SOLAR LIGHT REFLECTIVITY STUDY

TALLAWONG STATION PRECINCT SOUTH, ROUSE HILL

WD965-03F02(REV1)- SR REPORT

APRIL 16, 2020

Prepared for:

Deicorp Projects (Tallawong Station) Pty Ltd

Level 4, 161 Redfern Street

Redfern, NSW 2016

WINDTECH Consultants Pty Ltd
Head Office: 607 Forest Road, Bexley, NSW 2207, Australia
P +61 2 9503 0300 **E** reception@windtechglobal.com **W** www.windtechconsult.com

Sydney | Dubai | London | Melbourne | Mumbai | New York | Hong Kong | Singapore

DOCUMENT CONTROL

Date	Revision History	Issued Revision	Prepared By (initials)	Instructed By (initials)	Reviewed & Authorised by (initials)
April 14, 2020	Initial.	0	TH/BT/IM	SWR	TH
April 16 2020	Updated title.	1	TH/BT/IM	SWR	TH

The work presented in this document was carried out in accordance with the Windtech Consultants Quality Assurance System, which is based on International Standard ISO 9001.
This document is issued subject to review and authorisation by the Team Leader noted by the initials printed in the last column above. If no initials appear, this document shall be considered as preliminary or draft only and no reliance shall be placed upon it other than for information to be verified later.
This document is prepared for our Client's particular requirements which are based on a specific brief with limitations as agreed to with the Client. It is not intended for and should not be relied upon by a third party and no responsibility is undertaken to any third party without prior consent provided by Windtech Consultants. The information herein should not be reproduced, presented or reviewed except in full. Prior to passing on to a third party, the Client is to fully inform the third party of the specific brief and limitations associated with the commission.

EXECUTIVE SUMMARY

This report presents the results of a detailed study for the effect of potential solar glare from the proposed Tallawong Station Precinct South development located at 1-15 & 2-12 Conferta Avenue, Rouse Hill. This study identifies any possible adverse reflected solar glare conditions affecting motorists, pedestrians, and to occupants of neighbouring buildings. If necessary, recommendations are made to mitigate any potentially adverse effects. This study assesses compliance with the controls for solar glare from the State Environmental Planning Policy No. 65 (SEPP65, Part 04 (Designing the Building) for Amenity), which contains the Apartment Design Guide (ADG), and the Secretary's Environmental Assessment Requirements (SEARs) requirement for Visual and Amenity Impacts.

The results of the study indicate that, to avoid any adverse glare to motorists and pedestrians on the surrounding streets, occupants of neighbouring buildings, and to comply with the abovementioned planning control requirements, the following limitations to the maximum normal specular reflectance of visible light of the external façade glazing is recommended:

- Main building façade glazing (ie: windows):
    - Building 1A.1 – Western aspect main building façade: 11%.
    - Building 1A.2 – Western aspect main building façade: 11%.
    - Building 1B.1 – Western aspect main building façade: 11%.
    - Building 1B.2 – Western aspect main building façade: 11%.
    - Building 2A.1 – Western aspect main building façade: 11%.
    - Building 2C.1 – Western aspect main building façade: 11%.
    - Building 2C.2 – Eastern aspect main building façade: 11%.
    - Building 2D.1 – Western aspect main building façade: 11%.
    - Building 2E.1 – Eastern aspect main building façade: 11%.
- Balustrade glazing:
    - Building 1A.1 – Western aspect balustrades: 8%.
    - Building 1A.2 – Western aspect balustrades: 8%.
    - Building 1B.1 – Northern curved and Western aspect balustrades: 8%.
    - Building 1B.2 – Western aspect balustrades: 8%.
    - Building 2A.1 – Western aspect balustrades: 8%.

- Building 2C.1 – Western aspect balustrades: 8%.
- Building 2C.2 – Eastern aspect balustrades: 8%.
- Building 2D.1 – Western aspect balustrades: 8%.
- Building 2E.1 – Eastern aspect balustrades: 11%.

- All other glazing (windows and balustrades) should have a maximum normal specular reflectance of visible light of 20%.

It should be noted that the most reflective surface on the façade of a building is the glazing. Reflected solar glare from concrete, brickwork, timber, etc. is negligible (i.e. less than 1% normal specular reflectance) and hence will not cause any adverse solar glare effects. Note also that, for any painted or powder-coated metallic surfaces on the exterior façade of the development, the maximum normal specular reflectance of visible light for those types of surfaces is in the range of 1% to 5%, which is well within the abovementioned limit.

Hence, with the incorporation of the abovementioned recommendations, the results of this study indicate that the subject development will not cause adverse solar glare to motorists or pedestrians in the surrounding area, or to occupants of neighbouring buildings, and will comply with the planning controls regarding reflectivity from SEPP65 and the Secretary's Environmental Assessment Requirements (SEARs) requirement for Visual and Amenity Impacts.

CONTENTS

1 GLARE OBSERVED BY MOTORISTS

1.1 Methodology

The reflectivity analysis of the subject development has been carried out using the technique published by Hassall (1991). The limiting veiling luminance of 500 cd/m^2 for the comfort of motorists, as suggested in Hassall (1991), has been adopted as a basis of assessing the glare impact from the subject development.

The various critical glazed aspects of the development were determined and are shown in Figure 1. Solar charts for each of these critical glazed aspects are presented in Appendix B, and these are used to derive the check zones which are shown in Figure 2. The solar chart of each critical aspect is determined from the standard sun chart of the region, provided in Appendix C (Phillips, 1992), using the method detailed in Hassall (1991). The check zones highlight the areas that are potentially affected by solar reflections from each critical glazed aspect. It should be noted that the check zones shown in Figure 2 do not take into account the effect of overshadowing by neighbouring buildings or the shielding effect of any existing trees or other obstructions. These effects are examined in the detailed analysis described in Section 1.2 of this report.

Study point locations are selected within the check zone areas where motorists are facing the general direction of the subject development (within ±10° of the direct sight-line). These are shown in Figure 2, and summarised in Table 1. Computer generated images or photographs using a calibrated camera, have been taken from the viewpoint of motorists at each study point location. A scaled glare protractor has been superimposed over each viewpoint image.

The glare protractor is used to assess the amount of glare likely to be caused and to provide a direct comparison with the criterion of 500 cd/m^2. Alternatively, the glare protractor can be used to determine the maximum acceptable reflectivity index of the façade material of the development for the glare to be within the criterion of 500 cd/m^2, to ensure that solar glare will not cause discomfort or threaten the safety of motorists and hence to enable the subject development to comply with the relevant planning control requirements regarding solar light reflectivity.

Figure 1: Critical Glazed Aspects of the Development (typical plan shown)

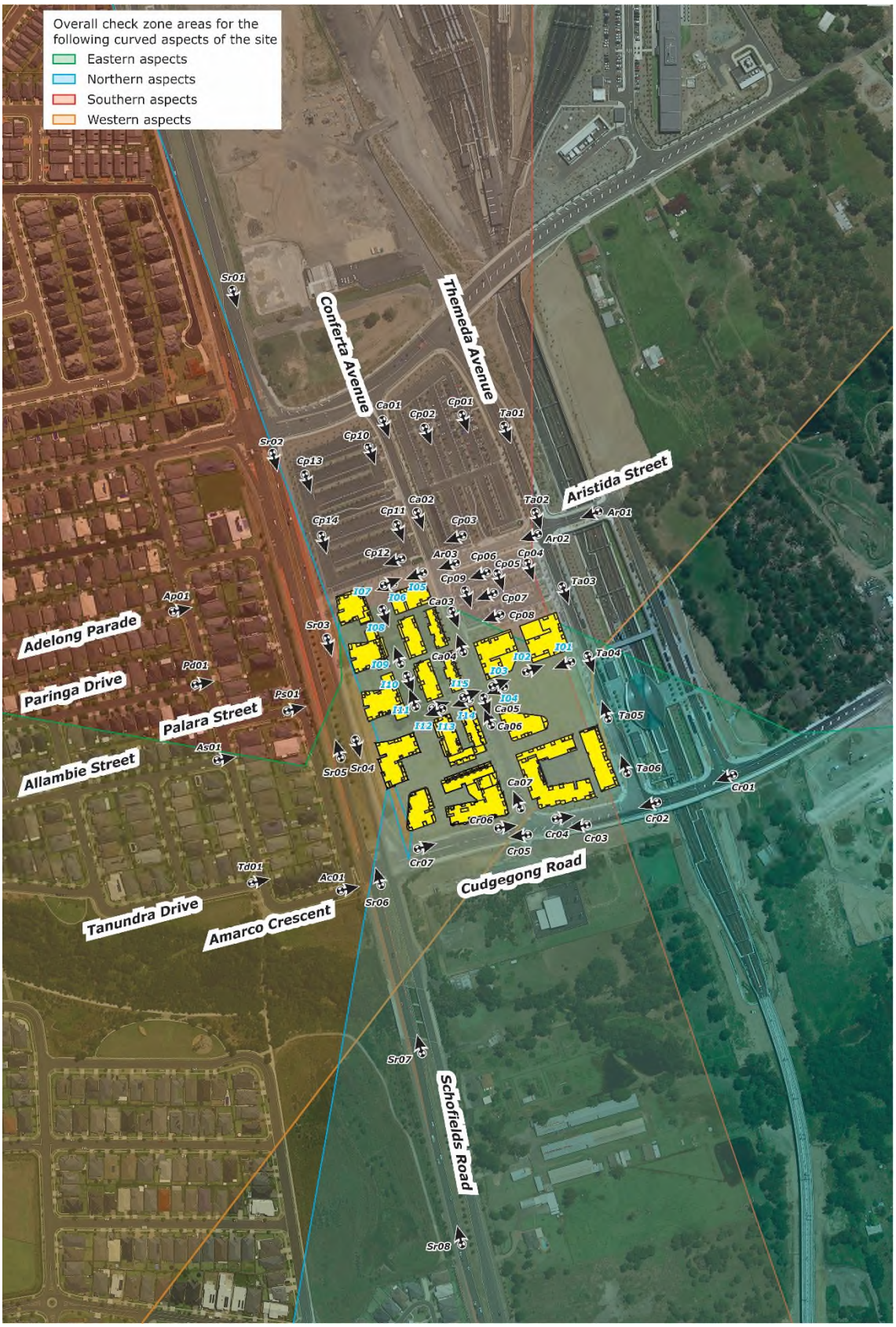

Figure 2a: Check Zones and Study Point Locations – Flat Aspects
(the check zones are the areas where glare could potentially be observed)

Figure 3b: Check Zones and Study Point Locations – Curved Aspects
(the check zones are the areas where glare could potentially be observed)

Table 1: Aspects of the Development that could reflect Solar Glare to Each Study Point for Motorists

Study Point	Location and Viewpoint	Aspect(s) of the Development
AR01	Aristida Street, heading south	Northern, Western, N curved, NW curved, NE curved and SW curved aspects
AR02	Aristida Street, heading south	Northern, Southern, Western, N curved, NW curved, NE curved and SW curved aspects
AR03	Aristida Street, heading south	Northern, Southern, Western, NW curved, NE curved, SE curved and SW curved aspects
TA01	Themeda Avenue, heading east	Northern, Southern, Western, N curved, NW curved, NE curved and SW curved aspects
TA02	Themeda Avenue, heading east	Northern, Southern, Western, N curved, NW curved, NE curved and SW curved aspects
TA03	Themeda Avenue, heading east	Northern, Western, N curved, NW curved, NE curved and SW curved aspects
TA04	Themeda Avenue, heading east	Northern, Eastern, Western, N curved, NW curved and NE curved aspects
TA05	Themeda Avenue, heading west	Northern, Eastern, N curved, NW curved and NE curved aspects
TA06	Themeda Avenue, heading west	Northern, Eastern, N curved, NW curved and NE curved aspects
CA01	Conferta Avenue, heading east	Northern, Southern, Western, N curved, NW curved, NE curved, SE curved and SW curved aspects
CA02	Conferta Avenue, heading east	Northern, Southern, Western, NW curved, NE curved, SE curved and SW curved aspects
CA03	Conferta Avenue, heading east	Northern, Eastern, Southern, Western, NW curved, NE curved, SE curved and SW curved aspects
CA04	Conferta Avenue, heading west	Northern, Eastern, Southern, Western, NW curved, NE curved, SE curved and SW curved aspects
CA05	Conferta Avenue, heading east	Northern, Eastern, Southern, Western, NW curved, NE curved, SE curved and SW curved aspects
CA06	Conferta Avenue, heading west	Northern, Eastern, Southern, Western, NW curved, NE curved, SE curved and SW curved aspects
CA07	Conferta Avenue, heading west	Northern, Eastern, Southern, Western, N curved, NW curved, NE curved, SE curved and SW curved aspects
CR01	Cudgegong Road, heading south	Northern, Eastern, N curved, NW curved and NE curved aspects
CR02	Cudgegong Road, heading south	Northern, Eastern, N curved, NW curved and NE curved aspects
CR03	Cudgegong Road, heading south	Northern, Eastern, Southern, N curved, NW curved, NE curved and SE curved aspects
CR04	Cudgegong Road, heading north	Northern, Eastern, Southern, N curved, NW curved, NE curved and SE curved aspects

Study Point	Location and Viewpoint	Aspect(s) of the Development
CR05	Cudgegong Road, heading south	Northern, Eastern, Southern, N curved, NW curved, NE curved, SE curved and SW curved aspects
CR06	Cudgegong Road, heading north	Northern, Eastern, Southern, Western, N curved, NW curved, NE curved, SE curved and SW curved aspects
CR07	Cudgegong Road, heading north	Northern, Eastern, Southern, Western, NE curved, SE curved and SW curved aspects
CP01	Carpark Area (between Themeda Avenue & Conferta Avenue), heading east	Northern, Southern, Western, N curved, NW curved, NE curved and SW curved aspects
CP02	Carpark Area (between Themeda Avenue & Conferta Avenue), heading east	Northern, Southern, Western, N curved, NW curved, NE curved, SE curved and SW curved aspects
CP03	Carpark Area (between Themeda Avenue & Conferta Avenue), heading south	Northern, Southern, Western, N curved, NW curved, NE curved and SW curved aspects
CP04	Carpark Area (between Themeda Avenue & Conferta Avenue), heading east	Northern, Southern, Western, N curved, NW curved, NE curved and SW curved aspects
CP05	Carpark Area (between Themeda Avenue & Conferta Avenue), heading east	Northern, Southern, Western, N curved, NW curved, NE curved and SW curved aspects
CP06	Carpark Area (between Themeda Avenue & Conferta Avenue), heading south	Northern, Southern, Western, N curved, NW curved, NE curved and SW curved aspects
CP07	Carpark Area (between Themeda Avenue & Conferta Avenue), heading south	Northern, Southern, Western, N curved, NW curved, NE curved and SW curved aspects
CP08	Carpark Area (between Themeda Avenue & Conferta Avenue), heading south	Northern, Southern, Western, N curved, NW curved, NE curved and SW curved aspects
CP09	Carpark Area (between Themeda Avenue & Conferta Avenue), heading east	Northern, Southern, Western, NW curved, NE curved and SW curved aspects
CP10	Carpark Area (between Conferta Avenue & Schofields Road), heading east	Northern, Southern, Western, NW curved, NE curved, SE curved and SW curved aspects
CP11	Carpark Area (between Conferta Avenue & Schofields Road), heading east	Northern, Southern, Western, NW curved, NE curved, SE curved and SW curved aspects
CP12	Carpark Area (between Conferta Avenue & Schofields Road), heading south	Northern, Southern, Western, NW curved, NE curved, SE curved and SW curved aspects
CP13	Carpark Area (between Conferta Avenue & Schofields Road), heading east	Northern, Southern, Western, NW curved, SE curved and SW curved aspects
CP14	Carpark Area (between Conferta Avenue & Schofields Road), heading east	Northern, Southern, Western, NW curved, SE curved and SW curved aspects
I01	Proposed New Road (Between Buildings 1A and 1B), heading south	Northern, Eastern, Western, N curved, NW curved and NE curved aspects
I02	Proposed New Road (Between Buildings 1A and 1B), heading north	Northern, Eastern, Southern, Western, N curved, NW curved, NE curved and SW curved aspects
I03	Proposed New Road (Between Buildings 1A and 1B), heading north	Northern, Eastern, Southern, Western, NW curved, NE curved, SE curved and SW curved aspects
I04	Proposed New Road (Between Buildings 1A and 1B), heading south	Northern, Eastern, Southern, Western, NW curved, NE curved, SE curved and SW curved aspects
I05	Proposed New Road (Between Buildings 2A, 2B, 2D and 2E), heading south	Northern, Southern, Western, NW curved, NE curved, SE curved and SW curved aspects

Study Point	Location and Viewpoint	Aspect(s) of the Development
I06	Proposed New Road (Between Buildings 2A, 2B, 2D and 2E), heading south	Northern, Southern, Western, NW curved, NE curved, SE curved and SW curved aspects
I07	Proposed New Road (Between Buildings 2A, 2B, 2D and 2E), heading north	Northern, Southern, Western, NW curved, NE curved, SE curved and SW curved aspects
I08	Proposed New Road (Between Buildings 2A, 2B, 2D and 2E), heading east	Northern, Eastern, Southern, Western, NW curved, NE curved, SE curved and SW curved aspects
I09	Proposed New Road (Between Buildings 2A, 2B, 2D and 2E), heading west	Northern, Eastern, Southern, Western, NW curved, NE curved, SE curved and SW curved aspects
I10	Proposed New Road (Between Buildings 2A, 2B, 2D and 2E), heading east	Northern, Eastern, Southern, Western, NW curved, NE curved, SE curved and SW curved aspects
I11	Proposed New Road (Between Buildings 2A, 2B, 2D and 2E), heading west	Northern, Eastern, Southern, Western, NW curved, NE curved, SE curved and SW curved aspects
I12	Proposed New Road (Between Buildings 2A, 2B, 2D and 2E), heading north	Northern, Eastern, Southern, Western, NW curved, NE curved, SE curved and SW curved aspects
I13	Proposed New Road (Between Buildings 2A, 2B, 2D and 2E), heading south	Northern, Eastern, Southern, Western, NW curved, NE curved, SE curved and SW curved aspects
I14	Proposed New Road (Between Buildings 2A, 2B, 2D and 2E), heading south	Northern, Eastern, Southern, Western, NW curved, NE curved, SE curved and SW curved aspects
I15	Proposed New Road (Between Buildings 2A, 2B, 2D and 2E), heading north	Northern, Eastern, Southern, Western, NW curved, NE curved, SE curved and SW curved aspects
SR01	Schofields Road, heading east	Northern, Southern, Western, NW curved, SE curved and SW curved aspects
SR02	Schofields Road, heading east	Northern, Southern, Western, NW curved, SE curved and SW curved aspects
SR03	Schofields Road, heading east	Southern, Western, NW curved, SE curved and SW curved aspects
SR04	Schofields Road, heading east	Eastern, Southern, Western, NW curved, SE curved and SW curved aspects
SR05	Schofields Road, heading west	Eastern, Southern, Western, SE curved and SW curved aspects
SR06	Schofields Road, heading west	Northern, Eastern, Southern, Western, SE curved and SW curved aspects
SR07	Schofields Road, heading west	Northern, Eastern, Southern, NE curved, SE curved and SW curved aspects
SR08	Schofields Road, heading west	Northern, Eastern, Southern, NE curved, SE curved and SW curved aspects
AC01	Amarco Crescent, heading north	Eastern, Southern, Western, SE curved and SW curved aspects
PS01	Palara Street, heading north	Southern, Western, NW curved, SE curved and SW curved aspects
AP01	Adelong Parade, heading north	Southern, Western, NW curved, SE curved and SW curved aspects
PD01	Paringa Drive, heading north	Southern, Western, NW curved, SE curved and SW curved aspects

Study Point	Location and Viewpoint	Aspect(s) of the Development
AS01	Alambie Street, heading north	Eastern, Southern, Western, SE curved and SW curved aspects
TD01	Tanundra Drive, heading north	Eastern, Southern, Western, SE curved and SW curved aspects

1.2 Analysis and Discussion

The amount of solar glare observed by motorists from the façade of the development at each study point location is presented in this section. Treatment options are provided if excessive solar glare conditions are observed.

1.2.1 Motorists heading south along Aristida Street

Points AR01, AR02 and AR03 are located along Aristida Street, to the north and west of the development site. These points represent the critical sightline of motorists heading south along Aristida Street at these locations. Calibrated images of the viewpoint of motorists at these locations have been overlaid with a scaled glare meter, as shown in Appendix A.

