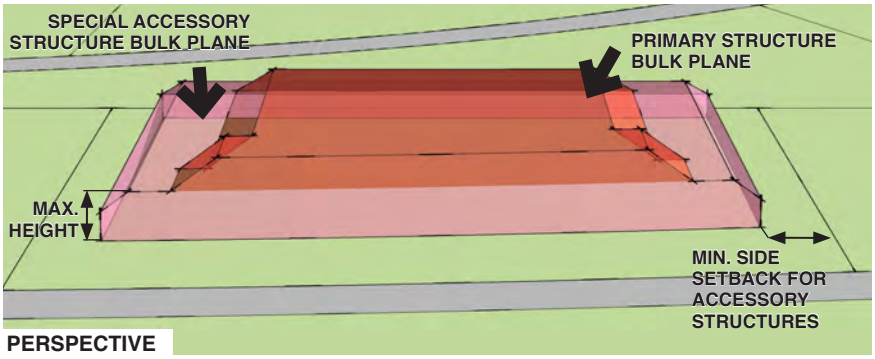
A special bulk plane standard is recommended to address accessory structures in the R-1 and R-2 Zoning Districts. The special bulk plane rises at a 40° angle from a 12.5 foot starting height above the minimum side and rear setbacks for accessory structures to a maximum overall height of 21 feet until it intersects the bulk plane for the primary structure. Accessory structures would be required to fit within the special accessory structure bulk plane or the primary structure bulk plane.

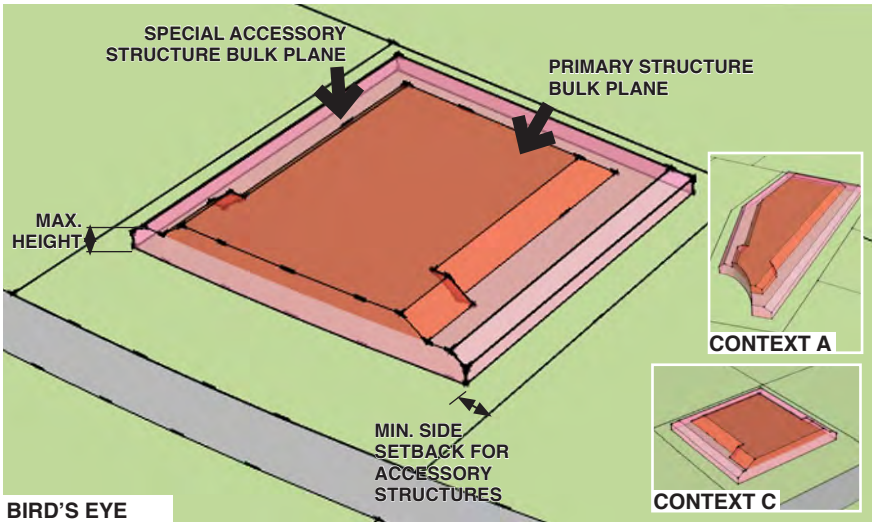
In the R-1 and R-2 Zone Districts, current regulations set forth minimum side and rear setbacks for accessory structures that differ from minimum setbacks for primary structures (the setbacks for primary and accessory structures are identical to each other in all other zone districts). Because the recommended bulk plane in R-1 and R-2 begins at the minimum setbacks for the primary structure, it would not apply to an accessory structure built at a reduced setback.

Figure 3.9: Special Accessory Structure Standards for the R-1 and R-2 Districts

	Accessory Structure Bulk Plane R-1 R-2
Starting Height	12.5’
Angle	40°
Max. Height	21’
Projected From	Side, Rear
Measured From	Min. Accessory Structure Setbacks

	Test Lot
Context	B
Zone District	R-1
Test Lot Size	99,560 sq. feet
Test Lot Width	290’





As illustrated in Context B (R-1), a special bulk plane standard would apply to accessory structures built outside of the minimum side and rear setbacks for the primary structure. Accessory structures would be required to fit within the recommended accessory structure bulk plane (pink) or the primary structure bulk plane (red).

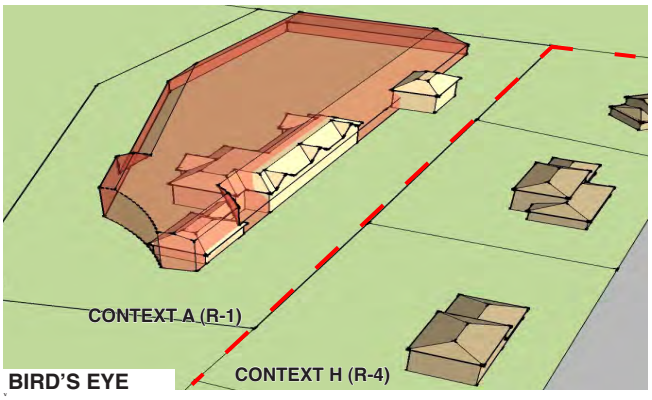
RECOMMENDED BULK PLANE CONTINUED

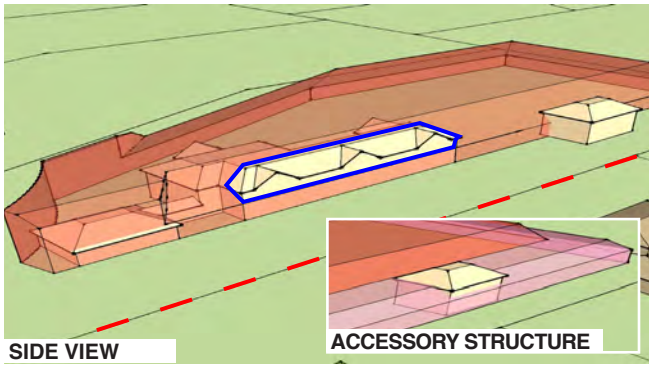
Relationship to Design of Current Trends Structures

The recommended bulk plane would accommodate most new construction in the R-1, R-2, R-3, R-4 and R-5 Zone Districts but would not permit structures with long, two-story walls located at or near the side setback. The figures below and on the following pages illustrate the effect of the recommended bulk plane on the design of structures in selected contexts (see Attachments G-H for illustrations in all contexts). Other than side-facing gable roof ends, portions of the illustrated structures that protrude from the transparent red building envelope would not be allowed.

Figure 3.10: Design Impact of Recommended Bulk Plane in Context A (R-1)

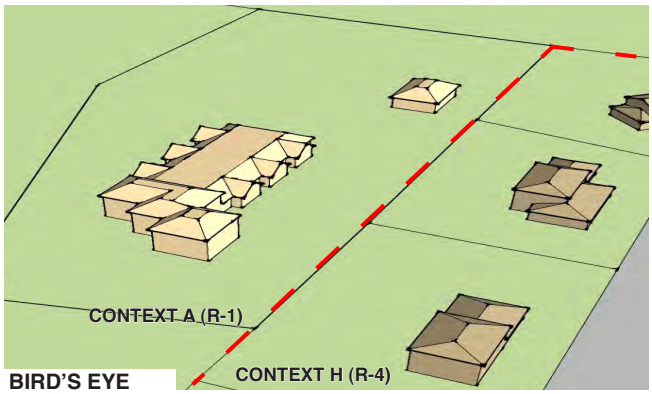
Recommended Bulk Plane Applied to Current Trends Structure

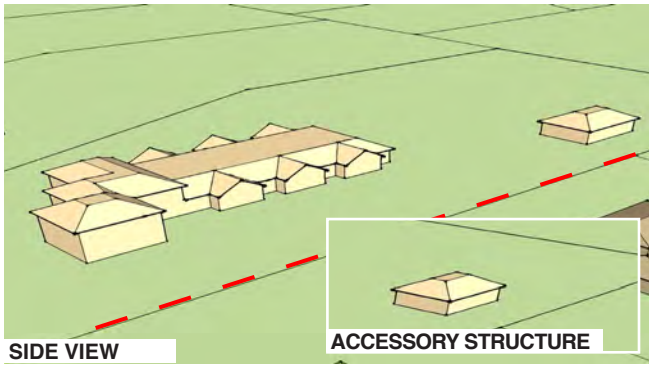




Not Permitted by Recommended Bulk Plane: *As illustrated in Context A (R-1), the bulk plane would allow the two-story portion of the 9,000 sq. foot structure illustrated above at the side setback towards the front of the lot, including the gable roof end. The standard would not allow the blue highlighted portion of the structure which protrudes through the bulk plane or the pink highlighted portion of the accessory structure that protrudes through the special accessory structure bulk plane for the R-1 and R-2 Zone Districts.. See Attachment H for side-by-side illustrations of current trends structures within the recommended bulk plane in all contexts.*

Current Trends Structure Redesigned to Fit within Recommended Bulk Plane



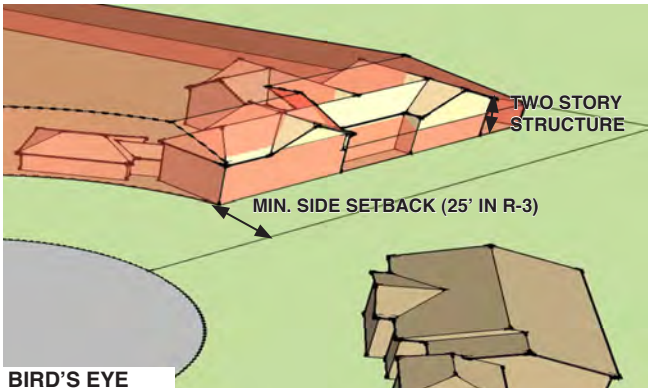


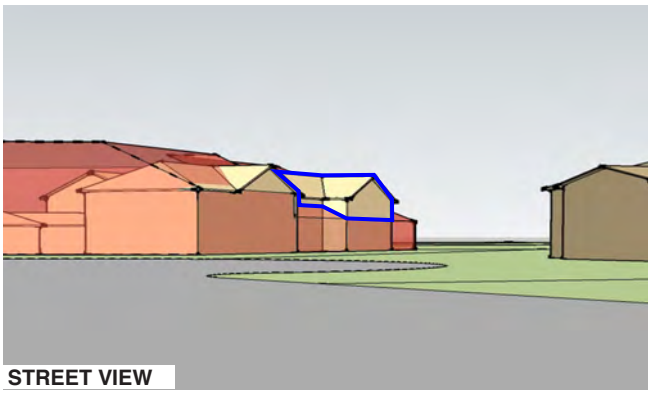
Permitted by Recommended Bulk Plane: *The 9,000 sq. foot structure illustrated above has been redesigned to fit within the recommended bulk plane, requiring an increased side setback for the two-story element in the rear area of the lot and a reduced height for the accessory structure built outside of the primary structure setbacks. See Attachment I for side-by-side illustrations of re-designed current trends structures that fit within the recommended bulk plane in all contexts.*

RECOMMENDED BULK PLANE CONTINUED

Figure 3.11: Design Impact of Recommended Bulk Plane in Context D (R-3)