An analysis of the glare meters overlaid onto the viewpoint images at these study point locations indicate that parts of the subject development that are visible and within the zone of sensitive vision. A check zone analysis was undertaken to determine if motorists at the study point locations are potentially affected by solar reflections from the visible aspects within the zone of sensitive vision. This is summarised as follows:

Study Point	Visible Aspects	Check Zone Analysis
AR01	• Building 2A.1 – Northern and Western Aspect. • Building 2D.1 – Northern Aspect	• Building 2A.1 – N/A • Building 2D.1 – N/A
AR02	• Building 2A.1 – Northern and Western Aspect. • Building 2D.1 – Northern Aspect	• Building 2A.1 – N/A • Building 2D.1 – N/A
AR03	• Building 2A.1 – Northern and Western Aspect. • Building 2D.1 – Northern Aspect	• Building 2A.1 – N/A • Building 2D.1 – N/A

The results of the detailed analysis above indicate the study point locations are not located within the check zones for the portions of the aspects which are visible within the zone of sensitive vision. Hence there will be no adverse solar glare observed by motorists heading south along Aristida Street at these locations.

1.2.2 Motorists heading east along Themeda Avenue

Points TA01, TA02, TA03 and TA04 are located along Themeda Avenue, to the north of the development site. These points represent the critical sightline of motorists heading east along Themeda Avenue at these locations. Calibrated images of the viewpoint of motorists at these locations have been overlaid with a scaled glare meter, as shown in Appendix A.

An analysis of the glare meters overlaid onto the viewpoint images at these study point locations indicate there are parts of the subject development that are visible and within the zone of sensitive vision. A check zone analysis was undertaken to determine if motorists at the study point locations are potentially affected by solar reflections from the visible aspects within the zone of sensitive vision. This is summarised as follows:

Study Point	Visible Aspects	Check Zone Analysis
TA01	• Building 1A.1 – Northern and Western Aspect. • Building 1B.3 – Northern and Western Aspect.	• Building 1A.1 – Northern and Western Aspect. • Building 1B.3 – Northern and Western Aspect.
TA02	• Building 1A.1 – Northern and Western Aspect. • Building 1B.3 – Northern and Western Aspect.	• Building 1A.1 – Northern and Western Aspect. • Building 1B.3 – Northern and Western Aspect.
TA03	• Building 1B.3 – Northern and Western Aspect.	• Building 1B.3 – Northern and Western Aspect.
TA04	• Building 1B.3 – Northern Aspect.	• Building 1B.3 – Northern Aspect.

The results of the detailed analysis above indicate the study point locations are located within the check zones for the visible aspects indicated above and hence there is potential for solar glare to be observed. It should be noted the direct sun will also be visible and within the zone of sensitive vision of motorists at these locations (during the early morning periods). The intensity of the direct view of the sun will be far more severe than any glare from the northern aspects of the various buildings mentioned above. Hence a maximum normal specular reflectance of visible light of 20% is recommended to be used on the glazing along the northern aspect of the various buildings mentioned above.

Further analysis indicates that visible western aspects of Building 1B.3 will be overshadowed by various buildings of the development site respectively at the times when solar glare would have otherwise been observed (late afternoon). The visible eastern aspect of Building 1A.1 does benefit from some form of overshadowing effects from the surrounding streetscapes, however there are portions of the visible aspect that do not. Hence, to avoid adverse solar glare affecting motorists heading east along Themeda Avenue, the following limitations to the maximum normal specular reflectance of visible light of the external façade glazing is recommended:

- Main building façade glazing (ie: windows):
    - Building 1A.1 – Western aspect main building façade: 11%.
- Balustrade glazing:
    - Building 1A.1 – Western aspect balustrades: 8%.
- All other glazing (windows and balustrades) should have a maximum normal specular reflectance of visible light of 20%.

1.2.3 Motorists heading west along Themeda Avenue

Points TA05 and TA06 are located along Themeda Avenue, to the north of the development site. These points represent the critical sightline of motorists heading west along Themeda Avenue at these locations. Calibrated images of the viewpoint of motorists at these locations have been overlaid with a scaled glare meter, as shown in Appendix A.

An analysis of the glare meter overlaid onto the viewpoint at Points TA05 and TA06 indicates that parts of the northern and eastern aspects of Building 1A.1 are visible and within the zone of sensitive vision. Further analysis indicate these study point locations are located within the check zones for the visible aspects and hence there is potential for solar glare to be observed. However it should be noted the visible eastern aspect will be overshadowed by various buildings of the development site respectively at the times when solar glare would have otherwise been observed (early morning). Furthermore, the direct sun will also be visible and within the zone of sensitive vision of motorists at these locations (during the late afternoon periods). The intensity of the direct view of the sun will be far more severe than any glare from the northern aspect of the Building 1A.1. Hence a maximum normal specular reflectance of visible light of 20% is recommended to be used on the glazing along the northern and eastern aspect of the Building 1A.1.

1.2.4 Motorists heading east along Conferta Avenue

Points CA01, CA02, CA03 and CA05 are located along Conferta Avenue, that runs through the development site. These points represent the critical sightline of motorists heading east along Conferta Avenue at these locations. Calibrated images of the viewpoint of motorists at these locations have been overlaid with a scaled glare meter, as shown in Appendix A.

An analysis of the glare meters overlaid onto the viewpoint images at these study point locations indicate there are parts of the subject development that are visible and within the zone of sensitive vision. A check zone analysis was undertaken to determine if motorists at the study point locations are potentially affected by solar reflections from the visible aspects within the zone of sensitive vision. This is summarised as follows:

Study Point	Visible Aspects	Check Zone Analysis
CA01	• Building 1A.2 – Southern and Western Aspect. • Building 1B.1 – Southern and Western Aspect. • Building 1B.2 – Southern and Western Aspect. • Building 2A.1 – Northern and Western Aspect. • Building 2A.2 – Northern and Western Aspect. • Building 2A.3 – Northern and Western Aspect. • Building 2B.1 – Northern and Western Aspect. • Building 2C.1 – Northern and Western Aspect.	• Building 1A.2 – Southern and Western Aspect. • Building 1B.1 – Southern and Western Aspect. • Building 1B.2 – Southern and Western Aspect. • Building 2A.1 – Northern and Western Aspect. • Building 2A.2 – Northern and Western Aspect. • Building 2A.3 – Northern and Western Aspect. • Building 2B.1 – Northern and Western Aspect. • Building 2C.1 – Northern and Western Aspect.

Study Point	Visible Aspects	Check Zone Analysis
CA02	• Building 1A.2 – Southern and Western Aspect. • Building 1B.1 – Southern and Western Aspect. • Building 1B.2 – Southern and Western Aspect. • Building 2A.1 – Northern Aspect. • Building 2A.2 – Northern and Western Aspect. • Building 2A.3 – Northern and Western Aspect. • Building 2B.1 – Northern and Western Aspect. • Building 2C.1 – Northern and Western Aspect.	• Building 1A.2 – Southern and Western Aspect. • Building 1B.1 – Southern and Western Aspect. • Building 1B.2 – Southern and Western Aspect. • Building 2A.1 –Northern Aspect. • Building 2A.2 – Northern and Western Aspect. • Building 2A.3 – Northern and Western Aspect. • Building 2B.1 – Northern and Western Aspect. • Building 2C.1 – Northern and Western Aspect.
CA03	• Building 1A.2 – Southern Aspect. • Building 1B.1 – Southern and Western Aspect. • Building 1B.2 – Southern and Western Aspect. • Building 2B.1 – Northern and Western Aspect. • Building 2C.1 – Northern and Western Aspect.	• Building 1A.2 – Southern Aspect. • Building 1B.1 – Southern and Western Aspect. • Building 1B.2 – Southern and Western Aspect. • Building 2B.1 – Northern and Western Aspect. • Building 2C.1 – Northern and Western Aspect.
CA05	• Building 1B.2 – Southern and Western Aspect. • Building 2C.1 – Northern Aspect.	• Building 1B.2 – Southern and Western Aspect. • Building 2C.1 – Northern Aspect.

The results of the detailed analysis above indicate the study point locations are located within the check zones for the visible aspects indicated above and hence there is potential for solar glare to be observed. It should be noted the direct sun will also be visible and within the zone of sensitive vision of motorists at these locations (during the early morning periods). The intensity of the direct view of the sun will be far more severe than any glare from the northern and southern aspects of the various buildings mentioned above. Hence a maximum normal specular reflectance of visible light of 20% is recommended to be used on the glazing along the northern and southern aspects of the various buildings mentioned above.

Further analysis indicates that visible western aspects of Buildings 1B.1, 1B.2, 2A.2, 2A.3, 2B.1 and 2C.1 will be overshadowed by various buildings of the development site respectively at the times when solar glare would have otherwise been observed (late afternoon). The visible western aspect of Building 1A.2 and 2A.1 does benefit from some form of overshadowing effects from the surrounding streetscapes, however there are portions of the visible aspect that do not. Hence, to avoid adverse solar glare affecting motorists heading east along Conferta Avenue, the following limitations to the maximum normal specular reflectance of visible light of the external façade glazing is recommended:

- Main building façade glazing (ie: windows):
    - Building 1A.2 – Western aspect main building façade: 11%.

- Building 2A.1 – Western aspect main building façade: 11%.

- Balustrade glazing:
  - Building 1A.2 – Western aspect balustrades: 8%.
  - Building 2A.1 – Western aspect balustrades: 8%.

- All other glazing (windows and balustrades) should have a maximum normal specular reflectance of visible light of 20%.

1.2.5 Motorists heading west along Conferta Avenue

Points CA04, CA06 and CA07 are located along Conferta Avenue, that runs through the development site. These points represent the critical sightline of motorists heading west along Conferta Avenue at these locations. Calibrated images of the viewpoint of motorists at these locations have been overlaid with a scaled glare meter, as shown in Appendix A.

An analysis of the glare meters overlaid onto the viewpoint images at these study point locations indicate there are parts of the subject development that are visible and within the zone of sensitive vision. A check zone analysis was undertaken to determine if motorists at the study point locations are potentially affected by solar reflections from the visible aspects within the zone of sensitive vision. This is summarised as follows:

Study Point	Visible Aspects	Check Zone Analysis
CA04	• Building 2A.1 – Northern Aspect.	• Building 2A.1 – Northern Aspect.
CA06	• Building 1A.2 – Southern Aspect. • Building 2A.1 – Northern and Eastern Aspect. • Building 2A.2 – Northern and Eastern Aspect. • Building 2A.3 – Northern Aspect.	• Building 1A.2 – Southern Aspect. • Building 2A.1 – Northern and Eastern Aspect. • Building 2A.2 – Northern and Eastern Aspect. • Building 2A.3 – Northern Aspect.
CA07	• Building 1A.2 – Southern and Eastern Aspect. • Building 1B.1 – Southern and Eastern Aspect. • Building 2A.1 – Northern and Eastern Aspect. • Building 2A.2 – Northern and Eastern Aspect. • Building 2A.3 – Northern and Eastern Aspect. • Building 2B.1 – Northern Aspect.	• Building 1A.2 – Southern and Eastern Aspect. • Building 1B.1 – Southern and Eastern Aspect. • Building 2A.1 – Northern and Eastern Aspect. • Building 2A.2 – Northern and Eastern Aspect. • Building 2A.3 – Northern and Eastern Aspect. • Building 2B.1 – Northern Aspect.

The results of the detailed analysis above indicate the study point locations are located within the check zones for the visible aspects indicated above and hence there is potential for solar glare to be observed. It should be noted the direct sun will also be visible and within the zone of sensitive vision of motorists at these locations (during the late afternoon periods). The intensity of the direct view of the sun will be far more severe than any glare from the northern and southern aspects of the various buildings mentioned above. Hence a maximum normal specular

reflectance of visible light of 20% is recommended to be used on the glazing along the northern and southern aspects of the various buildings mentioned above.

Further analysis indicates that visible eastern aspects of Buildings 1A.2, 1B.1, 2A.1, 2A.2 and 2A.3 will be overshadowed by various buildings of the development site respectively at the times when solar glare would have otherwise been observed (early morning). Hence there will be no adverse solar glare observed by motorists heading west along Conferta Avenue at this location.

1.2.6 Motorists heading south along Cudgegong Road

Points CR01, CR02, CR03 and CR05 are located along Cudgegong Road, to the north and east of the development site. These points represent the critical sightline of motorists heading south along Cudgegong Road at these locations. Calibrated images of the viewpoint of motorists at these locations have been overlaid with a scaled glare meter, as shown in Appendix A.

An analysis of the glare meters overlaid onto the viewpoint images at these study point locations indicate the view of the subject development is visible but outside the zone of sensitive vision of motorists at Points CR01 and CR05. Hence there will be no adverse solar glare observed by motorists heading south along Cudgegong Road at this location.

For the remaining study point locations, there are parts of the subject development that are visible and within the zone of sensitive vision. A check zone analysis was undertaken to determine if motorists at the study point locations are potentially affected by solar reflections from the visible aspects within the zone of sensitive vision. This is summarised as follows:

Study Point	Visible Aspects	Check Zone Analysis
CR01	• N/A outside the zone of sensitive vision	• N/A
CR02	• Building 2C.1 – Eastern Aspect.	• Building 2C.1 – N/A
CR03	• Building 2C.2 – Eastern Aspect.	• Building 2C.2 – N/A
CR05	• N/A outside the zone of sensitive vision	• N/A

The results of the detailed analysis above indicate the study point locations are not located within the check zones for the portions of the aspects which are visible within the zone of sensitive vision. Hence there will be no adverse solar glare observed by motorists heading south along Cudgegong Road at these locations.

1.2.7 Motorists heading north along Cudgegong Road

Points CR04, CR06 and CR07 are located along Cudgegong Road, to the east of the development site. These points represent the critical sightline of motorists heading north along Cudgegong Road at these locations. Calibrated images of the viewpoint of motorists at these locations have been overlaid with a scaled glare meter, as shown in Appendix A.

An analysis of the glare meters overlaid onto the viewpoint images at these study point locations indicate the view of the subject development is visible but outside the zone of sensitive vision of motorists at Points CR04 and CR06. Hence there will be no adverse solar glare observed by motorists heading north along Cudgegong Road at these locations.

An analysis of the glare meter overlaid onto the viewpoint at Point CR07 indicates that parts of the southern and eastern aspects of Building 1B.1 are visible and within the zone of sensitive vision. However, further analysis indicates that this study point is not located within the check zones for the portions of the aspects which are visible within the zone of sensitive vision. Hence there will be no adverse solar glare observed by motorists heading north along Cudgegong Road at this location.

1.2.8 Motorists heading east along Schofields Road

Points SR01, SR02, SR03 and SR04 are located along Schofields Road, to the south and west of the development site. These points represent the critical sightline of motorists heading east along Schofields Road at these locations. Calibrated images of the viewpoint of motorists at these locations have been overlaid with a scaled glare meter, as shown in Appendix A.

An analysis of the glare meters overlaid onto the viewpoint images at these study point locations indicate the view of the subject development is visible but outside the zone of sensitive vision of motorists at Point SR04. Hence there will be no adverse solar glare observed by motorists heading east along Schofields Road at this location.

For the remaining study point locations, there are parts of the subject development that are visible and within the zone of sensitive vision. A check zone analysis was undertaken to determine if motorists at the study point locations are potentially affected by solar reflections from the visible aspects within the zone of sensitive vision. This is summarised as follows:

Study Point	Visible Aspects	Check Zone Analysis
SR01	• Building 2D.1 – Southern and Western Aspect. • Building 2D.2 – Southern Aspect. • Building 2D.3 – Southern Aspect. • Building 2E.1 – Southern Aspect.	• Building 2D.1 – Southern and Western Aspect. • Building 2D.2 – Southern Aspect. • Building 2D.3 – Southern Aspect. • Building 2E.1 – Southern Aspect.
SR02	• Building 2D.1 – Southern and Western Aspect. • Building 2D.3 – Southern Aspect. • Building 2E.1 – Southern Aspect.	• Building 2D.1 – Southern and Western Aspect. • Building 2D.3 – Southern Aspect. • Building 2E.1 – Southern Aspect.
SR03	• Building 2E.1 – Southern and Western Aspect.	• Building 2E.1 – Southern and Western Aspect.
SR04	• N/A outside the zone of sensitive vision	• N/A

The results of the detailed analysis above indicate the study point locations are located within the check zones for the visible aspects indicated above and hence there is potential for solar glare to be observed. It should be noted the direct sun will also be visible and within the zone of

sensitive vision of motorists at these locations (during the early morning periods). The intensity of the direct view of the sun will be far more severe than any glare from the southern aspects of the various buildings mentioned above. Hence a maximum normal specular reflectance of visible light of 20% is recommended to be used on the glazing along the southern aspect of the various buildings mentioned above.

Further analysis indicates that visible western aspect of Building 2E.1 will be overshadowed by various buildings of the development site at the times when solar glare would have otherwise been observed (late afternoon). However, the visible western aspect of Building 2D.1 does not benefit from overshadowing effects from the surrounding streetscapes. Hence, to avoid adverse solar glare affecting motorists heading east along Schofields Road, the following limitations to the maximum normal specular reflectance of visible light of the external façade glazing is recommended:

- Main building façade glazing (ie: windows):
    - Building 2D.1 – Western aspect main building façade: 11%.
- Balustrade glazing:
    - Building 2D.1 – Western aspect balustrades: 8%.
- All other glazing (windows and balustrades) should have a maximum normal specular reflectance of visible light of 20%.

1.2.9 Motorists heading west along Schofields Road

Points SR05, SR06, SR07 and SR08 are located along Schofields Road, to the south and east of the development site. These points represent the critical sightline of motorists heading west along Schofields Road at these locations. Calibrated images of the viewpoint of motorists at these locations have been overlaid with a scaled glare meter, as shown in Appendix A.

An analysis of the glare meters overlaid onto the viewpoint images at these study point locations indicate the view of the subject development is visible but outside the zone of sensitive vision of motorists at Points SR05. Hence there will be no adverse solar glare observed by motorists heading west along Schofields Road at this location.

For the remaining study point locations, there are parts of the subject development that are visible and within the zone of sensitive vision. A check zone analysis was undertaken to determine if motorists at the study point locations are potentially affected by solar reflections from the visible aspects within the zone of sensitive vision. This is summarised as follows:

Study Point	Visible Aspects	Check Zone Analysis
SR05	• N/A outside the zone of sensitive vision	• N/A

Study Point	Visible Aspects	Check Zone Analysis
SR06	• Building 2D.1 – Southern and Eastern Aspect. • Building 2D.2 – Southern and Eastern Aspect. • Building 2D.3 – Southern Aspect.	• Building 2D.1 – Southern and Eastern Aspect. • Building 2D.2 – Southern and Eastern Aspect. • Building 2D.3 – Southern Aspect.
SR07	• Building 2D.1 – Southern and Eastern Aspect. • Building 2D.2 – Southern and Eastern Aspect. • Building 2D.3 – Southern and Eastern Aspect. • Building 2E.1 – Southern and Eastern Aspect.	• Building 2D.1 – Southern and Eastern Aspect. • Building 2D.2 – Southern and Eastern Aspect. • Building 2D.3 – Southern and Eastern Aspect. • Building 2E.1 – Southern and Eastern Aspect.
SR08	• Building 2D.1 – Southern and Eastern Aspect. • Building 2D.2 – Southern and Eastern Aspect. • Building 2D.3 – Southern and Eastern Aspect. • Building 2E.1 – Southern and Eastern Aspect.	• Building 2D.1 – Southern and Eastern Aspect. • Building 2D.2 – Southern and Eastern Aspect. • Building 2D.3 – Southern and Eastern Aspect. • Building 2E.1 – Southern and Eastern Aspect.

The results of the detailed analysis above indicate the study point locations are located within the check zones for the visible aspects indicated above and hence there is potential for solar glare to be observed. It should be noted the direct sun will also be visible and within the zone of sensitive vision of motorists at these locations (during the late afternoon periods). The intensity of the direct view of the sun will be far more severe than any glare from the southern aspects of the various buildings mentioned above. Hence a maximum normal specular reflectance of visible light of 20% is recommended to be used on the glazing along the southern aspect of the various buildings mentioned above.

Further analysis indicates that visible eastern aspects of Buildings 2D.1, 2D.2 and 2D.3 will be overshadowed by various buildings of the development site respectively at the times when solar glare would have otherwise been observed (early morning). The visible eastern aspect of Building 2C.2 and 2E.1 does benefit from some form of overshadowing effects from the surrounding buildings and streetscapes, however there are portions of the visible aspect that do not. Hence, to avoid adverse solar glare affecting motorists heading west along Schofields Road, the following limitations to the maximum normal specular reflectance of visible light of the external façade glazing is recommended:

- Main building façade glazing (ie: windows):
    - Building 2C.2 – Eastern aspect main building façade: 11%.
    - Building 2E.1 – Eastern aspect main building façade: 11%.
- Balustrade glazing:
    - Building 2C.2 – Eastern aspect balustrades: 8%.

- Building 2E.1 – Eastern aspect balustrades: 11%.

- All other glazing (windows and balustrades) should have a maximum normal specular reflectance of visible light of 20%.

1.2.10 Motorists heading north along Amarco Crescent

Point AC01 is located along Amarco Crescent, to the south-west of the development site. This point represents the critical sightline of motorists heading north along Amarco Crescent at this location. A calibrated image of the viewpoint of motorists at this location has been overlaid with a scaled glare meter, as shown in Appendix A.

An analysis of the glare meter overlaid onto the viewpoint image at Point AC01 indicates that parts of the southern and eastern aspects of Building 1B.1 are visible and within the zone of sensitive vision. However, further analysis indicates that this study point is not located within the check zones for the portions of the aspects which are visible within the zone of sensitive vision. Hence there will be no adverse solar glare observed by motorists heading north along Amarco Crescent at this location.

1.2.11 Motorists heading north along Palara Street

Point PS01 is located along Palara Street, to the south of the development site. This point represents the critical sightline of motorists heading north along Palara Street at this location. A calibrated image of the viewpoint of motorists at this location has been overlaid with a scaled glare meter, as shown in Appendix A.

An analysis of the glare meter overlaid onto the viewpoint image at Point PS01 indicates that parts of the southern aspects of Buildings 2D.2 and 2D.3 are visible and within the zone of sensitive vision. However, further analysis indicates that this study point is not located within the check zones for the portions of the aspects which are visible within the zone of sensitive vision. Hence there will be no adverse solar glare observed by motorists heading north along Palara Street at this location.

1.2.12 Motorists heading north along Adelong Parade

Point AP01 is located along Adelong Parade, to the south of the development site. This point represents the critical sightline of motorists heading north along Adelong Parade at this location. A calibrated image of the viewpoint of motorists at this location has been overlaid with a scaled glare meter, as shown in Appendix A.

An analysis of the glare meter overlaid onto the viewpoint image at Point AP01 indicates that parts of the southern and western aspects of Building 2C.2 are visible and within the zone of sensitive vision. However, further analysis indicates that this study point is not located within the check zones for the portions of the aspects which are visible within the zone of sensitive vision. Hence there will be no adverse solar glare observed by motorists heading north along Adelong Parade at this location.

1.2.13 Motorists heading north along Paringa Drive

Point PD01 is located along Paringa Drive, to the south of the development site. This point represents the critical sightline of motorists heading north along Paringa Drive at this location. A calibrated image of the viewpoint of motorists at this location has been overlaid with a scaled glare meter, as shown in Appendix A.

An analysis of the glare meter overlaid onto the viewpoint image at Point PD01 indicates that parts of the southern aspect of Building 2D.2 is visible and within the zone of sensitive vision. However, further analysis indicates that this study point is not located within the check zone for the portions of this aspect which is visible within the zone of sensitive vision. Hence there will be no adverse solar glare observed by motorists heading north along Paringa Drive at this location.

1.2.14 Motorists heading north along Alambie Street

Point AS01 is located along Alambie Street, to the south of the development site. This point represents the critical sightline of motorists heading north along Alambie Street at this location. A calibrated image of the viewpoint of motorists at this location has been overlaid with a scaled glare meter, as shown in Appendix A.

An analysis of the glare meter overlaid onto the viewpoint image at Point AS01 indicates that parts of the southern aspects of Buildings 2D.2, 2D.3 and 2E.1 are visible and within the zone of sensitive vision. However, further analysis indicates that this study point is not located within the check zones for the portions of the aspects which are visible within the zone of sensitive vision. Hence there will be no adverse solar glare observed by motorists heading north along Alambie Street at this location.

1.2.15 Motorists heading north along Tanundra Drive

Point TD01 is located along Tanundra Drive, to the south-west of the development site. This point represents the critical sightline of motorists heading north along Tanundra Drive at this location. A calibrated image of the viewpoint of motorists at this location has been overlaid with a scaled glare meter, as shown in Appendix A.

An analysis of the glare meter overlaid onto the viewpoint image at Point TD01 indicates that parts of the southern and eastern aspects of Building 2C.2 are visible and within the zone of sensitive vision. However, further analysis indicates that this study point is not located within the check zones for the portions of the aspects which are visible within the zone of sensitive vision. Hence there will be no adverse solar glare observed by motorists heading north along Tanundra Drive at this location.

1.2.16 Motorists heading east within the Carpark Area (between Themeda Avenue & Conferta Avenue)

Points CP01, CP02, CP04, CP05 and CP09 are located within the carpark area between Themeda Avenue & Conferta Avenue, to the north-west of the development site. These points represents the critical sightline of motorists heading east within the carpark at this location. A calibrated image of the viewpoint of motorists at these locations has been overlaid with a scaled glare meter, as shown in Appendix A.

An analysis of the glare meters overlaid onto the viewpoint images at these study point locations indicate there are parts of the subject development that are visible and within the zone of sensitive vision. A check zone analysis was undertaken to determine if motorists at the study point locations are potentially affected by solar reflections from the visible aspects within the zone of sensitive vision. This is summarised as follows:

Study Point	Visible Aspects	Check Zone Analysis
CP01	• Building 1A.1 – Western Aspect. • Building 1A.2 – Northern and Western Aspect. • Building 1B.1 – Western Aspect.	• Building 1A.1 – Western Aspect. • Building 1A.2 – Northern and Western Aspect. • Building 1B.1 – Western Aspect.
CP02	• Building 1A.1 – Western Aspect. • Building 1A.2 – Western Aspect. • Building 1B.2 – Western Aspect.	• Building 1A.1 – Western Aspect. • Building 1A.2 – Western Aspect. • Building 1B.2 – Western Aspect.
CP04	• Building 1A.1 – Western Aspect.	• Building 1A.1 – Western Aspect.
CP05	• Building 1A.1 – Southern and Western Aspect. • Building 1A.2 – Northern and Western Aspect. • Building 1B.1 – Northern and Western Aspect. • Building 1B.2 – Western Aspect.	• Building 1A.1 – Southern and Western Aspect. • Building 1A.2 – Northern and Western Aspect. • Building 1B.1 – Northern and Western Aspect. • Building 1B.2 – Western Aspect.
CP09	• Building 1A.2 – Western Aspect.	• Building 1A.2 – Western Aspect.

The results of the detailed analysis above indicate the study point locations are located within the check zones for the visible aspects indicated above and hence there is potential for solar glare to be observed. The visible northern and southern aspects of the Buildings 1A.1, 1A.2 and 1B.2 will benefit from shading provided by various buildings of the development site; in particular Building 1B.2, at the times when solar glare could be observed (early morning). Furthermore, the direct sun will also be visible and within the zone of sensitive vision of motorists at these locations (during the early morning periods). The intensity of the direct view of the sun will be far more severe than any glare from the northern and southern aspects of the various buildings mentioned above. Hence a maximum normal specular reflectance of visible light of 20% is recommended to be used on the glazing along the northern and southern aspects of the various buildings mentioned above.

Further analysis indicates that visible western aspects of Buildings 1A.1, 1A.2, 1B.1 and 1A.2, and the proposed balustrades along the curved northern aspect of Building 1B.1 benefits from

some form of overshadowing effects from the surrounding streetscapes, however there are portions of the visible aspect that do not; such as those abutting the car park to the west of the site. Hence, to avoid adverse solar glare affecting motorists heading west along Schofields Road, the following limitations to the maximum normal specular reflectance of visible light of the external façade glazing is recommended:

Main building façade glazing (ie: windows):

Building 1A.1 – Western aspect main building façade: 11%.

Building 1A.2 – Western aspect main building façade: 11%.

Building 1B.1 – Western aspect main building façade: 11%.

Building 1B.2 – Western aspect main building façade: 11%.

Balustrade glazing:

Building 1A.1 – Western aspect balustrades: 8%.

Building 1A.2 – Western aspect balustrades: 8%.

Building 1B.1 – Northern curved and Western aspect balustrades: 8%.

Building 1B.2 – Western aspect balustrades: 8%.

All other glazing (windows and balustrades) should have a maximum normal specular reflectance of visible light of 20%.

1.2.17 Motorists heading south within the Carpark Area (between Themeda Avenue & Conferta Avenue)

Points CP03, CP06, CP07 and CP08 are located within the carpark area between Themeda Avenue & Conferta Avenue, to the north-west of the development site. These points represents the critical sightline of motorists heading south within the carpark at these locations. A calibrated image of the viewpoint of motorists at these locations has been overlaid with a scaled glare meter, as shown in Appendix A.

An analysis of the glare meters overlaid onto the viewpoint images at these study point locations indicate there are parts of the subject development that are visible and within the zone of sensitive vision. A check zone analysis was undertaken to determine if motorists at the study point locations are potentially affected by solar reflections from the visible aspects within the zone of sensitive vision. This is summarised as follows:

Study Point	Visible Aspects	Check Zone Analysis
CP03	• Building 2D.1 – Northern and Eastern Aspect.	• Building 2D.1 – N/A

Study Point	Visible Aspects	Check Zone Analysis
CP06	• Building 2A.1 – Northern Aspect. • Building 2A.5 – Northern and Eastern Aspect.	• Building 2A.1 – N/A • Building 2A.5 – N/A
CP07	• Building 2A.1 – Eastern Aspect. • Building 2A.2 – Northern Aspect.	• Building 2A.1 – N/A • Building 2A.2 – N/A
CP08	• Building 2A.2 – Northern Aspect.	• Building 2A.2 – N/A

The results of the detailed analysis above indicates the study point locations are not located within the check zones for the portions of the aspects which are visible within the zone of sensitive vision. Hence there will be no adverse solar glare observed by motorists heading south within the carpark at these locations.

1.2.18 Motorists heading east within the Carpark Area (between Conferta Avenue & Schofields Road)

Points CP10, CP11, CP13 and CP14 are located within the carpark area between Conferta Avenue & Schofields Road, to the west of the development site. These points represents the critical sightline of motorists heading east within the carpark at these locations. A calibrated image of the viewpoint of motorists at this location has been overlaid with a scaled glare meter, as shown in Appendix A.

Study Point	Visible Aspects	Check Zone Analysis
CP10	• Building 1A.2 – Western Aspect. • Building 2A.1 – Western Aspect.	• Building 1A.2 – Western Aspect. • Building 2A.1 – Western Aspect.
CP11	• Building 1B.1 – Southern and Western Aspect. • Building 1B.2 – Southern and Western Aspect. • Building 2A.1 – Western Aspect.	• Building 1B.1 – Southern and Western Aspect. • Building 1B.2 – Southern and Western Aspect. • Building 2A.1 – Western Aspect.
CP13	• Building 2D.1 – Southern and Western Aspect.	• Building 2D.1 – Southern and Western Aspect.
CP14	• Building 2D.1 – Southern and Western Aspect.	• Building 2D.1 – Southern and Western Aspect.

The results of the detailed analysis above indicate the study point locations are located within the check zones for the visible aspects indicated above and hence there is potential for solar glare to be observed. The visible southern aspects of the Buildings 1B.1, 1B.2 and 2D.1 will benefit from shading provided by various buildings of the development site at the times when solar glare could be observed (early morning). Furthermore, the direct sun will also be visible and within the zone of sensitive vision of motorists at these locations (during the early morning periods). The intensity of the direct view of the sun will be far more severe than any glare from the northern and southern aspects of the various buildings mentioned above. Hence a maximum normal specular reflectance of visible light of 20% is recommended to be used on the glazing along the northern and southern aspects of the various buildings mentioned above.

Similarly, the visible western aspect of Buildings 1B.1 and 1B.2 will be overshadowed by various buildings of the development site respectively at the times when solar glare would have otherwise been observed (late afternoon). The visible western aspect of Buildings 1A.2, 2A.1 and 2D.1 benefits from some form of overshadowing effects from the surrounding streetscapes, however there are portions of the visible aspect that do not; such as those abutting the car park to the west of the site. Hence, to avoid adverse solar glare affecting motorists heading west along Schofields Road, the following limitations to the maximum normal specular reflectance of visible light of the external façade glazing is recommended:

Main building façade glazing (ie: windows):

Building 1A.2 – Western aspect main building façade: 11%.

Building 2A.1 – Western aspect main building façade: 11%.

Building 2D.1 – Western aspect main building façade: 11%.

Balustrade glazing:

Building 1A.2 – Western aspect balustrades: 8%.

Building 2A.1 – Western aspect balustrades: 8%.

Building 2D.1 – Western aspect balustrades: 8%.

All other glazing (windows and balustrades) should have a maximum normal specular reflectance of visible light of 20%.

1.2.19 Motorists heading south within the Carpark Area (between Conferta Avenue & Schofields Road)

Point CP12 is located within the carpark area between Conferta Avenue & Schofields Road, to the west of the development site. This point represents the critical sightline of motorists heading south within the carpark at this location. A calibrated image of the viewpoint of motorists at this location has been overlaid with a scaled glare meter, as shown in Appendix A.

An analysis of the glare meter overlaid onto the viewpoint at Point CP12 indicates that the view of the development will not be within the zone of sensitive vision. Hence there will be no adverse solar glare observed by motorists heading south within the carpark at this location.

1.2.20 Motorists heading south along the Proposed New Road (Between Buildings 1A and 1B)

Points I01 and I04 are located along the proposed new road in between Buildings 1A and 1B. These points represent the critical sightline of motorists heading south along the proposed new road at these locations. Computer generated viewpoints of motorists at these locations have been overlaid with a scaled glare meter, as shown in Appendix A.

An analysis of the glare meters overlaid onto the viewpoint images at these study point locations indicate there are parts of the subject development that are visible and within the zone of sensitive vision. A check zone analysis was undertaken to determine if motorists at the study point locations are potentially affected by solar reflections from the visible aspects within the zone of sensitive vision. This is summarised as follows:

Study Point	Visible Aspects	Check Zone Analysis
I01	• Building 1A.2 – Eastern Aspect. • Building 2A.3 – Northern and Eastern Aspect. • Building 2A.4 – Northern and Eastern Aspect. • Building 2B.1 – Northern and Western Aspect. • Building 2D.3 – Northern and Eastern Aspect. • Building 2E.1 – Western Aspect.	• Building 1A.2 – N/A • Building 2A.3 – N/A • Building 2A.4 – N/A • Building 2B.1 – N/A • Building 2D.3 – N/A • Building 2E.1 – N/A
I04	• Building 2A.4 – Eastern Aspect. • Building 2B.1 – Northern and Western Aspect. • Building 2D.3 – Northern and Eastern Aspect. • Building 2E.1 – Western Aspect.	• Building 2A.4 – N/A • Building 2B.1 – N/A • Building 2D.3 – N/A • Building 2E.1 – N/A

The results of the detailed analysis above indicates the study point locations are not located within the check zones for the portions of the aspects which are visible within the zone of sensitive vision. Hence there will be no adverse solar glare observed by motorists heading south along the proposed new road in between Buildings 1A and 1B at these locations.

1.2.21 Motorists heading north along the Proposed New Road (Between Buildings 1A and 1B)

Points I02 and I03 are located along the proposed new road in between Buildings 1A and 1B. These points represent the critical sightline of motorists heading north along the proposed new road at these locations. Computer generated viewpoints of motorists at these locations have been overlaid with a scaled glare meter, as shown in Appendix A.

An analysis of the glare meters overlaid onto the viewpoint images at these study point locations indicate there are parts of the subject development that are visible and within the zone of sensitive vision. A check zone analysis was undertaken to determine if motorists at the study point locations are potentially affected by solar reflections from the visible aspects within the zone of sensitive vision. This is summarised as follows:

Study Point	Visible Aspects	Check Zone Analysis
I02	• Building 1A.1 – Eastern Aspect.	• Building 1A.1 – N/A
I03	• Building 1A.1 – Southern and Eastern Aspect.	• Building 1A.1 – N/A

The results of the detailed analysis above indicates the study point locations are not located within the check zones for the portions of the aspects which are visible within the zone of

sensitive vision. Hence there will be no adverse solar glare observed by motorists heading north along the proposed new road in between Buildings 1A and 1B at these locations.

1.2.22 Motorists heading south along the Proposed New Road (Between Buildings 2A, 2B, 2D and 2E)

Points I05, I06, I13 and I14 are located along the proposed new road in between Buildings 2A, 2B, 2D and 2E. These points represent the critical sightline of motorists heading south along the proposed new road at these locations. Computer generated viewpoints of motorists at these locations have been overlaid with a scaled glare meter, as shown in Appendix A.

An analysis of the glare meters overlaid onto the viewpoint images at these study point locations indicate there are parts of the subject development that are visible and within the zone of sensitive vision. A check zone analysis was undertaken to determine if motorists at the study point locations are potentially affected by solar reflections from the visible aspects within the zone of sensitive vision. This is summarised as follows:

Study Point	Visible Aspects	Check Zone Analysis
I05	• Building 2D.1 – Northern Aspect.	• Building 2D.1 – N/A
I06	• Building 2D.1 – Northern Aspect.	• Building 2D.1 – N/A
I13	• Building 2D.3 – Northern and Eastern Aspect. • Building 2E.1 – Western Aspect.	• Building 2D.3 – N/A • Building 2E.1 – N/A
I14	• Building 2B.1 – Western Aspect. • Building 2D.3 – Northern and Eastern Aspect. • Building 2E.1 – Western Aspect.	• Building 2B.1 – N/A • Building 2D.3 – N/A • Building 2E.1 – N/A

The results of the detailed analysis above indicates the study point locations are not located within the check zones for the portions of the aspects which are visible within the zone of sensitive vision. Hence there will be no adverse solar glare observed by motorists heading south along the proposed new road in between Buildings 2A, 2B, 2D and 2E at these locations.

1.2.23 Motorists heading north along the Proposed New Road (Between Buildings 2A, 2B, 2D and 2E)

Points I07, I12 and I15 are located along the proposed new road in between Buildings 2A, 2B, 2D and 2E. These points represent the critical sightline of motorists heading north along the proposed new road at these locations. Computer generated viewpoints of motorists at these locations have been overlaid with a scaled glare meter, as shown in Appendix A.

An analysis of the glare meters overlaid onto the viewpoint images at these study point locations indicate the view of the subject development is visible but outside the zone of sensitive vision of motorists at Point I07. Hence there will be no adverse solar glare observed by motorists heading north along the proposed new road at this location.

For the remaining study point locations, there are parts of the subject development that are visible and within the zone of sensitive vision. A check zone analysis was undertaken to determine if motorists at the study point locations are potentially affected by solar reflections from the visible aspects within the zone of sensitive vision. This is summarised as follows:

Study Point	Visible Aspects	Check Zone Analysis
I07	• N/A outside the zone of sensitive vision	• N/A
I12	• Building 1A.1 – Southern and Eastern Aspect. • Building 1A.2 – Southern and Eastern Aspect	• Building 1A.1 – N/A • Building 1A.2 – N/A
I15	• Building 1A.1 – Southern and Eastern Aspect. • Building 1A.2 – Eastern Aspect	• Building 1A.1 – N/A • Building 1A.2 – N/A

The results of the detailed analysis above indicates the study point locations are not located within the check zones for the portions of the aspects which are visible within the zone of sensitive vision. Hence there will be no adverse solar glare observed by motorists heading north along the proposed new road in between Buildings 2A, 2B, 2D and 2E at these locations.

1.2.24 Motorists heading east along the Proposed New Road (Between Buildings 2A, 2B, 2D and 2E)

Points I08 and I10 are located along the proposed new road in between Buildings 2A, 2B, 2D and 2E. These points represent the critical sightline of motorists heading east along the proposed new road at these locations. Computer generated viewpoints of motorists at these locations have been overlaid with a scaled glare meter, as shown in Appendix A.