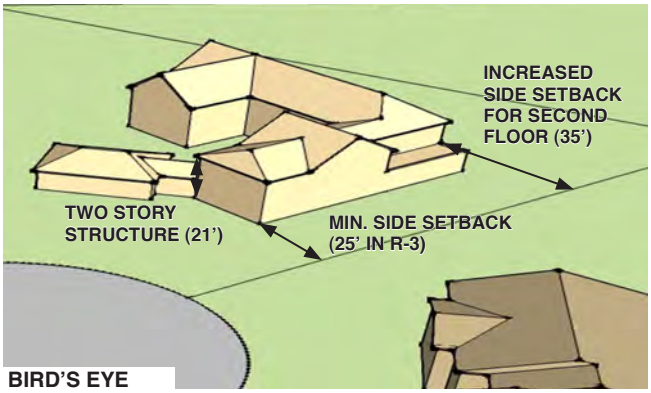
Recommended Bulk Plane Applied to Current Trends Structure

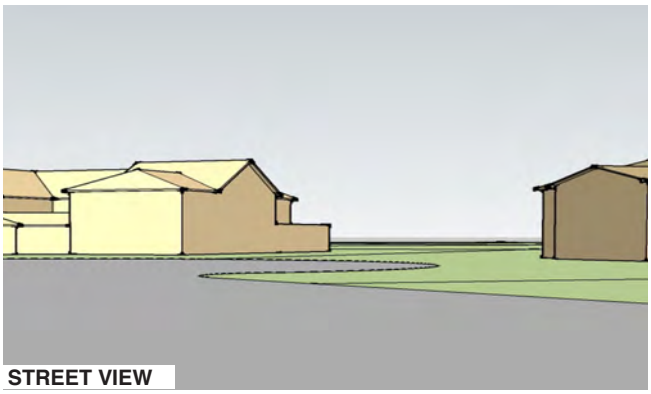




Not Permitted by Recommended Bulk Plane: *As illustrated in Context D (R-3), the bulk plane would allow the two-story portion of the 9,000 sq. foot structure illustrated above at the side setback towards the front of the lot, including the gable roof end. The standards would not allow the blue highlighted portion at rear of the structure that protrudes through the bulk plane. See Attachment G for side-by-side illustrations of current trends structures within the recommended bulk plane in all contexts.*

Current Trends Structure Redesigned to Fit within Recommended Bulk Plane



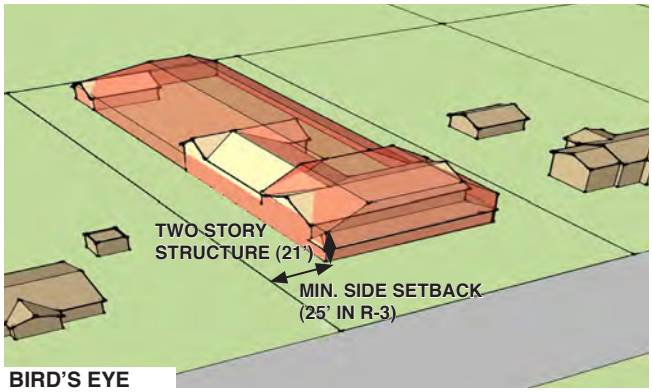


Permitted by Recommended Bulk Plane: *The 9,000 sq. foot structure illustrated above has been redesigned to fit within the recommended bulk plane, requiring an increased side setback for the two-story element in the rear area of the lot. See Attachment H for side-by-side illustrations of re-designed current trends structures that fit within the recommended bulk plane in all contexts.*

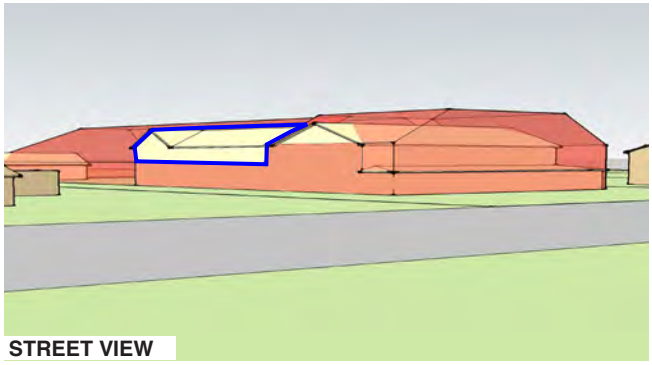
RECOMMENDED BULK PLANE CONTINUED

Figure 3.12: Design Impact of Recommended Bulk Plane in Context F (R-3)

Recommended Bulk Plane Applied to Current Trends Structure



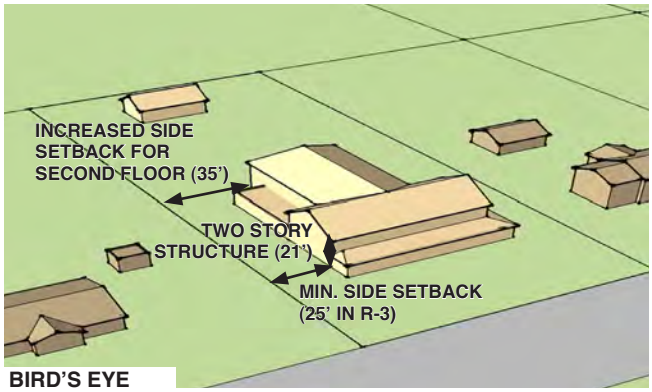
BIRD'S EYE



STREET VIEW

Not Permitted by Recommended Bulk Plane: *As illustrated in Context F (R-3), the bulk plane would accommodate a two-story structure built at the side setback towards the front of the lot, including the gable roof end. However, the highlighted portions of the 9,000 sq. foot structure illustrated above that protrude through the bulk plane toward the rear of the lot would not be allowed.*

Current Trends Structure Redesigned to Fit within Recommended Bulk Plane



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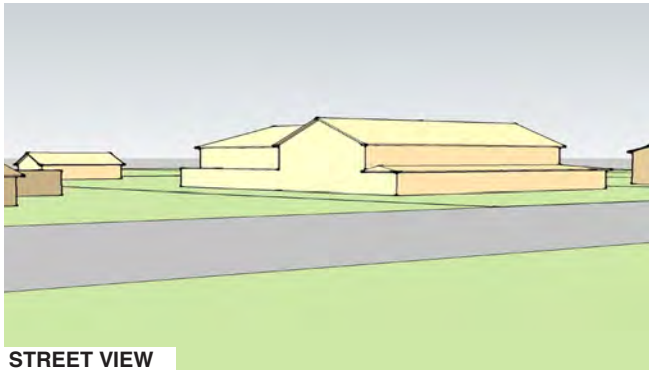


STREET VIEW

Permitted by Recommended Bulk Plane: *The 9,000 sq. foot structure illustrated above has been redesigned to fit within the recommended bulk plane, requiring the side wall to step down to one story at the side setback in the rear area of the lot.*

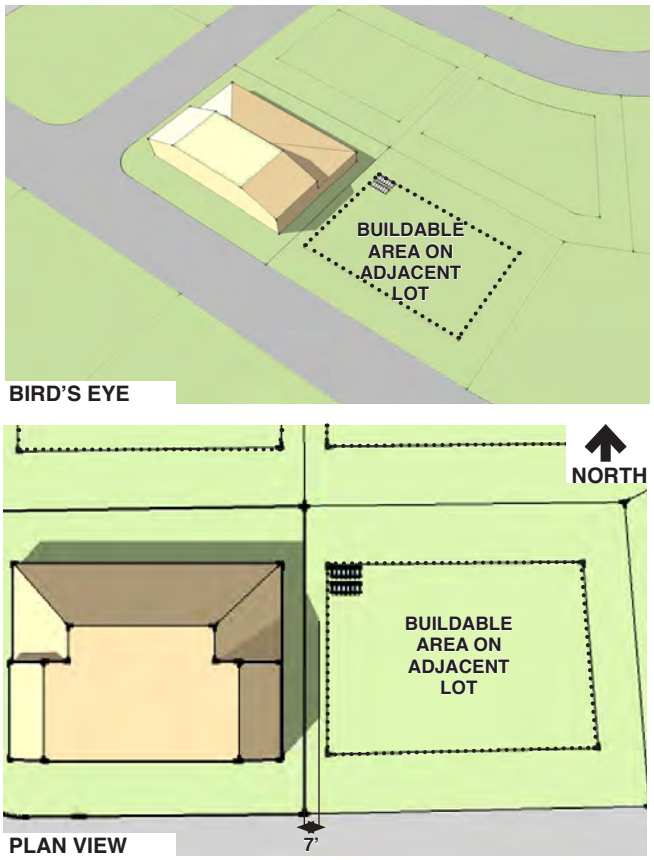
Recommended Bulk Plane CONTINUED

Solar Access and Shading

Potential solar access and shading impacts are an important consideration. The figure below illustrates the maximum potential shadow cast at the fall/spring equinox and winter solstice by a structure built to the limits of the recommended bulk plane in Context H (R-4 Zone District). Potential shading impacts are greatest in the R-4 Zone District because the minimum side setback for structures may be as low as 10 feet (as illustrated). Potential shading impacts are more limited in all other zone districts. Attachments E-F provide side-by-side comparisons of shading impacts possible under current regulations and at different bulk plane angles.

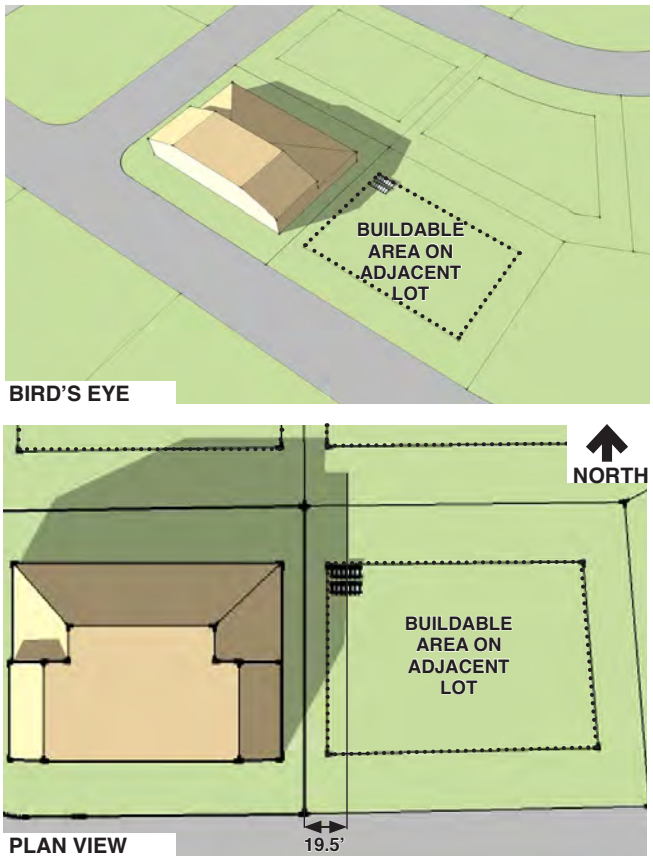
Figure 3.13: Shading Impacts of the Recommended Bulk Plane in Context H (R-4)

Fall/Spring Equinox - 2 pm.



As illustrated in Context G (R-4), a structure built to the limits of the recommended bulk plane would cast a shadow about 7 feet into the side setback area of an adjacent lot to the east at 2 pm. on the spring or fall equinox. No shadow would be cast into the area where structures or solar collection systems could be located on the adjacent lot. See Attachment E for side-by-side illustrations of shading impacts of alternative bulk plane angles on the fall/spring equinox.

Winter Solstice - 2 pm.