An analysis of the glare meters overlaid onto the viewpoint images at these study point locations indicate there are parts of the subject development that are visible and within the zone of sensitive vision. A check zone analysis was undertaken to determine if motorists at the study point locations are potentially affected by solar reflections from the visible aspects within the zone of sensitive vision. This is summarised as follows:

Study Point	Visible Aspects	Check Zone Analysis
I08	• Building 2A.4 – Southern Aspect. • Building 2A.5 – Southern Aspect. • Building 2B.1 – Southern and Western Aspect. • Building 2C.1 – Southern and Western Aspect. • Building 2D.3 – Northern and Western Aspect. • Building 2E.1 – Northern and Western Aspect.	• Building 2A.4 – Southern Aspect. • Building 2A.5 – Southern Aspect. • Building 2B.1 – Southern and Western Aspect. • Building 2C.1 – Southern and Western Aspect. • Building 2D.3 – Northern Aspect. • Building 2E.1 – Northern Aspect.

Study Point	Visible Aspects	Check Zone Analysis
I10	• Building 2B.1 – Southern and Western Aspect. • Building 2C.1 – Southern and Western Aspect. • Building 2C.2 – Northern Aspect. • Building 2E.1 – Northern Aspect.	• Building 2B.1 – Southern and Western Aspect. • Building 2C.1 – Southern and Western Aspect. • Building 2C.2 – Northern Aspect. • Building 2E.1 – Northern Aspect.

The results of the detailed analysis above indicate the study point locations are located within the check zones for the visible aspects indicated above and hence there is potential for solar glare to be observed. The visible northern and southern aspects of the Buildings 2A.4, 2A.5, 2B.1, 2D.3 and 2E.1 will benefit from shading provided by various buildings of the development site; in particular Building 2C.1, at the times when solar glare could be observed (early morning). Furthermore, the direct sun will also be visible and within the zone of sensitive vision of motorists at these locations (during the early morning periods). The intensity of the direct view of the sun will be far more severe than any glare from the northern and southern aspects of the various buildings mentioned above. Hence a maximum normal specular reflectance of visible light of 20% is recommended to be used on the glazing along the northern and southern aspects of the various buildings mentioned above.

Similarly, the visible western aspect of Building 2B.1 will be overshadowed by various buildings of the development site respectively at the times when solar glare would have otherwise been observed (late afternoon). The visible western aspect of Building 2C.1 does benefit from some form of overshadowing effects from the surrounding streetscapes, however there are portions of the visible aspect that do not; such as those directly in front of the proposed new road. Hence, to avoid adverse solar glare affecting motorists heading east along the proposed new road, the following limitations to the maximum normal specular reflectance of visible light of the external façade glazing is recommended:

- Main building façade glazing (ie: windows):
    - Building 2C.1 – Western aspect main building façade: 11%.
- Balustrade glazing:
    - Building 2C.1 – Western aspect balustrades: 8%.
- All other glazing (windows and balustrades) should have a maximum normal specular reflectance of visible light of 20%.

1.2.25 Motorists heading west along the Proposed New Road (Between Buildings 2A, 2B, 2D and 2E)

Points I09 and I11 are located along the proposed new road in between Buildings 2A, 2B, 2D and 2E. These points represent the critical sightline of motorists heading west along the proposed new road at these locations. Computer generated viewpoints of motorists at these locations have been overlaid with a scaled glare meter, as shown in Appendix A.

An analysis of the glare meters overlaid onto the viewpoint images at these study point locations indicate there are parts of the subject development that are visible and within the zone of sensitive vision. A check zone analysis was undertaken to determine if motorists at the study point locations are potentially affected by solar reflections from the visible aspects within the zone of sensitive vision. This is summarised as follows:

Study Point	Visible Aspects	Check Zone Analysis
I09	• Building 2A.1 – Southern Aspect. • Building 2D.1 – Northern Aspect.	• Building 2A.1 – Southern Aspect. • Building 2D.1 – Northern Aspect.
I11	• Building 2A.1 – Southern Aspect. • Building 2D.1 – Northern Aspect. • Building 2D.2 – Northern Aspect.	• Building 2A.1 – Southern Aspect. • Building 2D.1 – Northern Aspect. • Building 2D.2 – Northern Aspect.

The results of the detailed analysis above indicate the study point locations are located within the check zones for the visible aspects indicated above and hence there is potential for solar glare to be observed. A further analysis indicates the direct sun will also be visible and within the zone of sensitive vision of motorists at these locations (during the late afternoon periods). The intensity of the direct view of the sun will be far more severe than any glare from the northern and southern aspects of the various buildings mentioned above. Hence a maximum normal specular reflectance of visible light of 20% is recommended to be used on the glazing along the northern and southern aspects of the various buildings mentioned above.

2 GLARE OBSERVED BY PEDESTRIANS AND OCCUPANTS OF NEIGHBOURING BUILDINGS

Our past experience involving more than 250 projects, and also research by Rofail and Dowdle (2004), tends to indicate that buildings which cause a nuisance to pedestrians and occupants of neighbouring buildings are those that have a normal specular reflectivity of visible light greater than 20%. This seems to justify the suggested limit of 20% reflectivity by many local government authorities and state planning bodies. Hence a general recommendation is made that all glazing and other reflective materials used on the façade of the subject development have a maximum normal specular reflectivity of visible light of 20% to avoid adverse solar glare to pedestrians and occupants of neighbouring buildings.

3 TYPICAL NORMAL SPECULAR REFLECTANCE OF BUILDING SURFACES

It should be noted that the most reflective surface on the façade of a building is the glazing. Reflected solar glare from concrete, brickwork, timber, etc, is negligible (ie: less than 1% normal specular reflectance) and hence will not cause any adverse solar glare effects. The following sub-sections provide some general reflectance values of more reflective materials used on building facades.

3.1 Glazed Surfaces

A glazing supplier will be able to provide information on the maximum normal specular reflectance of visible light of different types of glazing. Some typical reflectivity values of different types of glazing are listed as follows:

- Clear float glass – typically 5% to 8%
- Low-e solar control glazing – typically 8% to 12%
- Other types of compliant performance glazing – up to 20%

3.2 Painted and/or Powder-Coated Metallic Surfaces

In the event that some portions of the external façade of the development feature powder-coated or painted metallic surfaces, it is not expected that adverse glare will be observed from those surfaces since the maximum normal specular reflectance of visible light of these types of façade materials range from 1% to 5%. This is well within the maximum limits specified in previous sections of this report.

4 CONCLUSION

A detailed study has been undertaken for the effect of potential solar glare from the proposed Tallawong Station Precinct South development located at 1-15 & 2-12 Conferta Avenue, Rouse Hill. This study identifies any possible adverse reflected solar glare conditions affecting motorists, pedestrians, and to occupants of neighbouring buildings. If necessary, recommendations are made to mitigate any potentially adverse effects. This study assesses compliance with the controls for solar glare from the State Environmental Planning Policy No. 65 (SEPP65, Part 04 (Designing the Building) for Amenity), which contains the Apartment Design Guide (ADG), and the Secretary's Environmental Assessment Requirements (SEARs) requirement for Visual and Amenity Impacts.

The results of the study indicate that, to avoid any adverse glare to motorists and pedestrians on the surrounding streets, occupants of neighbouring buildings, and to comply with the abovementioned planning control requirements, the following limitations to the maximum normal specular reflectance of visible light of the external façade glazing is recommended:

- Main building façade glazing (ie: windows):
    - Building 1A.1 – Western aspect main building façade: 11%.
    - Building 1A.2 – Western aspect main building façade: 11%.
    - Building 1B.1 – Western aspect main building façade: 11%.
    - Building 1B.2 – Western aspect main building façade: 11%.
    - Building 2A.1 – Western aspect main building façade: 11%.
    - Building 2C.1 – Western aspect main building façade: 11%.
    - Building 2C.2 – Eastern aspect main building façade: 11%.
    - Building 2D.1 – Western aspect main building façade: 11%.
    - Building 2E.1 – Eastern aspect main building façade: 11%.
- Balustrade glazing:
    - Building 1A.1 – Western aspect balustrades: 8%.
    - Building 1A.2 – Western aspect balustrades: 8%.
    - Building 1B.1 – Northern curved and Western aspect balustrades: 8%.
    - Building 1B.2 – Western aspect balustrades: 8%.
    - Building 2A.1 – Western aspect balustrades: 8%.

- Building 2C.1 – Western aspect balustrades: 8%.
- Building 2C.2 – Eastern aspect balustrades: 8%.
- Building 2D.1 – Western aspect balustrades: 8%.
- Building 2E.1 – Eastern aspect balustrades: 11%.

- All other glazing (windows and balustrades) should have a maximum normal specular reflectance of visible light of 20%.

It should be noted that the most reflective surface on the façade of a building is the glazing. Reflected solar glare from concrete, brickwork, timber, etc. is negligible (i.e. less than 1% normal specular reflectance) and hence will not cause any adverse solar glare effects. Note also that, for any painted or powder-coated metallic surfaces on the exterior façade of the development, the maximum normal specular reflectance of visible light for those types of surfaces is in the range of 1% to 5%, which is well within the abovementioned limit.

Hence, with the incorporation of the abovementioned recommendations, the results of this study indicate that the subject development will not cause adverse solar glare to motorists or pedestrians in the surrounding area, or to occupants of neighbouring buildings, and will comply with the planning controls regarding reflectivity from SEPP65 and the Secretary's Environmental Assessment Requirements (SEARs) requirement for Visual and Amenity Impacts.

5 REFERENCES

Hassall, D.N., 1991, "Reflectivity, Dealing with Rogue Solar Reflections", (published by author).

Phillips, R.O., 1992, "Sunshine and Shade in Australasia", Sixth Edition, CSIRO Publishing.

Rofail, A.W., and Dowdle, B., 2004, "Reflectivity Impact on Occupants of Neighbouring Properties", International Conf. on Building Envelope Systems & Technologies, Sydney.

State Environmental Planning Policy No. 65 (SEPP65), 2015, "Apartment Design Guide", NSW Department of Planning and Environment.

Secretary's Environmental Assessment Requirements (SEARs) requirement for Visual and Amenity Impacts