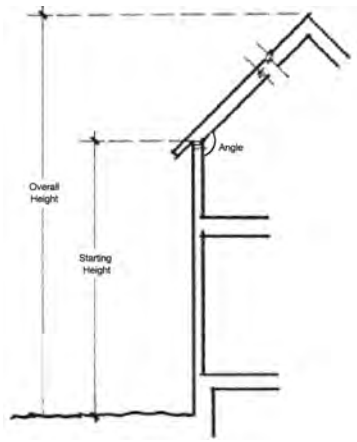


As illustrated in Context G (R-4), a structure built to the limits of the recommended bulk plane would cast a shadow about 19.5 feet onto an adjacent lot to the east at 2 pm. on the winter solstice. About 9.5 feet of shadow would be cast into the area where structures or solar collection systems could be located towards the rear of the adjacent lot. See Attachment F for side-by-side illustrations of shading impacts of alternative bulk plane angles on the summer solstice.

Recommended Bulk Plane CONTINUED

Elements of the Recommended Bulk Plane

The recommended bulk plane is composed of a series of inter-related height and bulk plane standards as summarized in Table 3.1 on page 3-3. Each standard promotes objectives for residential additions and new construction as described below.



The starting height for a bulk plane determines how tall the portion of a structure may be where the bulk plane begins. A pitched roof may then follow the bulk plane angle until reaching the maximum overall height.

Reshaping the Building Envelope

The recommended bulk plane reduces permitted height near the minimum side and rear setbacks, while allowing greater height toward the center of a lot, as illustrated in Figure 3.14 on page 3-13.

As a result, the building envelope steps down near the edges of a lot, but is expanded towards the center. For example, on a 156 foot wide, 245 foot deep lot in the R-3 Zone District, permitted height is reduced by up to 17.5 feet on 43% of the buildable area of the lot, while it is increased by up to 5 feet on the remaining 58%. On a 130 foot wide, 144 foot deep lot in R-4, permitted height is reduced by up to 17.5 feet on 50% of the lot while it is increased by up to 5 feet on the remaining 50%.

Bulk Plane Starting Height

This is the height above ground where the bulk plane begins. In all zone districts except R-5, the recommended starting height is 21 feet (two-stories) above the minimum side setbacks near the front of the lot, and 12.5 feet (one-story) above the minimum side and rear setbacks towards the rear of the lot. Allowing a two-story building height towards the front of a lot reduces the potential for existing structures to become non-conforming. Newer structures with taller floor-to-floor heights would require increased setbacks to fit within the recommended bulk plane as summarized in Figure 3.14 on page 3-13.

Measuring the bulk plane from a point above the current minimum setbacks promotes a one or two-story height for buildings that are built as close to the edges of their lots as is possible under current regulations.

Maximum Overall Height

The maximum height allowed on a site closely interacts with the bulk plane to produce the building envelope. In all districts except R-5, the recommended maximum overall height is 35 feet; this allows two-story structures with taller floor-to-ceiling heights while discouraging shallow or “squashed” roof forms as illustrated in Figure 3.15 on page 3-13. Increasing overall height also allows greater building mass towards the center of a lot, helping to compensate for the effect of the bulk plane. The recommended bulk plane requires increased setbacks for taller building elements, as summarized in Figure 3.14 on page 3-13.

Bulk Plane Angle

This is the angle of the bulk plane projecting from the starting height towards the center of the lot. The recommended angle is 40° to promote a diverse range of roof pitches while reducing the potential for existing structures to become non-conforming.

Front Area Depth

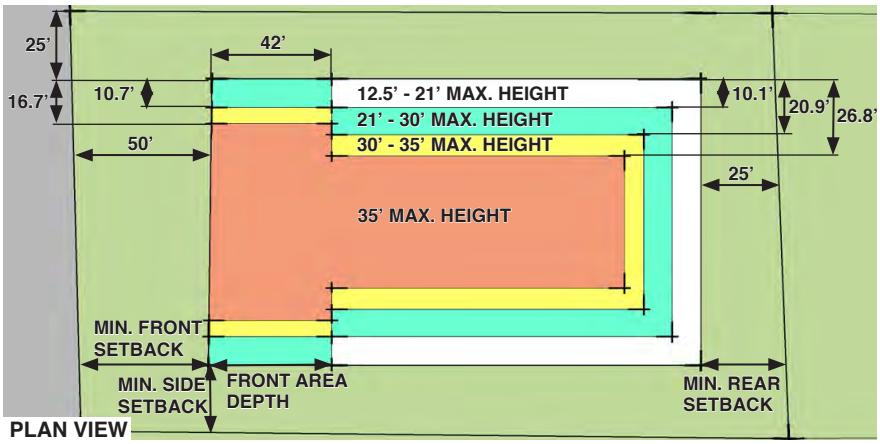
This is the depth of the front lot area where a two story-building would be allowed in all zone districts except R-5. It is measured from the minimum front setback. The recommended depth is 42 feet, which would accommodate traditional two-story wall lengths throughout the city.

Recommended Bulk Plane CONTINUED

Figure 3.14: Relationship of Permitted Height to Side and Rear Setbacks

Bulk Plane Front Area	
Primary Structure Height (max)	Req. Distance from Side/Rear Setback
21’	0’
30’	10.7’
35’	16.7’

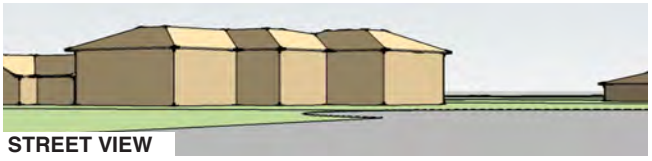
Bulk Plane Rear Area	
Primary Structure Height (max)	Req. Distance from Side/Rear Setback
12.5’	0’
21’	10.1’
30’	20.9’
35’	26.8’