APPENDIX A GLARE OVERLAYS FOR THE CRITICAL SIGHT-LINES

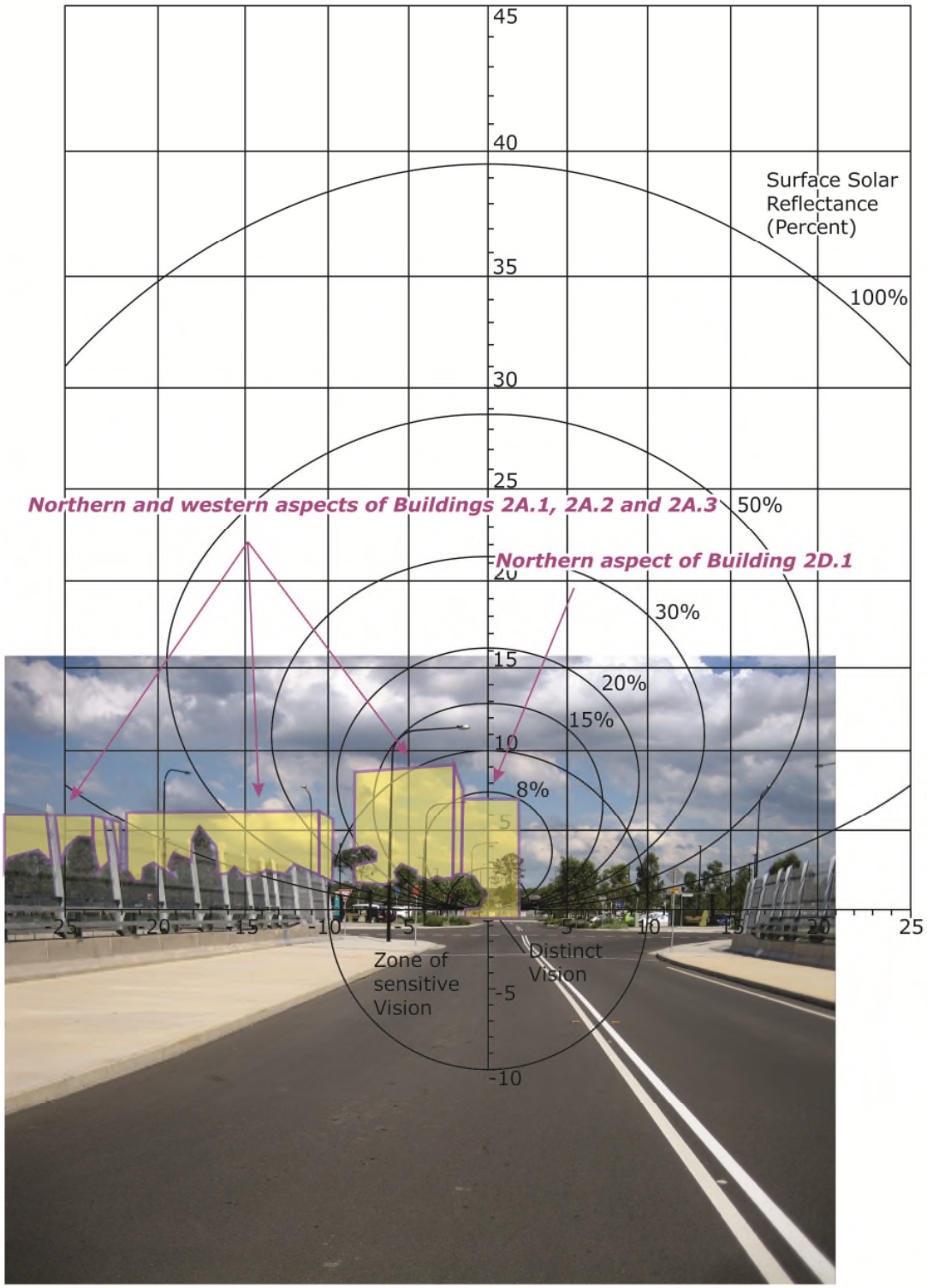

Figure A.1: Glare Overlay of the Viewpoint at Point AR01

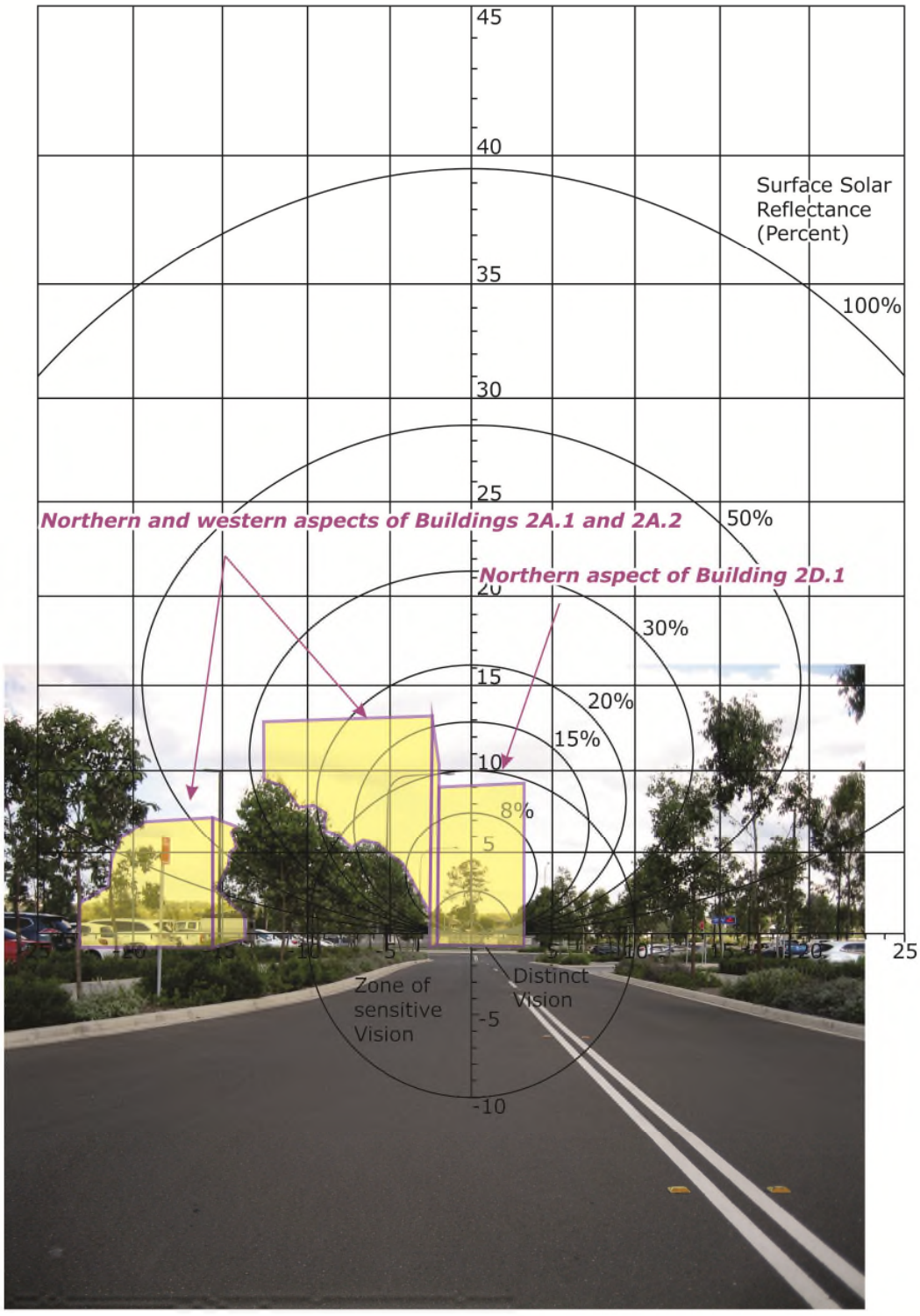

Figure A.2: Glare Overlay of the Viewpoint at Point AR02

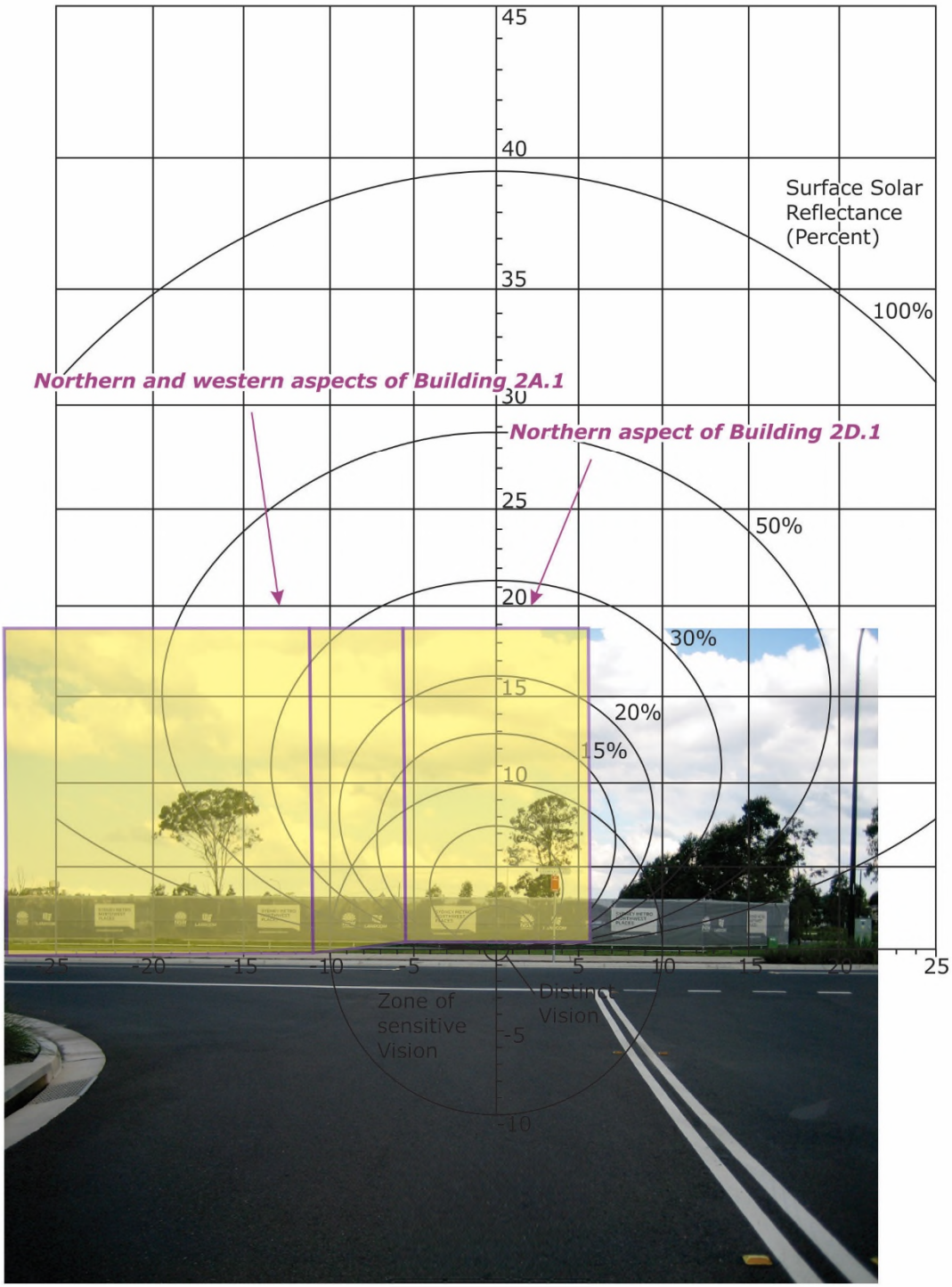

Figure A.3: Glare Overlay of the Viewpoint at Point AR03

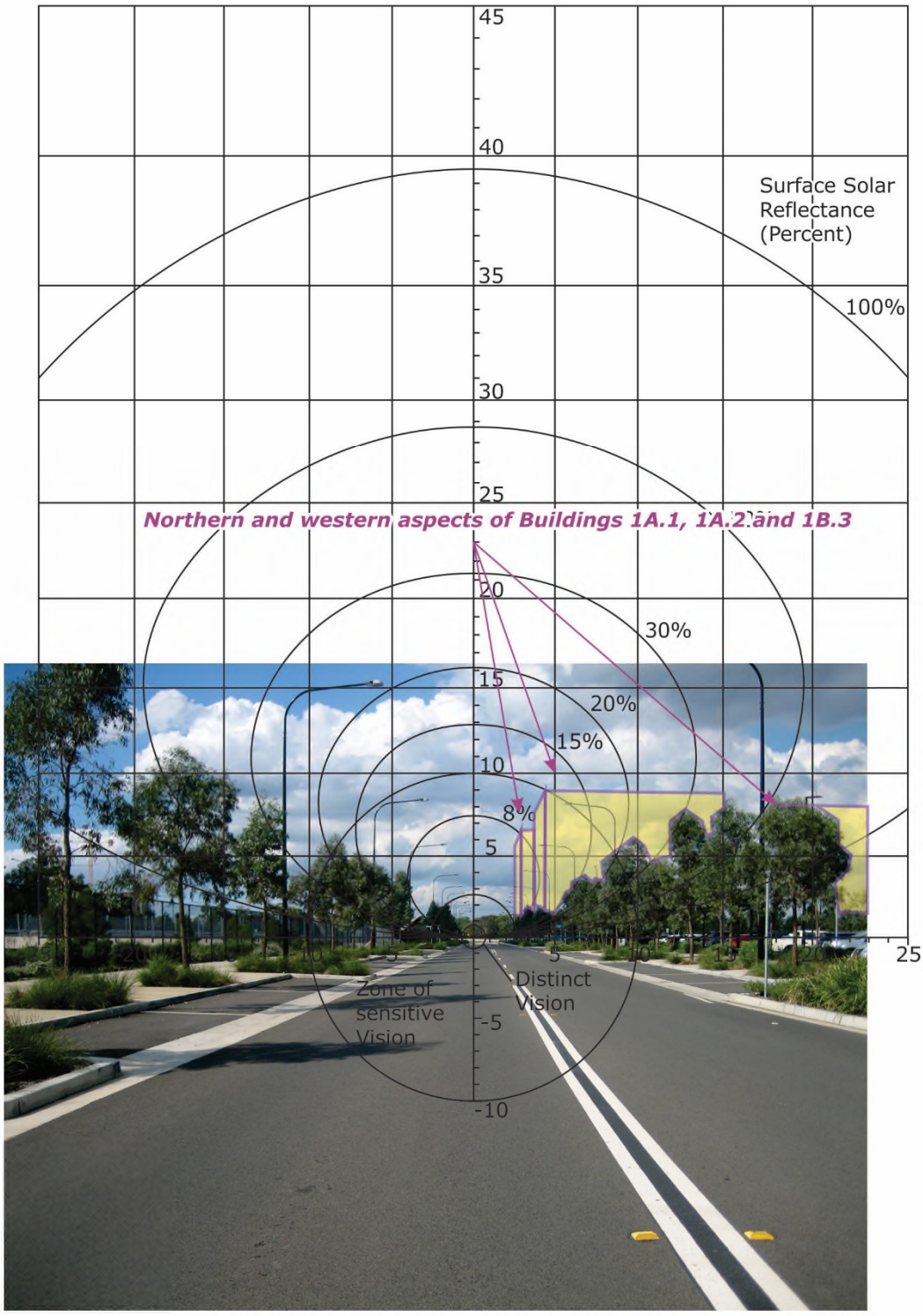

Figure A.4: Glare Overlay of the Viewpoint at Point TA01

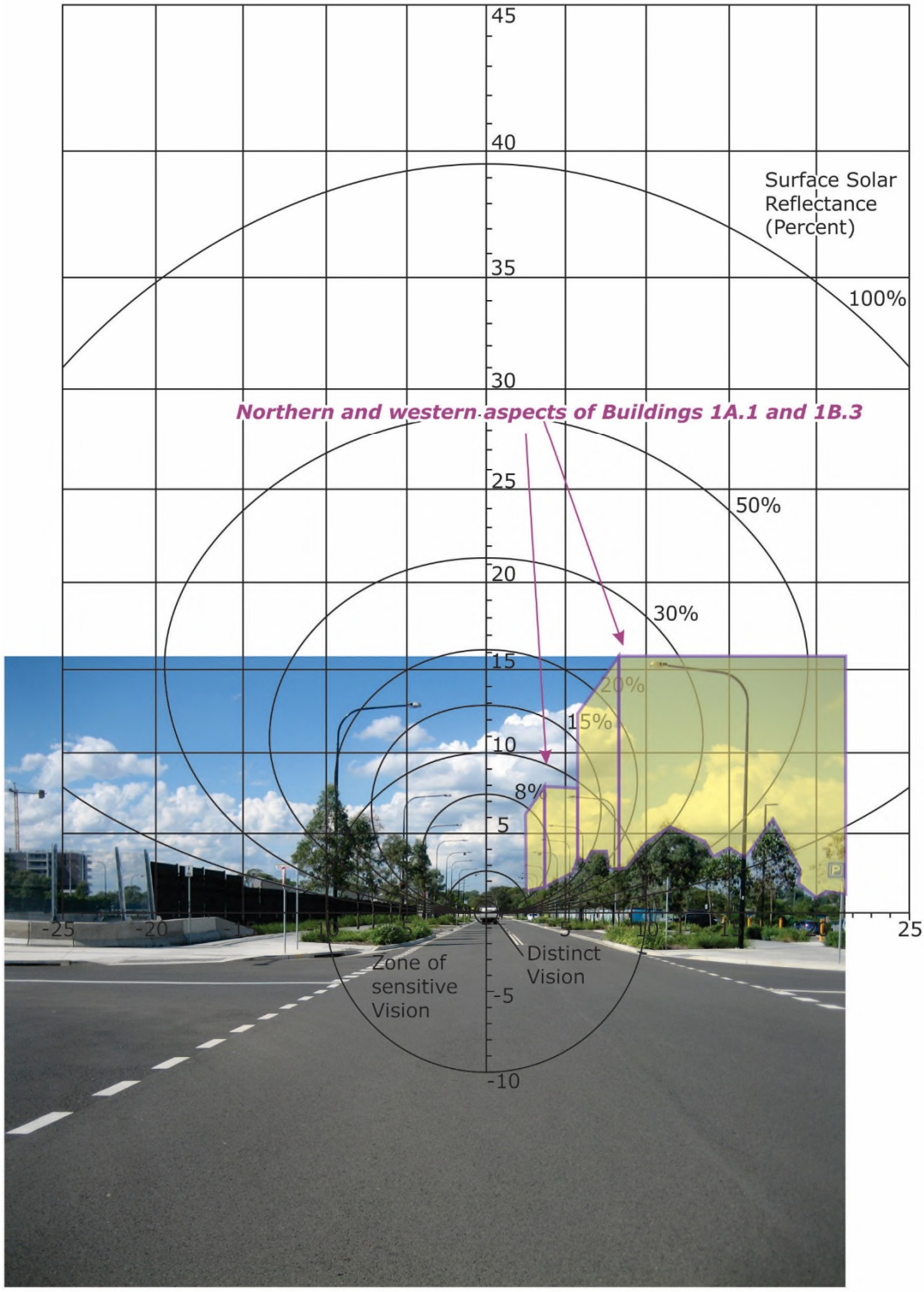

Figure A.5: Glare Overlay of the Viewpoint at Point TA02

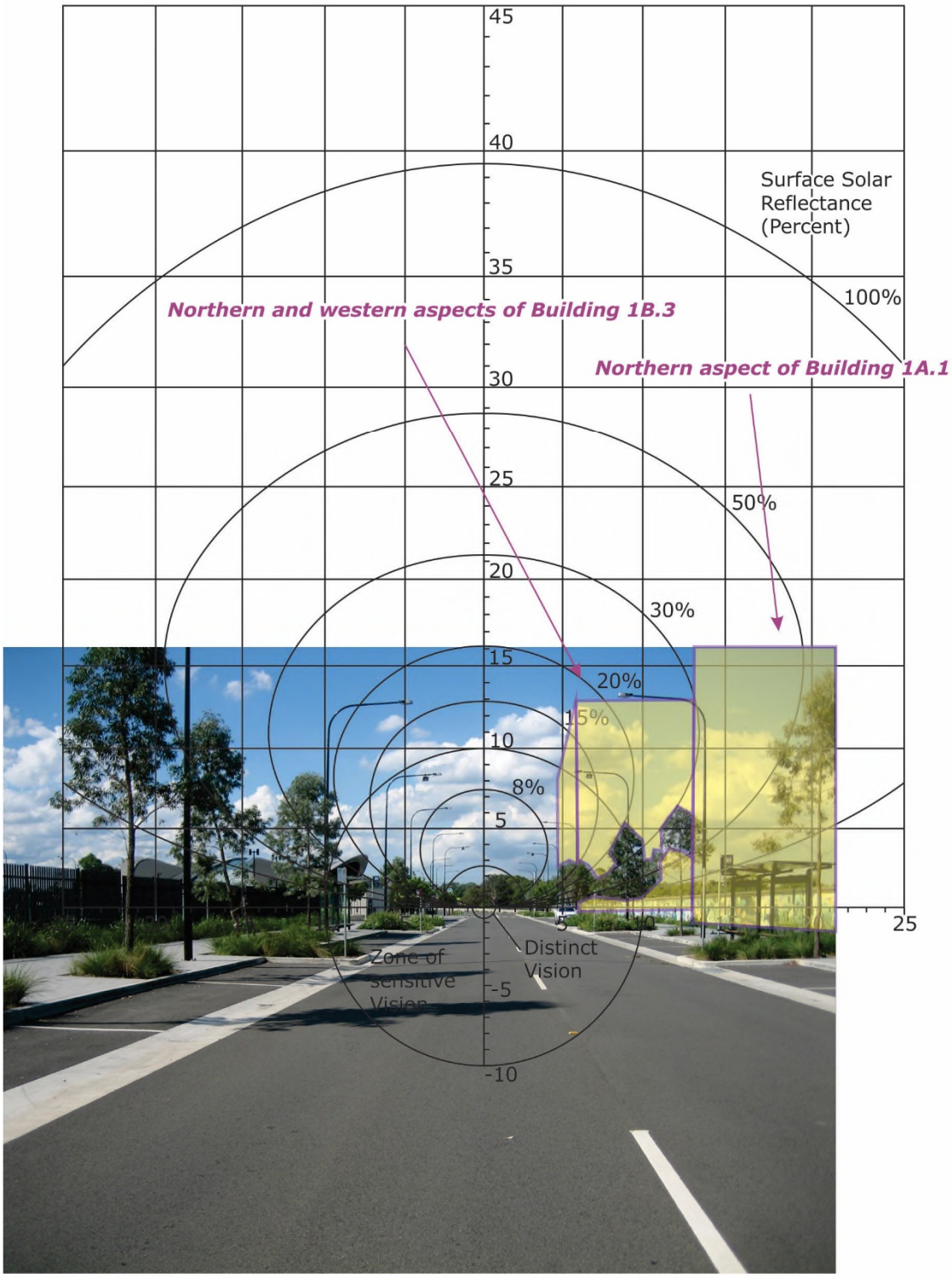