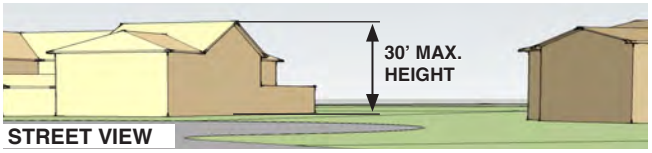
Context E (R-3). *The recommended bulk plane pushes taller building elements towards the center of the lot. The areas shown in red and yellow (58% of the buildable area of the lot) would allow a maximum overall height of 30 feet or more.*

Figure 3.15: Comparison of Existing 30 Foot Maximum Overall Height to Recommended 35 Foot Maximum Overall Height

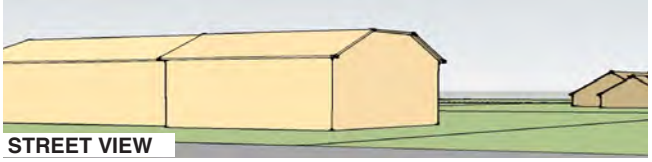
Maximum Overall Height of 30 Feet



Context A (R-1)*. Roof forms on large homes may be very shallow or “squashed” at 30 feet of overall height.*

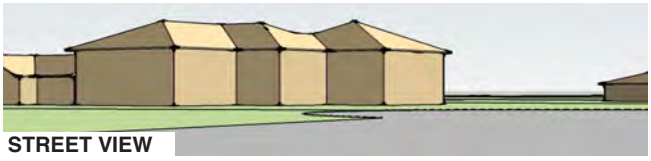


Context D (R-3)*. A two-story home with a sloped roof would typically allow floor-to-celing heights of about 9.5 feet* on each floor at 30 feet of overall height.*

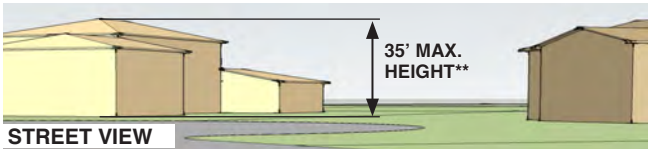


Context E (R-3)*. Roof forms on large homes may be very shallow or “squashed” at 30 feet of overall height.*

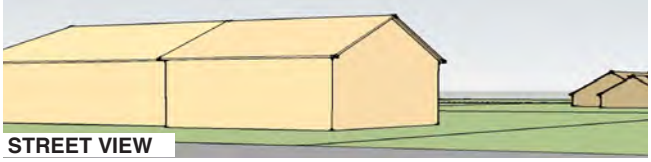
Maximum Overall Height of 35 Feet



Context A (R-1)*. Roof forms on large homes may be steeper or have a taller attic area at 35 feet of overall height.*



Context D (R-3)*. A two-story home with a sloped roof would typically allow floor-to-celing heights of about 12.5 feet* on each floor at 35 feet of overall height.***

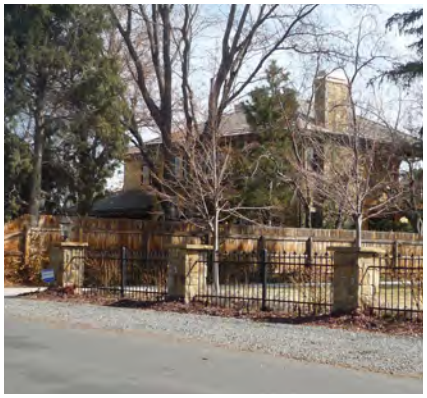


Context E (R-3)*. Roof forms on large homes may be steeper or have a taller attic area at 35 feet of overall height.*

*Accounts for a raised first floor and utility space between floors. **To fit within the recommended bulk plane, the portion of the structure with taller floor-to-celing heights would have to incorporate an additional setback as illustrated.

Implementation of the Recommended Bulk Plane

The recommended bulk plane would be implemented by zone district, with some variation occurring between individual districts. A bulk plane would apply on all lots in the R-1, R-2, R-3, R-4 and R-5 Zone Districts and would not apply on any lots in the R-3A Zone District. Standards would be the same for all lots in the R-1, R-2. R-3 and R-4 Zone Districts with the exception of a special accessory structure bulk plane standard in R-1 and R-2. Standards for all lots in the R-5 Zone District would vary from standards in other zone districts.



Although the same bulk plane standard would apply in diverse contexts, its practical application would be influenced by variations in lot shape and minimum setback standards.

Responding to Context

The implementation approach for the recommended bulk plane allows standards to vary for different zone districts. It does not, however, allow standards to vary by neighborhood or lot. Although existing context varies throughout Cherry Hills Village, an evaluation of potential bulk plane standards indicates that a bulk plane standard that varies only by zone district can address issues and promote objectives for new construction while allowing sufficient flexibility for property owners.

As described in Parts 1 and 2 of this report, potential bulk plane standards were evaluated in a range of different neighborhood contexts including a variety of lot shapes and sizes. This evaluation included development of preliminary bulk plane standards that would best address conditions in each context. Because such context-specific standards included only minor variations, (i.e., a 45 foot front area depth for the bulk plane would be appropriate for Context A while a 40 foot depth would be appropriate for Context E), it was determined that a more generalized standard could apply to a range of contexts. This more generalized standard is reflected in the recommended bulk plane, (i.e., the recommended 42 foot front area depth that applies in all contexts). Although the same bulk plane standard would apply in diverse contexts, its practical application would be influenced by variations in lot shape and current minimum setback standards.

Additional discussion of bulk plane variations is included in the description of bulk plane alternatives in Part 2 of this report. The discussion of bulk plane variables on page 5 also provides background for an understanding of how the recommended bulk plane responds to existing context in Cherry Hills Village.

Integrating with Existing and Future Standards

The recommended bulk plane is designed to work with existing zoning standards such as minimum setbacks and future zoning standards such as the Floor Area Ratio (FAR) standard recommended by the Residential Development Standards Committee.

Combining Bulk Plane and Floor Area Ratio Standards

Many communities across the country use a combination of bulk plane and FAR standards. While a bulk plane standard helps to reduce looming impacts adjacent to neighbors, a FAR standard helps reduce the impact of overall mass and promote diverse building forms. Used in combination, bulk plane and FAR standards promote diverse, appropriately-scaled building forms that step down towards smaller-scale neighbors.

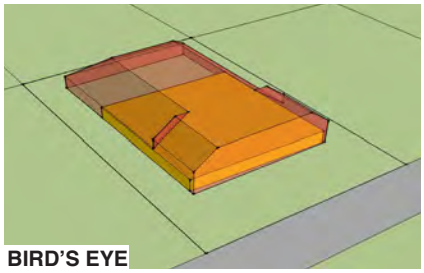
When using a combination of bulk plane and FAR standards, it is useful to illustrate the relationship between the maximum building size allowed by the FAR standard and the maximum building envelope allowed by the bulk plane standard. The general relationship between the recommended bulk plane and a hypothetical 0.30 FAR standard is illustrated at right. Note that the preliminary maximum FAR standard recommended by the Residential Development Standards Committee varies from 0.23 to 0.27 depending on the zone district.

Floor Area Ratio

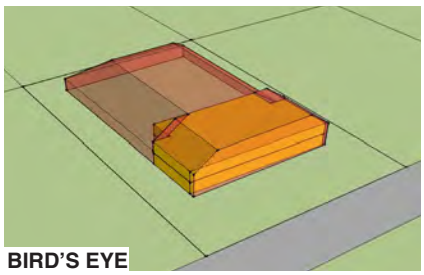
Floor Area Ratio (FAR) is the ratio of floor area to lot size calculated by dividing building square footage by lot size.

A combination of the recommended bulk plane and a hypothetical 0.30 FAR standard is illustrated below on a 38,850 square foot lot in Context E (R-3). The building envelope produced by the recommended bulk plane is shown in red, while the orange block shapes represent the maximum 11,655 square feet of floor area allowed by the FAR standard.

Each of the three model images below demonstrates a different configuration for the maximum allowed floor area to illustrate possible interaction between the recommended bulk plane and a future FAR standard.



BIRD'S EYE



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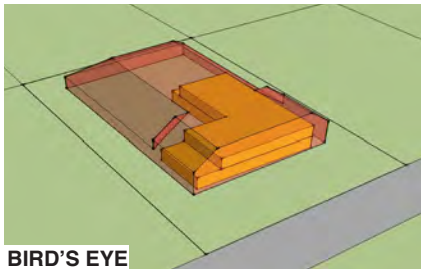

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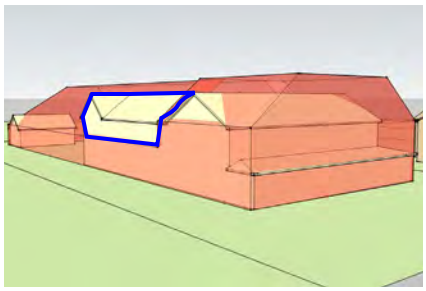


Some newer structures have two-story walls at or near the minimum side setback that would not conform with the recommended bulk plane in the rear area of the lot. The blue highlighted portion at rear of the structure above would be non-conforming.

Non-Conforming Structures

When a structure does not comply with one or more zoning standards, it is considered "non-conforming." Some existing structures may not conform with all current zoning standards, (i.e., an existing house may not meet one or more minimum setback standards or may include elements that do not meet the maximum height standard). If zoning standards are changed, additional existing structures may become non-conforming with the new or revised standards. While non-conforming structures are allowed to remain, restrictions may apply to their expansion or replacement.

It is important to identify any issues or implications related to non-conforming structures which may result if a bulk plane standard is implemented. Although the recommended bulk plane has been specifically calibrated to reduce potential non-conformity, some existing structures would not conform with the new standard.

Overall Rate of Conformity

A survey of sample lots in each zone district indicates that over 90% of properties would conform with the recommended bulk plane standard. A large majority of the properties that would not conform include structures built within the last 20 years. The rate of potential non-conformity appears to be highest in the R-1 Zone District (Context A-B) and on small or narrow lots in the R-3 Zone District (Context F). The rate of potential non-conformity is very low in the R-2 and R-5 Zone Districts (Contexts H-I).

Most existing structures in Cherry Hills Village would conform with the recommended bulk plane standard.

Non-conformity is most likely to occur under the following conditions:

- Some newer (built within the last 20 years) structures have two-story walls at or near the minimum side setback that would not conform with the bulk plane in the rear area of the lot. This occurs most often on small, narrow or shallow lots in the R-3 Zone District (Context F), but also occurs on some lots in the R-1 and R-4 Zone Districts (Contexts A, B and H).
- Some newer accessory structures that are built outside of the primary structure setbacks in the R-1 Zone District would not conform with the special accessory structure bulk plane for the R-1 and R-2 Districts (Context A-B).

Some large new homes in Context A (R-1) have longer two-story walls near the minimum side setback that do not conform with the recommended bulk plane standard. The two-story wall illustrated above is built at the minimum side setback for the primary structure and does not fit within the front area of the bulk plane.

Non-conformity may also sometimes occur under the following conditions:

- A limited number of newer structures have walls at or near the minimum side setback that would not conform with the bulk plane in the front area of the lot. This occurs most often with large structures in the R-1 Zone District (Contexts A-B) ,but also occurs on some lots in the R-2, R-3 and R-4 Zone Districts (Contexts B-I).
- A very limited number of traditional (more than 20 years old) structures have two-story walls at or near the minimum side setback that would not conform with the bulk plane in the rear area of the lot.