Figure A.6: Glare Overlay of the Viewpoint at Point TA03

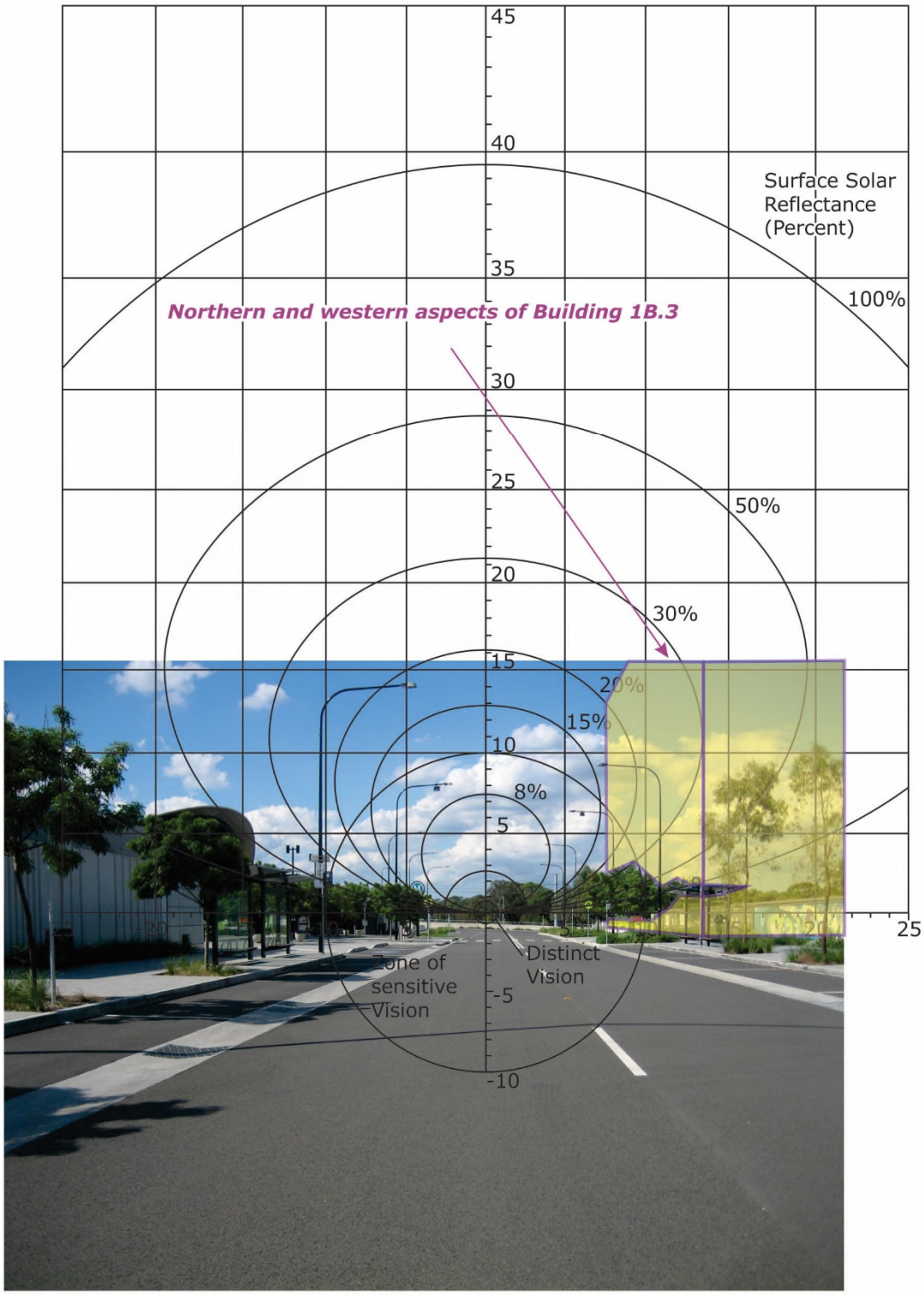

Figure A.7: Glare Overlay of the Viewpoint at Point TA04

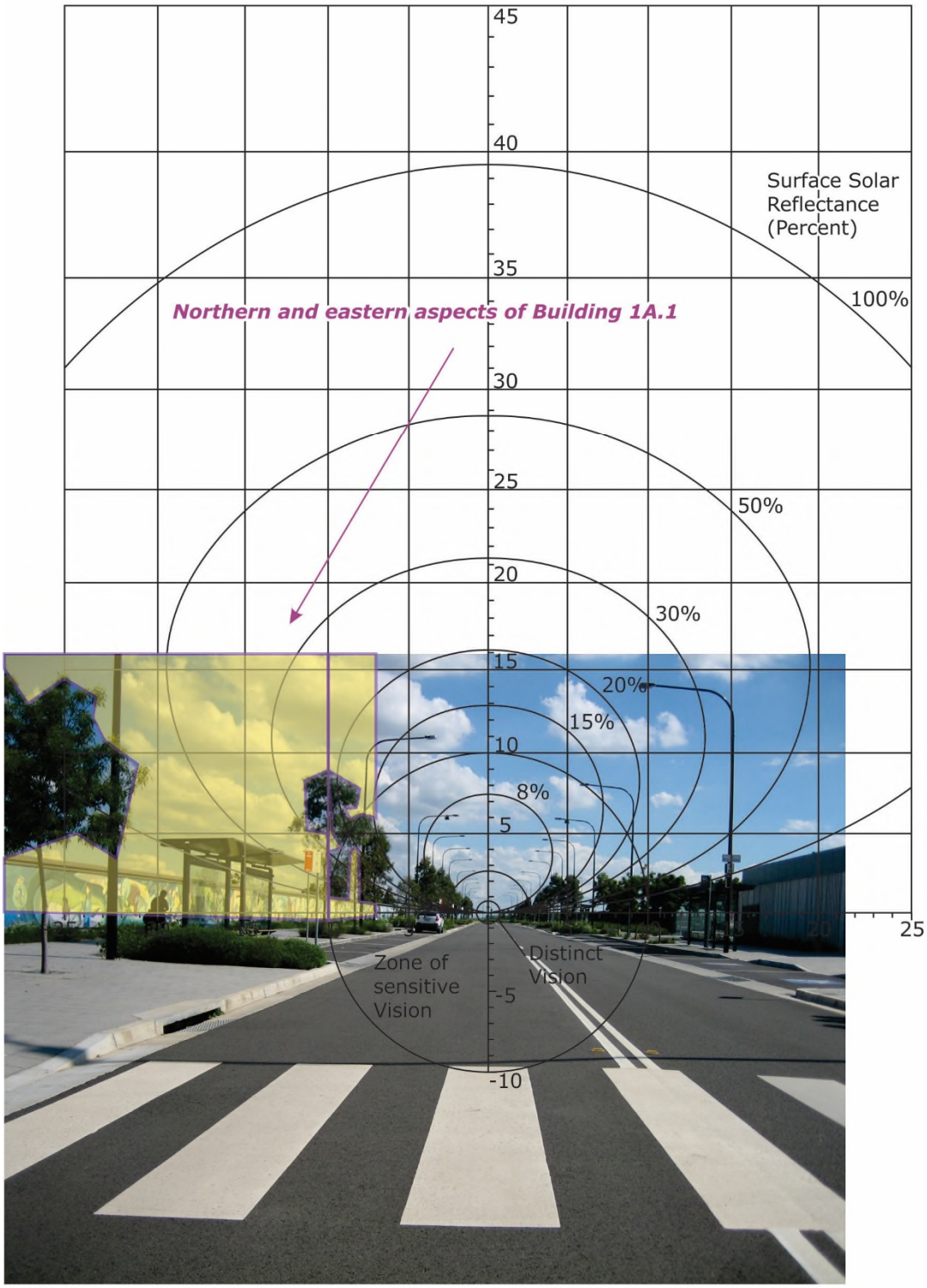

Figure A.8: Glare Overlay of the Viewpoint at Point TA05

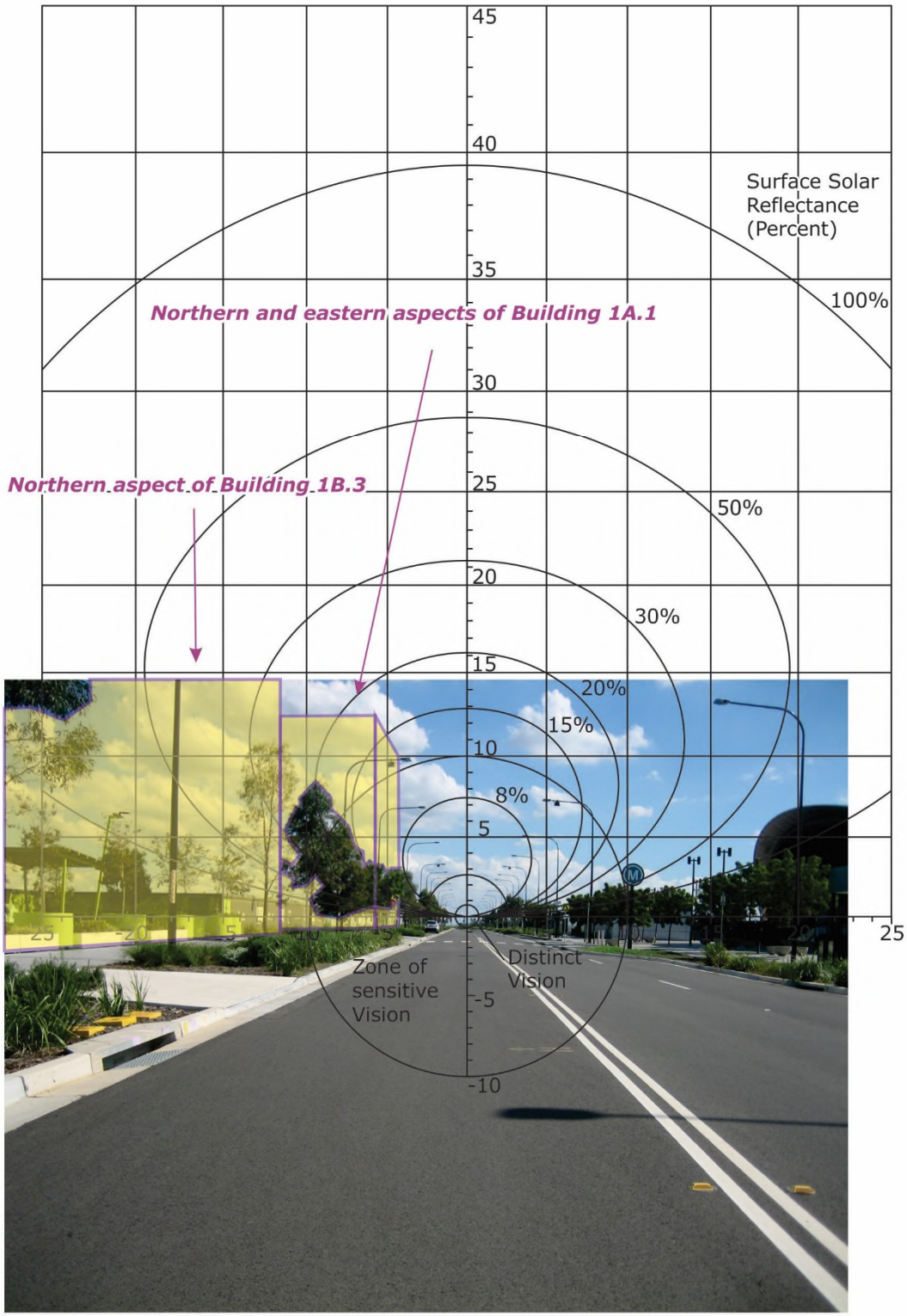

Figure A.9: Glare Overlay of the Viewpoint at Point TA06

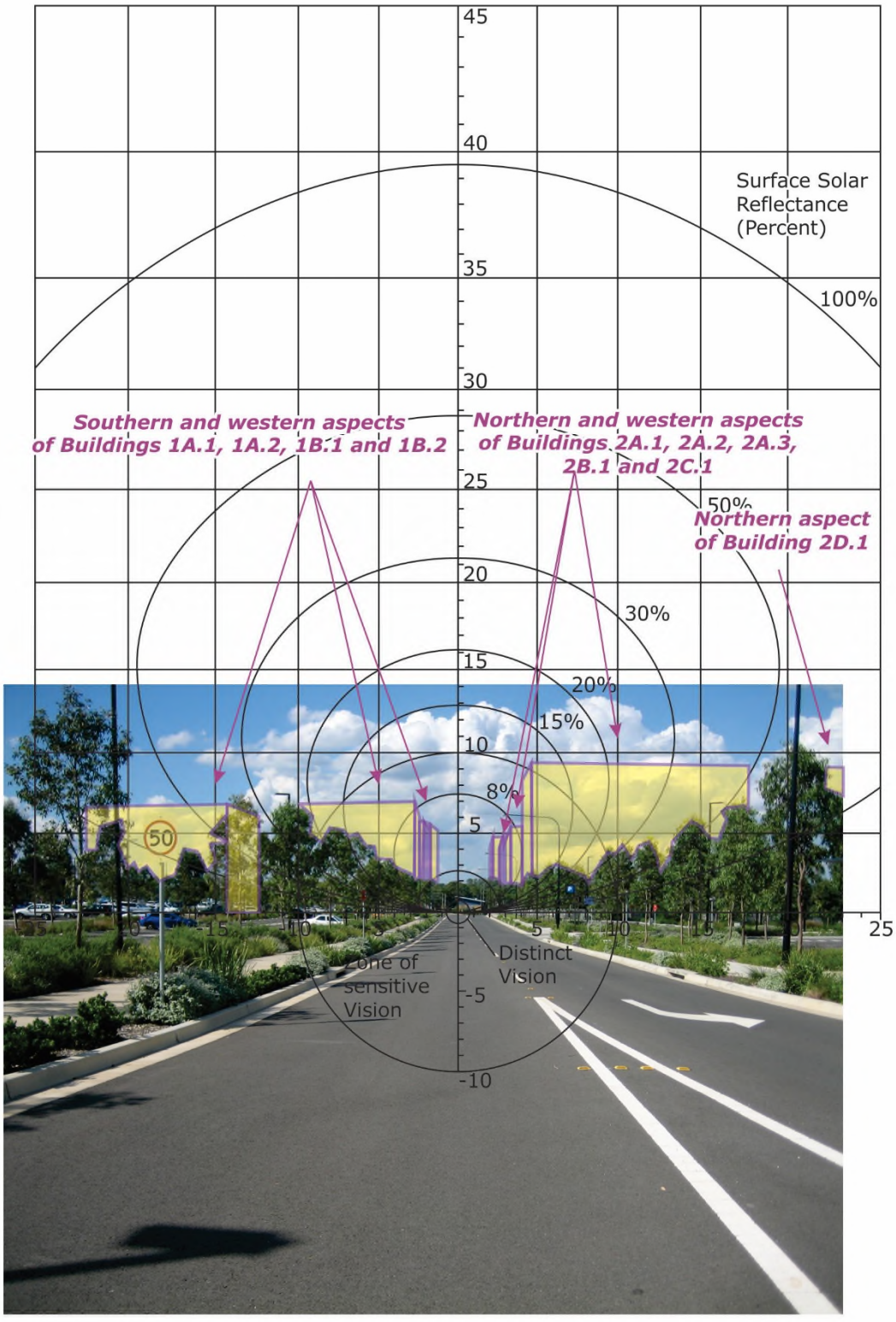

Figure A.10: Glare Overlay of the Viewpoint at Point CA01

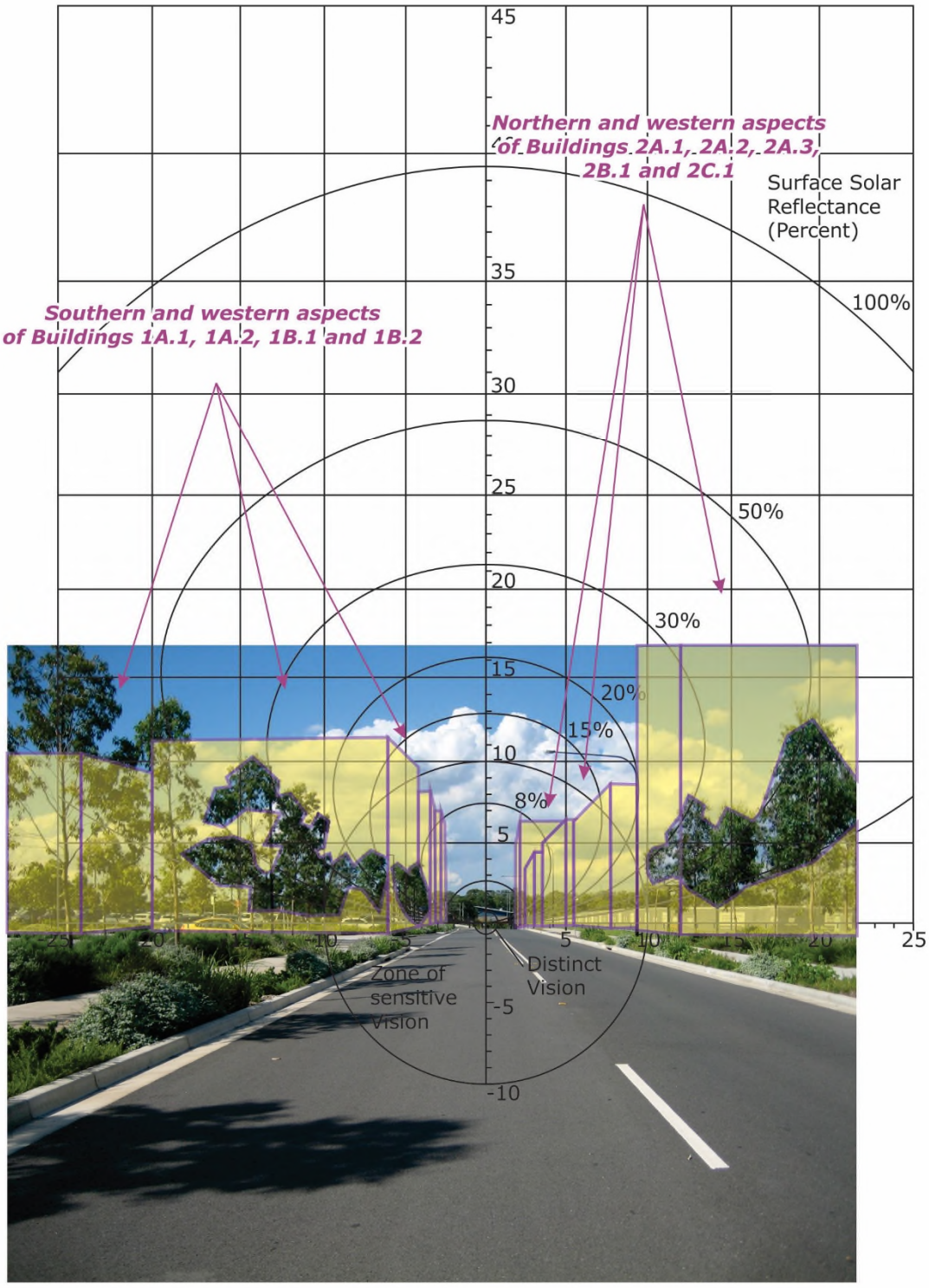

Figure A.11: Glare Overlay of the Viewpoint at Point CA02

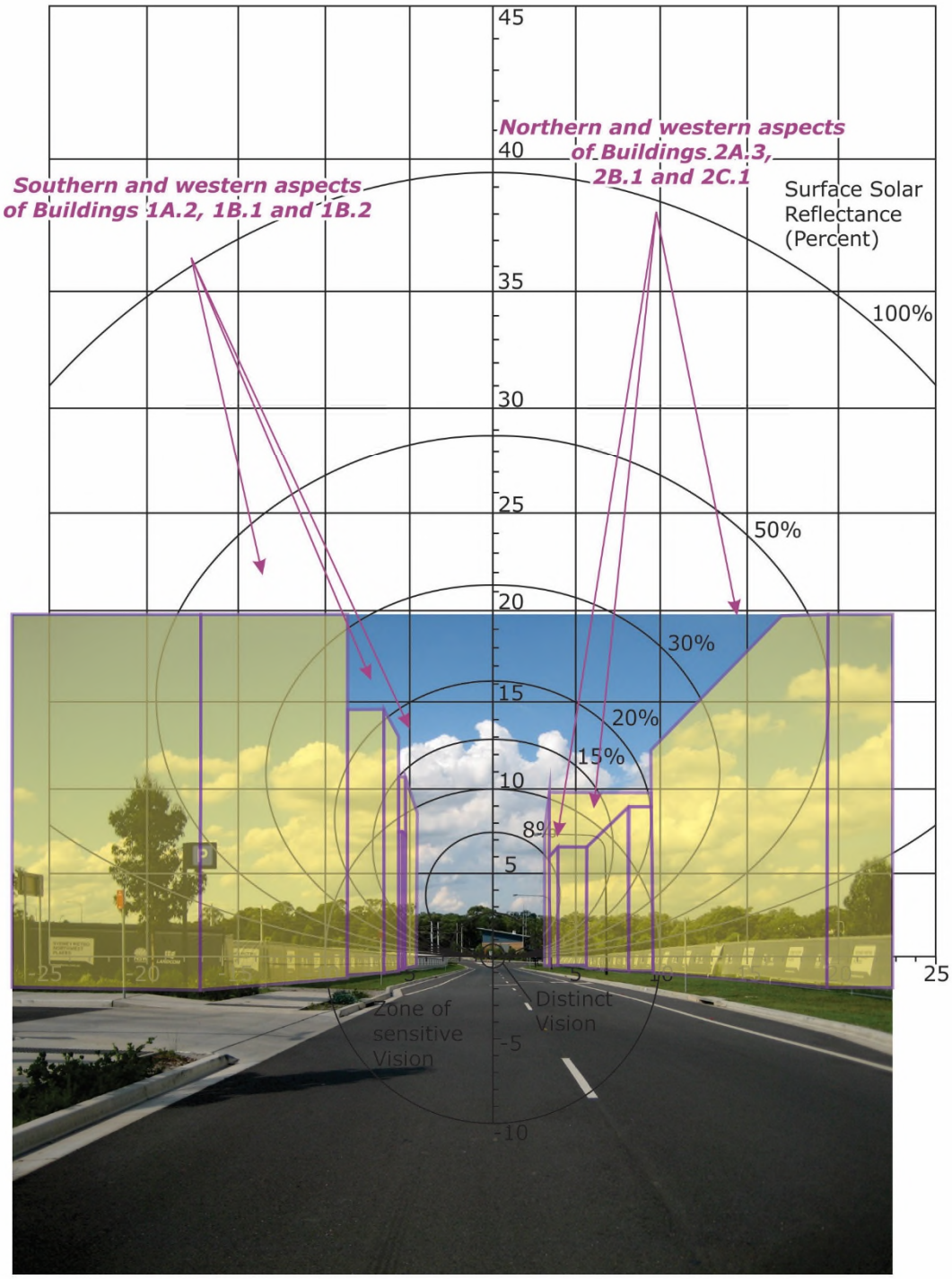

Figure A.12: Glare Overlay of the Viewpoint at Point CA03

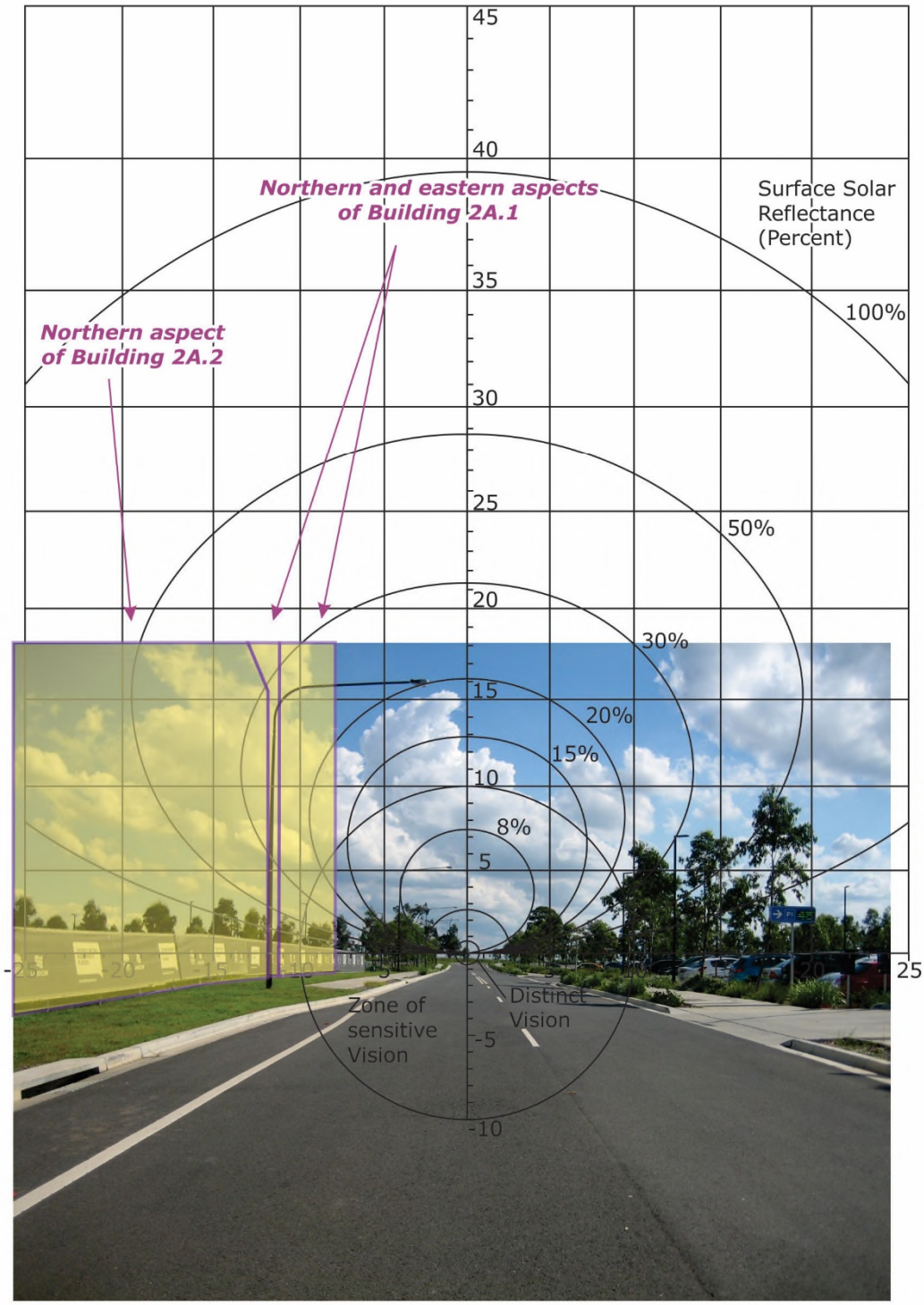

Figure A.13: Glare Overlay of the Viewpoint at Point CA04

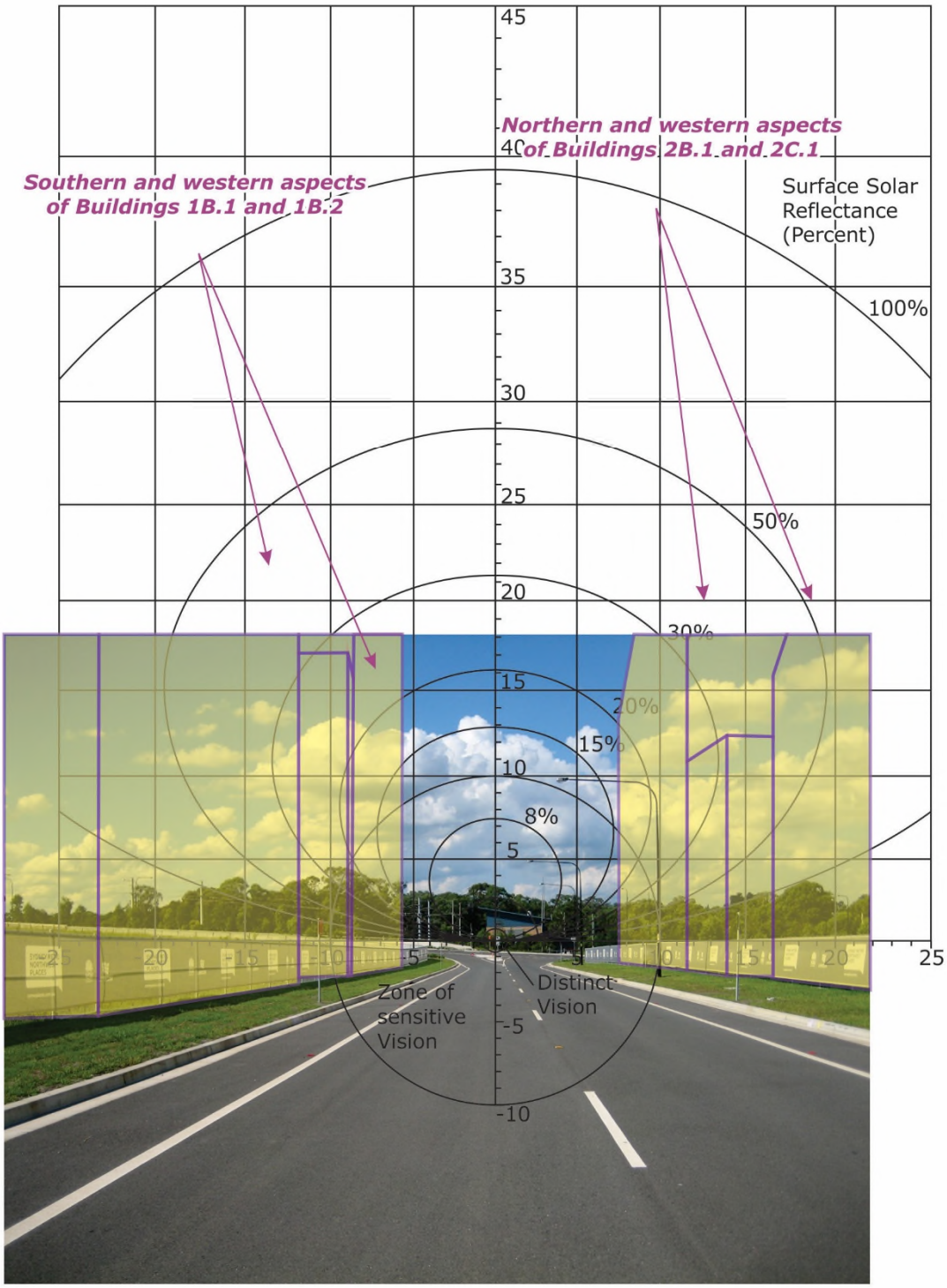

Figure A.14: Glare Overlay of the Viewpoint at Point CA05

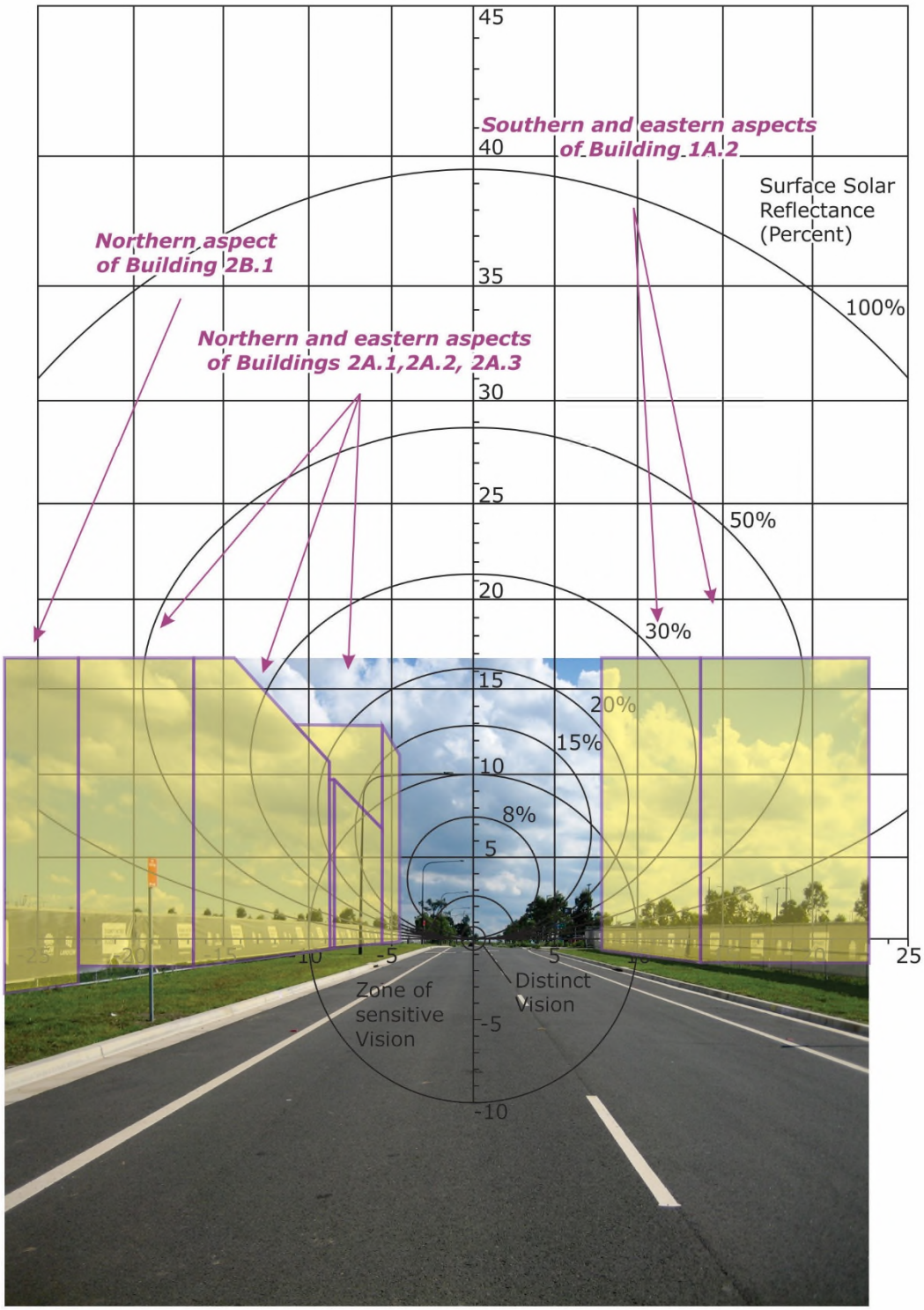

Figure A.15: Glare Overlay of the Viewpoint at Point CA06

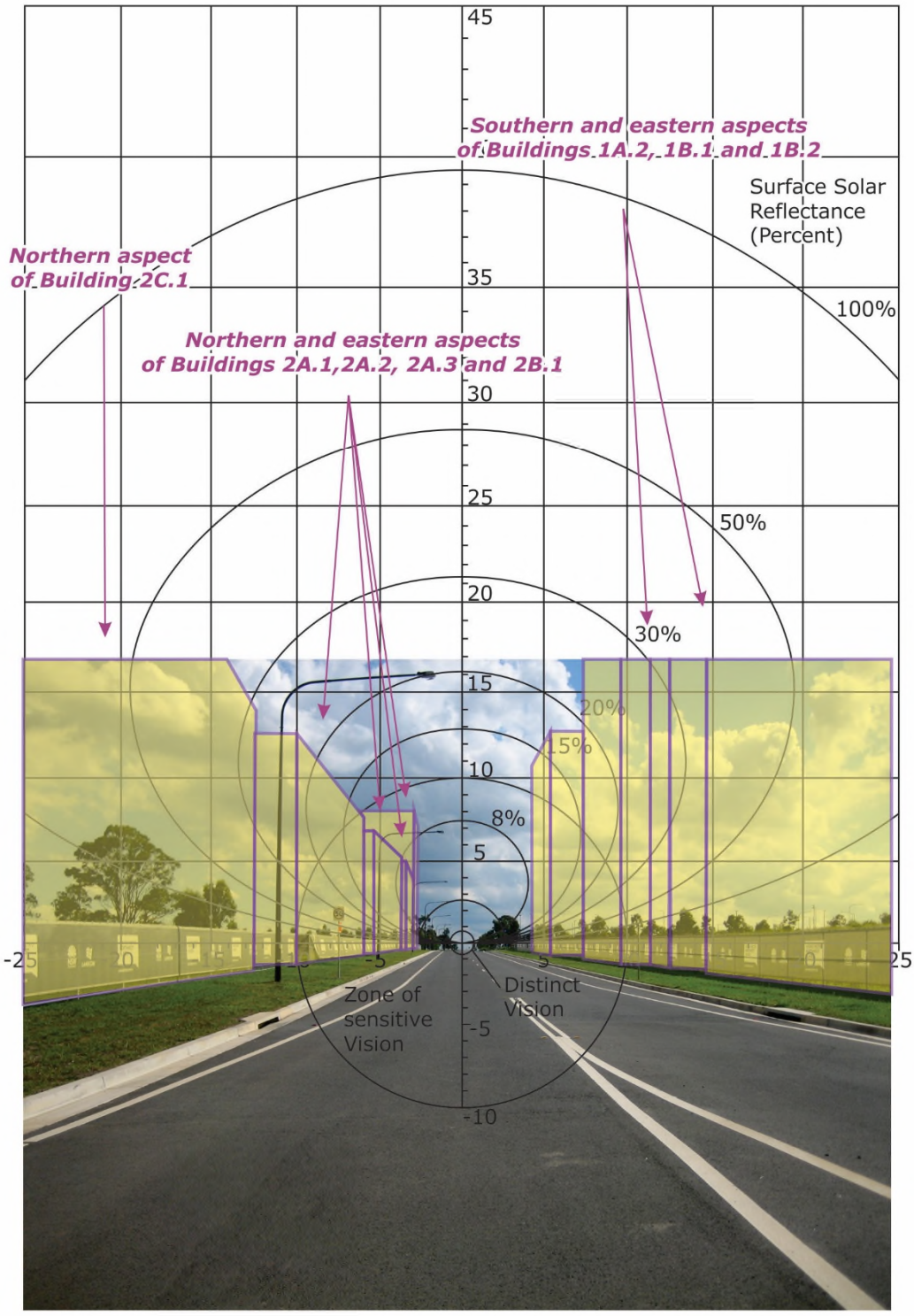

Figure A.16: Glare Overlay of the Viewpoint at Point CA07

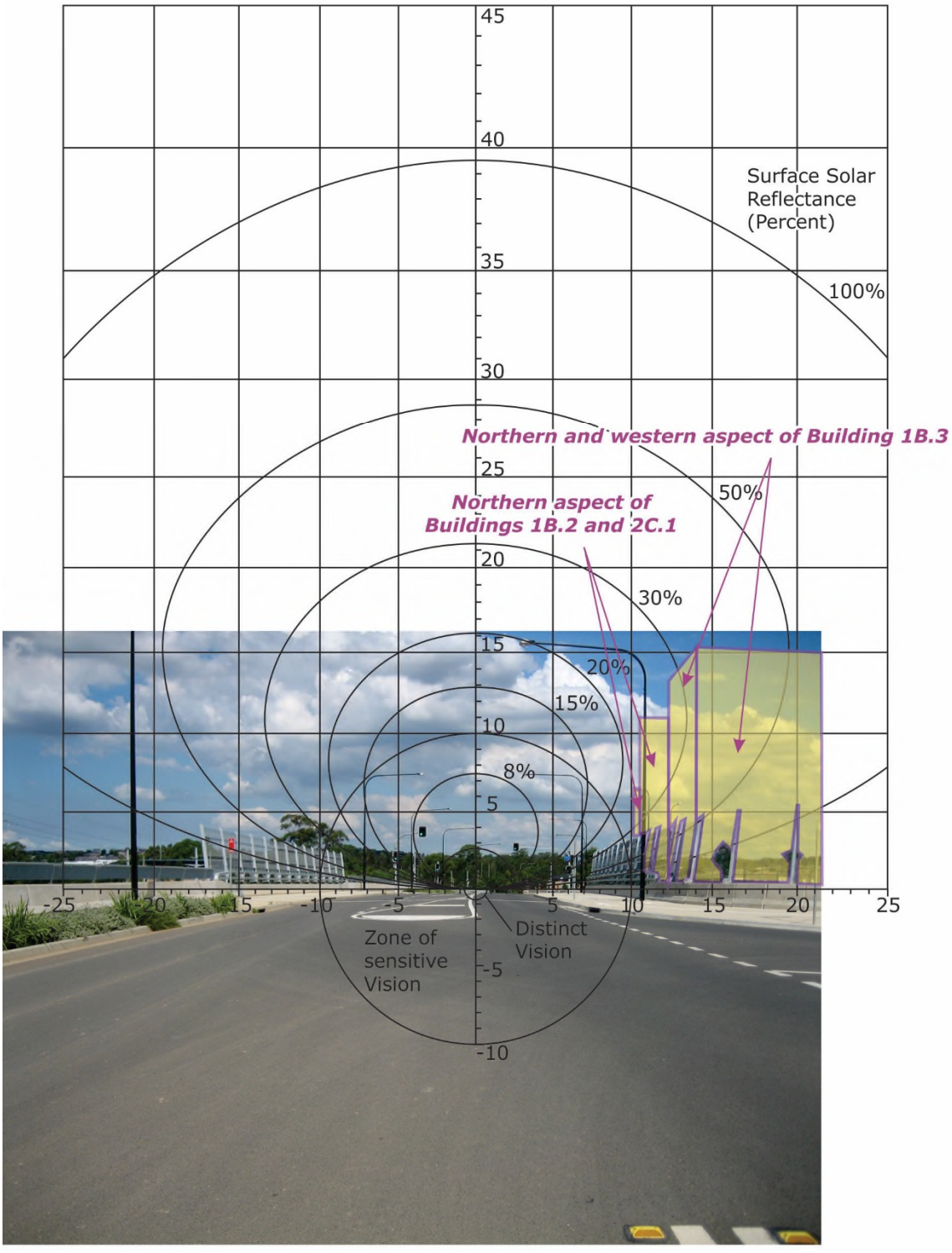

Figure A.17: Glare Overlay of the Viewpoint at Point CR01

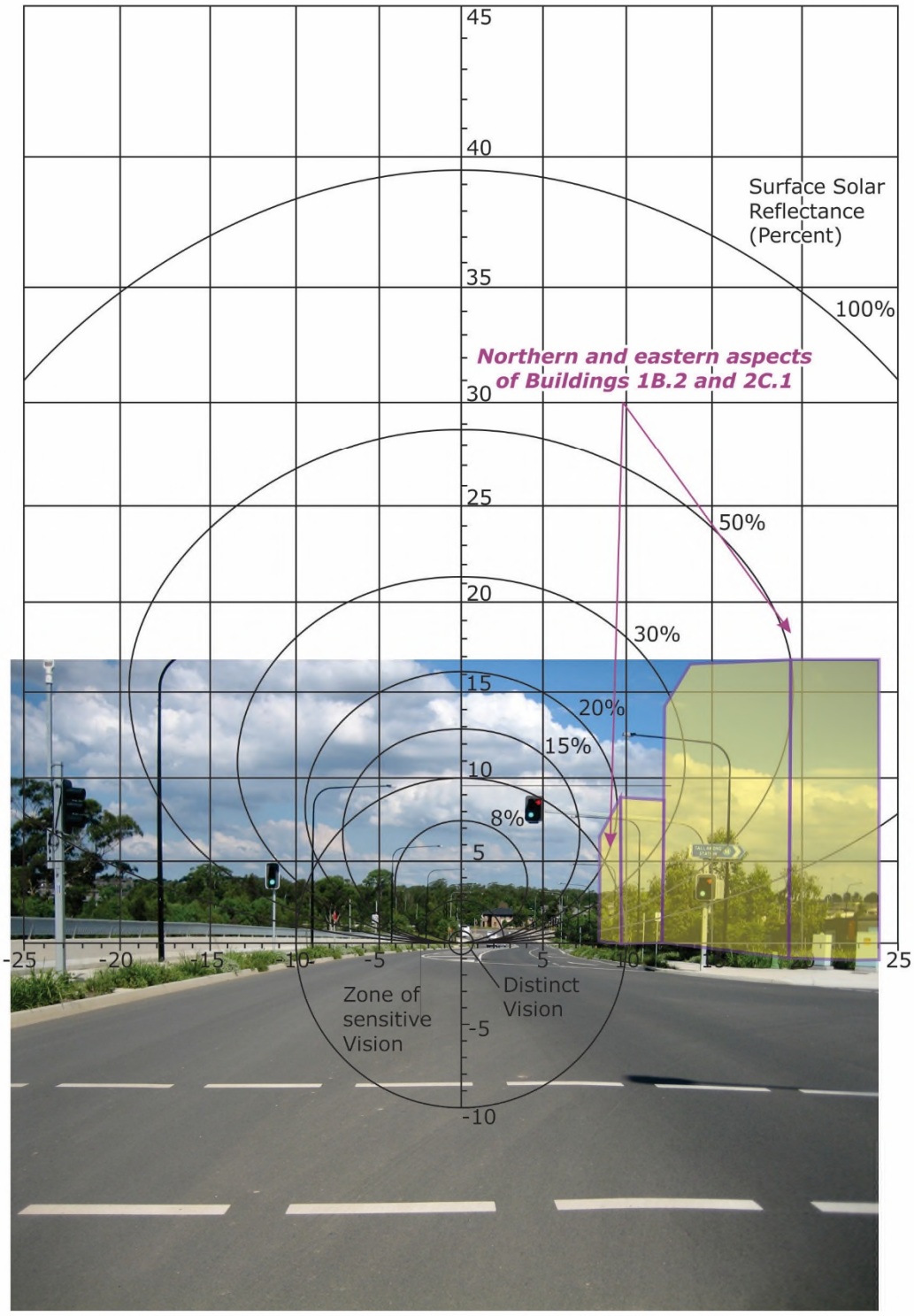

Figure A.18: Glare Overlay of the Viewpoint at Point CR02