Some newer homes on the narrow lots in Context F (R-3) have longer two-story walls near the minimum side setback that do not conform with the recommended bulk plane standard. The two-story wall illustrated above is built at the minimum side setback and does not fit within the front area of the bulk plane.

Rate of Conformity for New Construction

A survey of properties with structures built or significantly expanded between 2005 and 2009 indicates that around 70% of such properties would conform to the recommended bulk plane standard. The table below provides additional detail by zone district.

The rate of conformity for properties with new construction is lower than that for all properties because many newer structures are larger and taller than structures built in earlier decades. When larger structures are built on small or narrow lots (which has most commonly occurred in the R-3 Zone District), they are more likely to have long, two-story walls at or near minimum side and rear setbacks, which would not conform with the recommended bulk plane standard.

Table 3.2: Rate of Conformity for New Construction and Additions 2005-2009 by Zone District

	ZONE DISTRICT					
	R-1	R-2	R-3	R-4	R-5	All
Total Properties with New Const.	29	9	27	5	2	72
Conforming Properties w/ New Const.	23[1]	8	13[2]	5	2	51
% Conforming Properties w/ New Const.	79%	89%	48%	100%	100%	71%

[1]Note that non-conforming properties include two cases where an accessory structure built outside of the primary structure setbacks would not conform with the special accessory structure bulk plane for R-1 and R-2.

[2]Note that most non-conforming properties in R-3 are located in Contexts D and F. None of the three properties with new construction surveyed in Context F would conform with the recommended bulk plane standard.

Potential Adjustments to the Recommended Bulk Plane

The recommendations provided in this chapter are based on the criteria presented on page 5-2 and support the goals and objectives for new construction and additions in residential neighborhoods. It may be possible, however, to make adjustments to the recommended standards while maintaining their overall function and intent. Several potential adjustments are described below.

Potential Adjustments to Maximum Overall Height

The recommended increase in maximum overall height described and illustrated on pages 3-12 and 3-13 could be removed or adjusted. Potential adjustments could be prompted by significant resident or City Council concern regarding increased height limits, or by actions that are considered to make a change to the height limit unnecessary. Potential adjustments could include:

- Maintaining the current 30 foot overall maximum height limit in all zone districts
- Maintaining the current 30 foot overall maximum height limit in the R-4 Zone District where smaller lots and lower minimum setbacks provide limited separation between neighbors
- Increasing the overall height limit to 35 feet only in the R-1 and R-2 Zone Districts where existing minimum setback standards and large lots provide significant separation between neighbors

Potential Adjustments to the Bulk Plane Angle

The recommended bulk plane angle could be adjusted to address significant resident, architect or builder concerns. Potential adjustments could include:

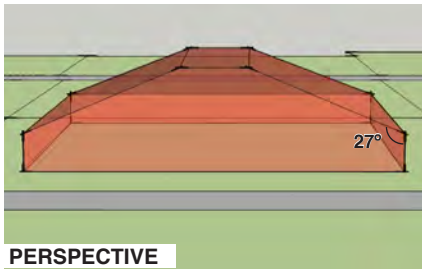
- Using a 27˚ angle to encourage shallow roof pitches or push taller building elements further towards the center of the lot. Note that Bulk Plane Alternative 1 and 2 described in Chapter 2 illustrate a 27˚ angle.
- Using a 45˚ angle to increase flexibility and allow for simplified bulk plane calculations

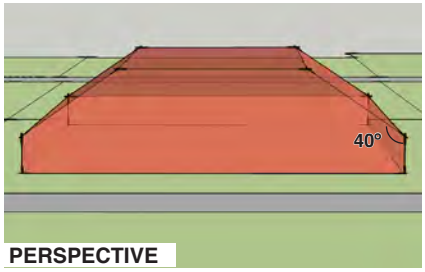
It is important to note that potential adjustments to the bulk plane angle would interact with any changes to maximum overall height. (I.e., a steeper bulk plane angle of 45˚ combined with maintenance of the existing 30 foot overall height limit could encourage flattened or mansard roof forms as illustrated by the left-column diagrams in Figure 3.15 on page 3-13) Alternative bulk angles are illustrated at right.

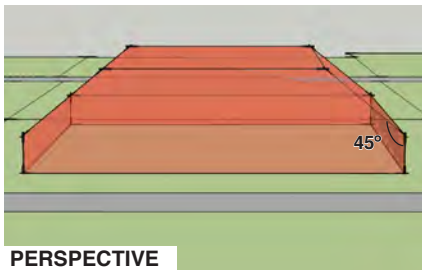
The recommended increase in maximum permitted overall height would allow additional flexibility for sloped roofs on larger homes.

Alternative Bulk Plane Angles

The angle of the bulk plane determines how far taller buildings must be set back from the edges of the lot and promotes particular roof forms. A 27° angle is used in the alternatives presented in Chapter 2. The recommended bulk plane uses a 40˚ angle.







Next Steps

This report will be presented to City Council for discussion. With Council direction, City Staff will then work with the Planning and Zoning Commission to prepare a bulk plane ordinance. The Planning and Zoning Commission and City Council will consider the ordinance in a series of public hearings.

Other Potential Adjustments

Additional potential adjustments could include:

- Development with a low floor area ratio (FAR) could be exempted from the bulk plane (assuming a future FAR standard).
- Exceptions to the bulk plane could be added or adjusted (i.e., the permitted width of dormers that project through the bulk plane could be changed).
- Minor adjustments could be made to the recommended bulk plane dimensions (i.e., the front area depth could be adjusted or bulk plane starting heights could be slightly increased or decreased).
- A one-part bulk plane could be used in the R-1 and/or R-2 Zone Districts.