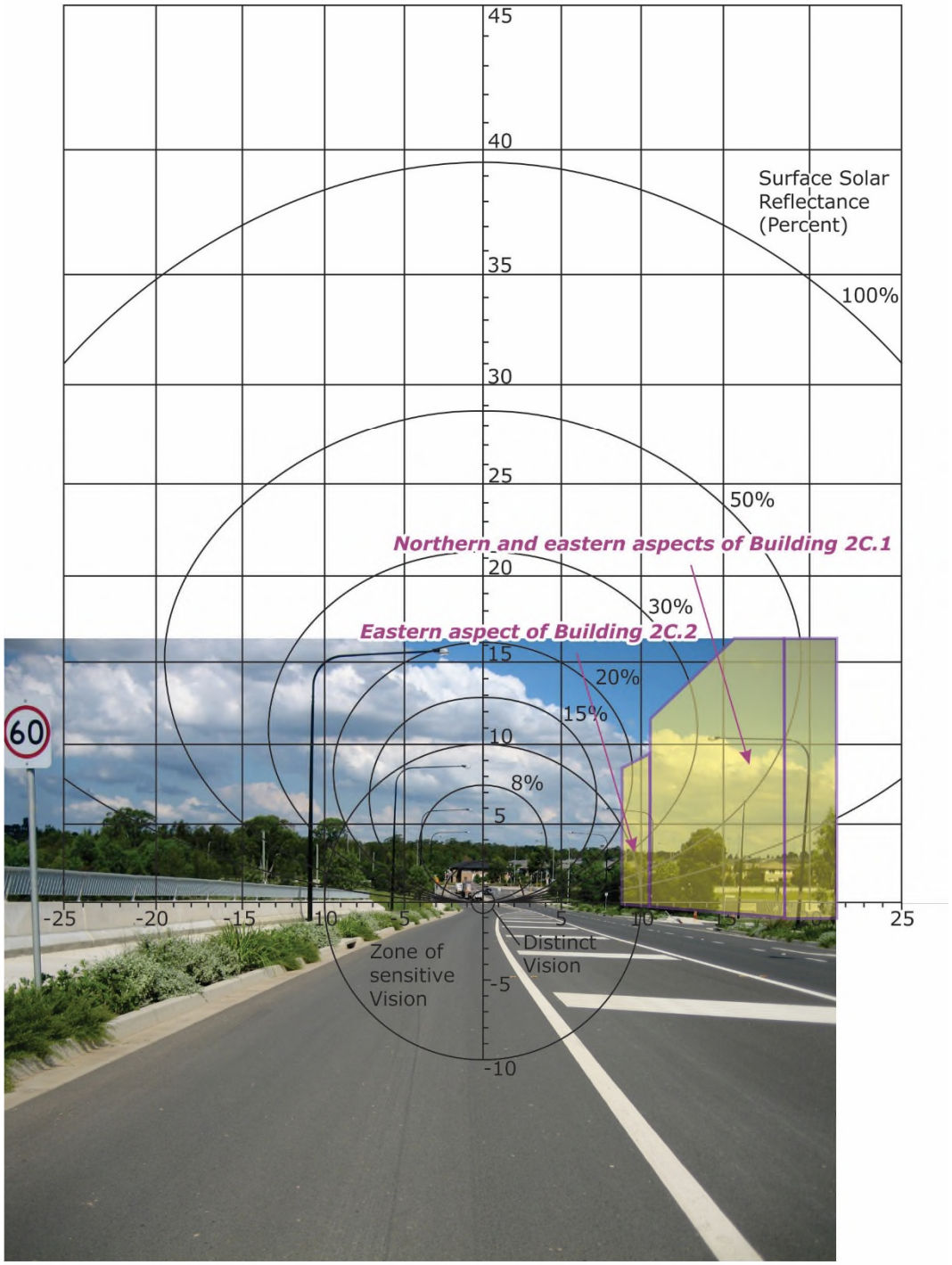

Figure A.19: Glare Overlay of the Viewpoint at Point CR03

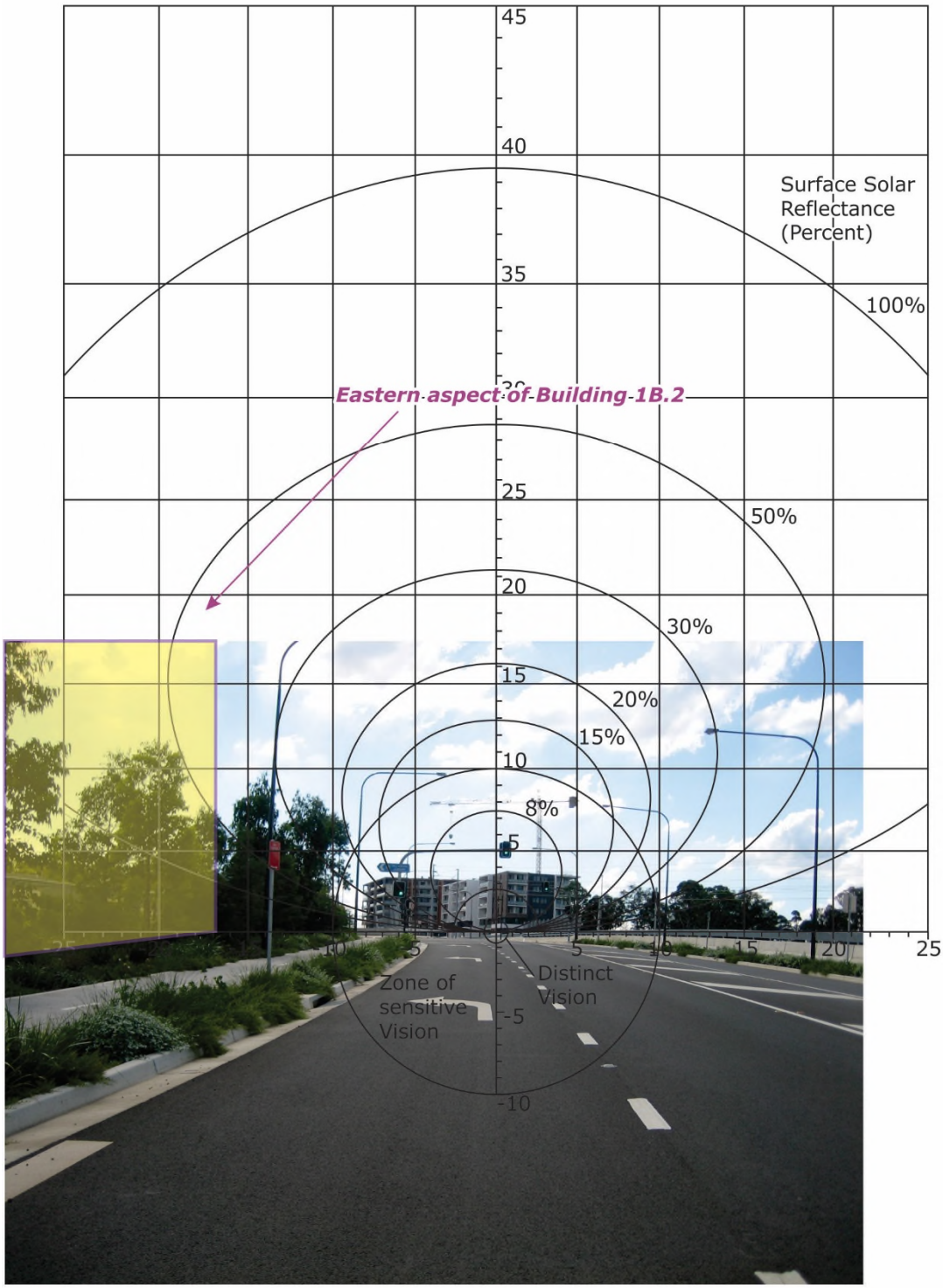

Figure A.20: Glare Overlay of the Viewpoint at Point CR04

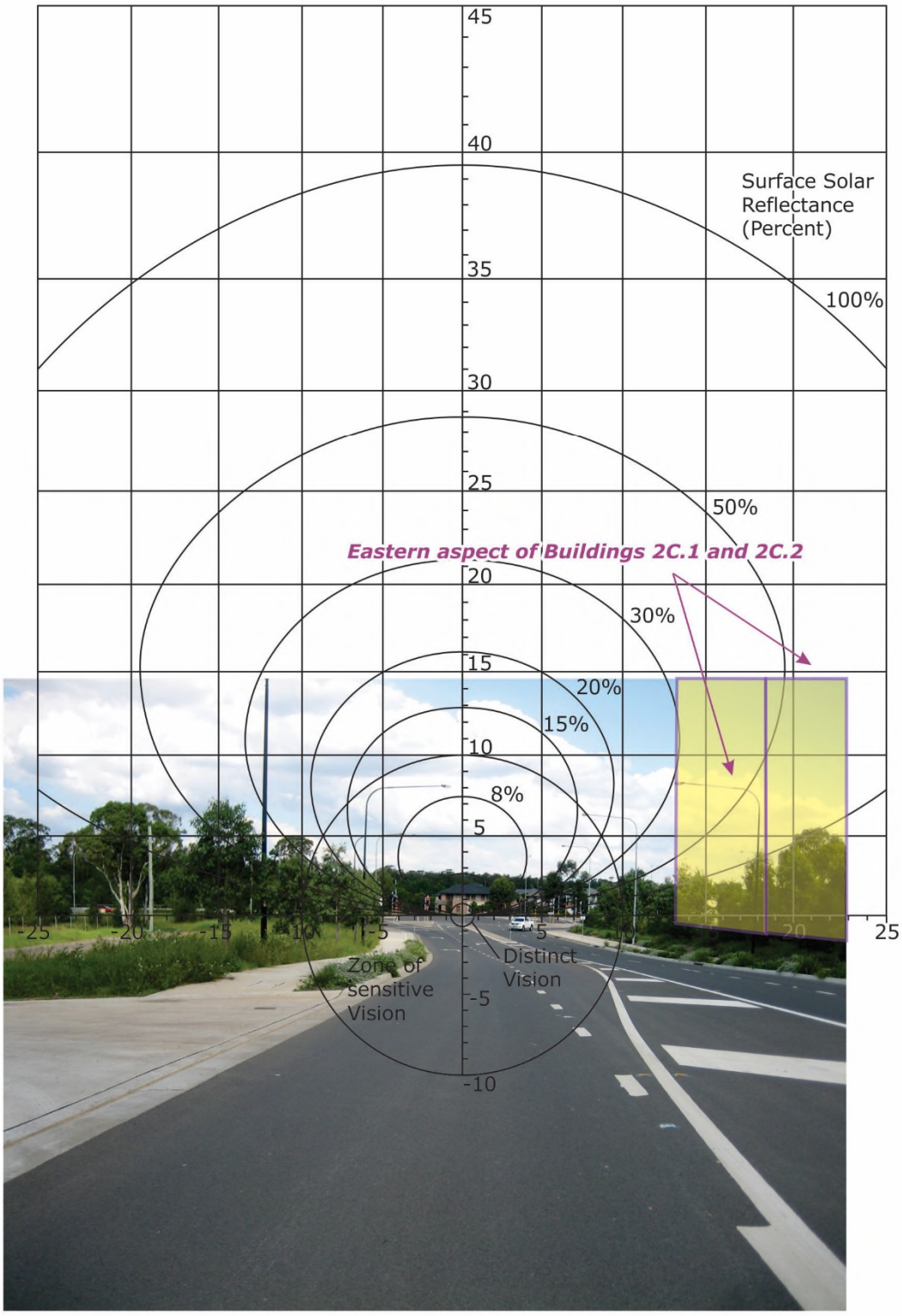

Figure A.21: Glare Overlay of the Viewpoint at Point CR05

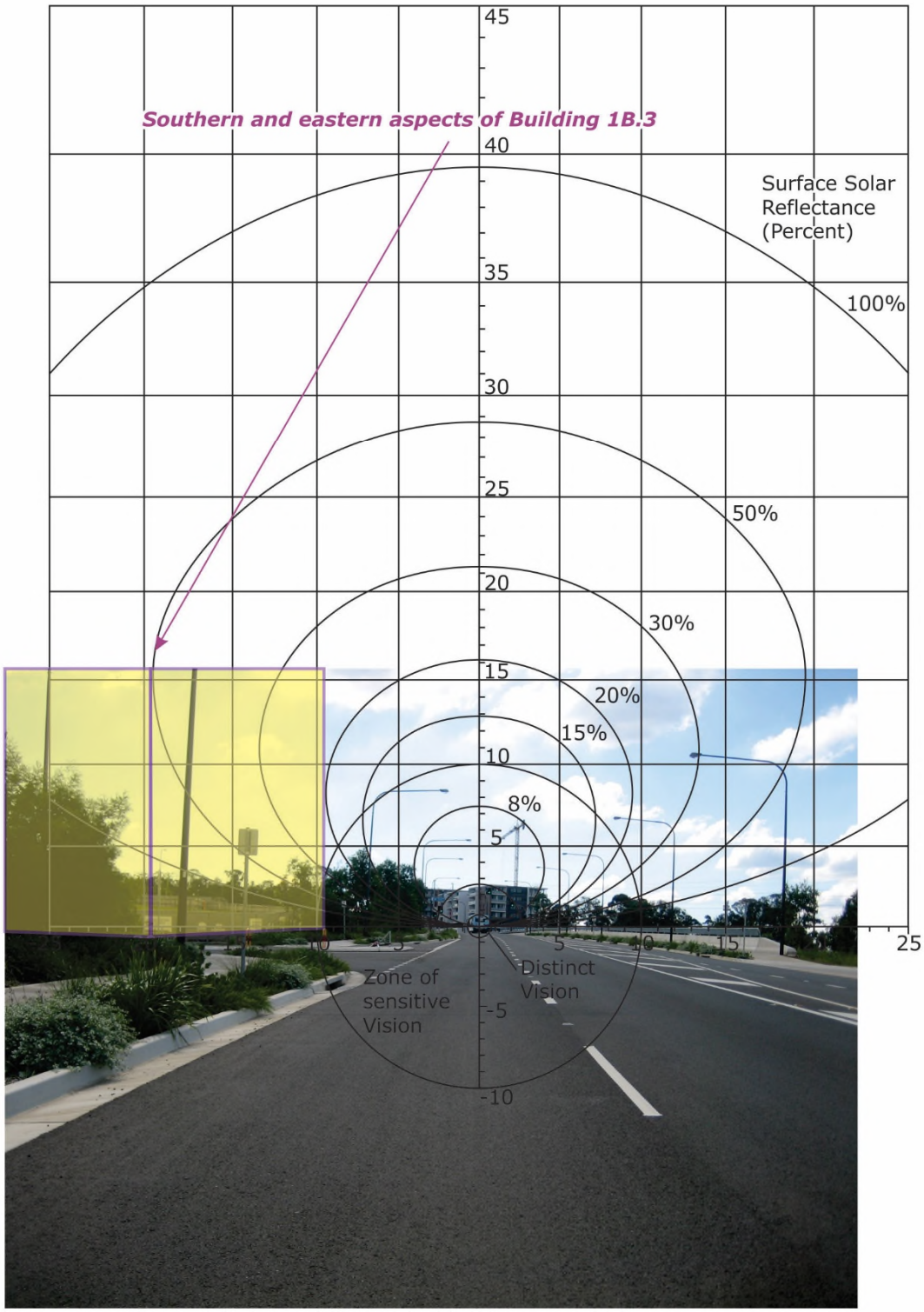

Figure A.22: Glare Overlay of the Viewpoint at Point CR06

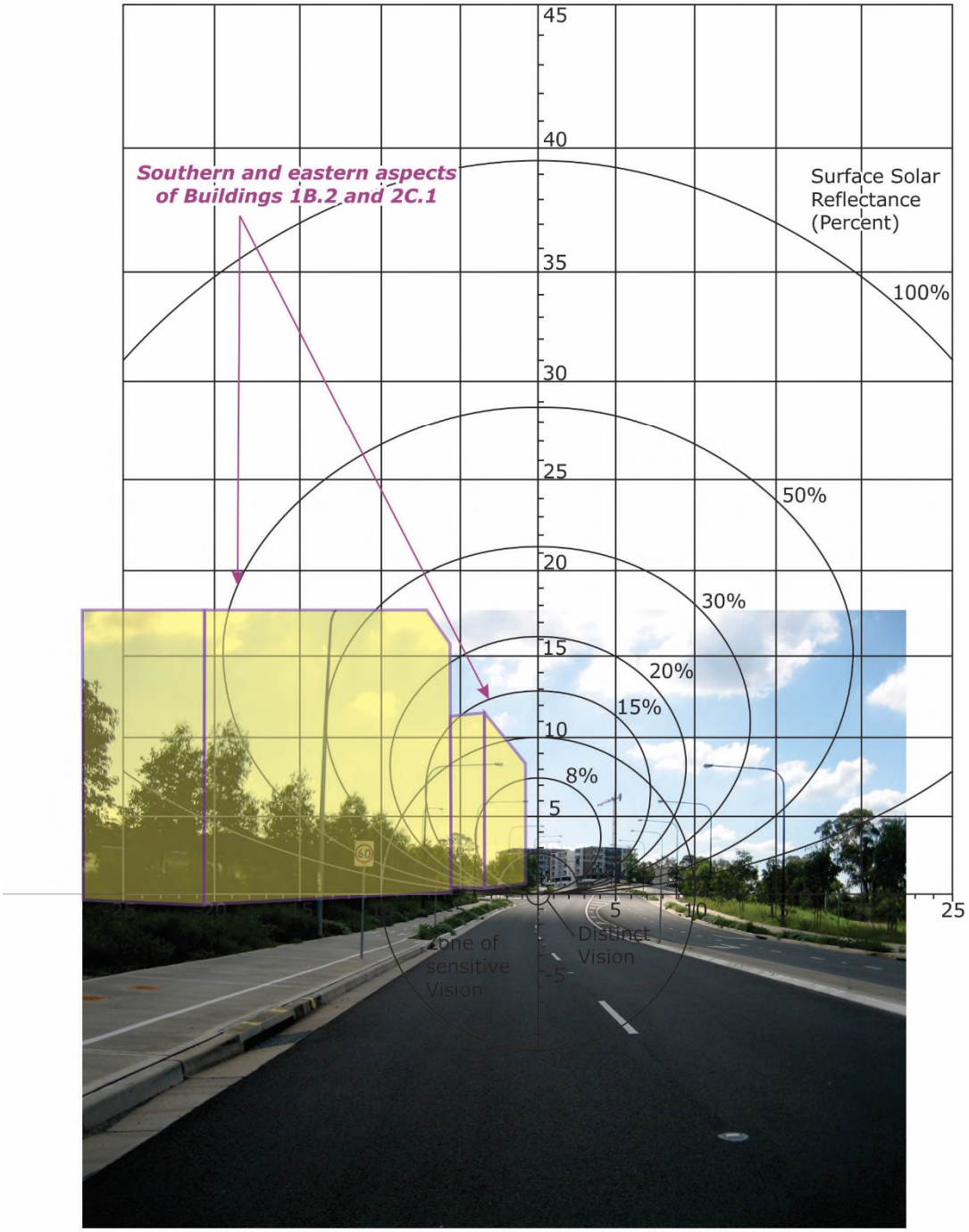

Figure A.23: Glare Overlay of the Viewpoint at Point CR07

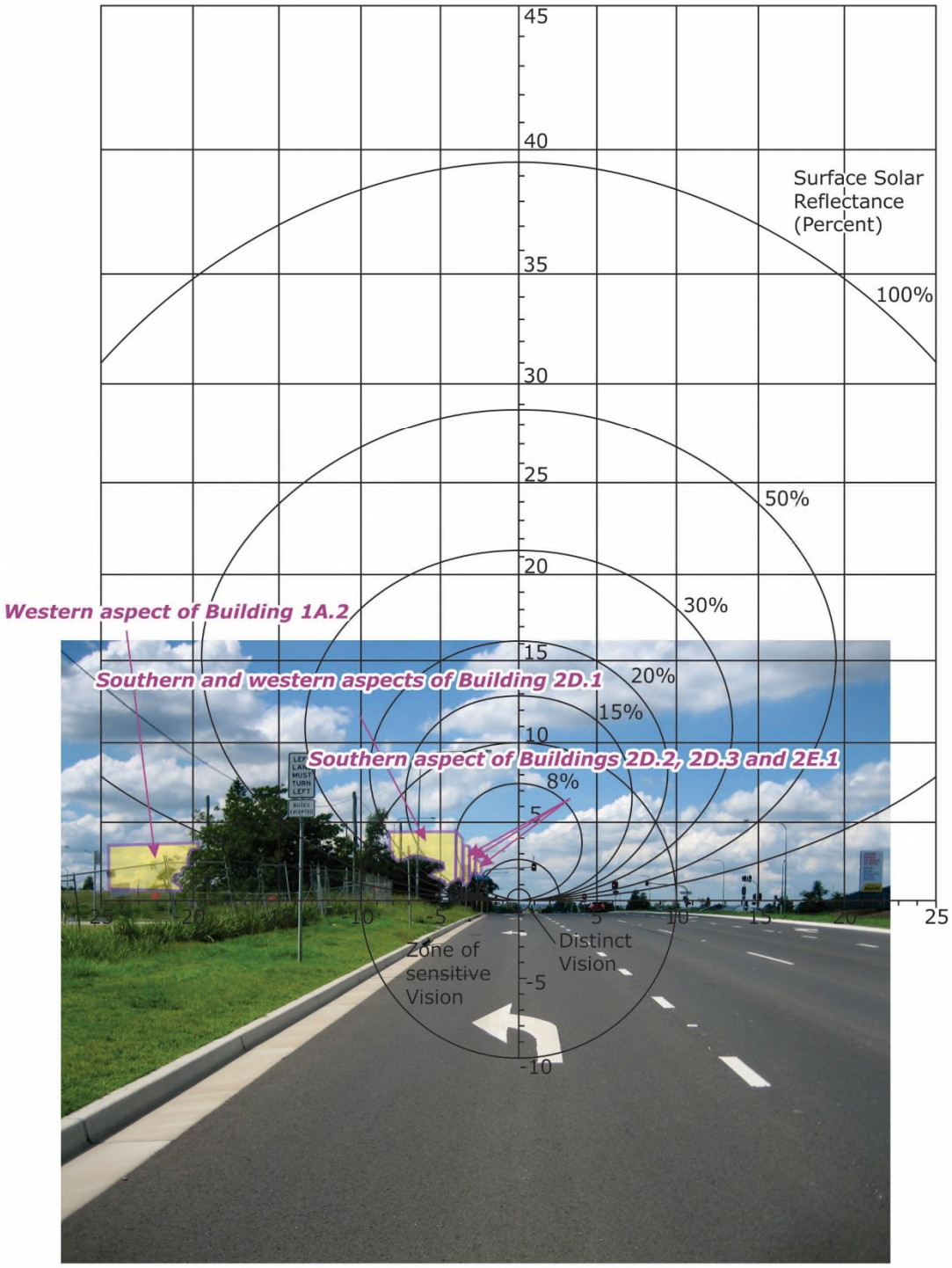

Figure A.24: Glare Overlay of the Viewpoint at Point SR01

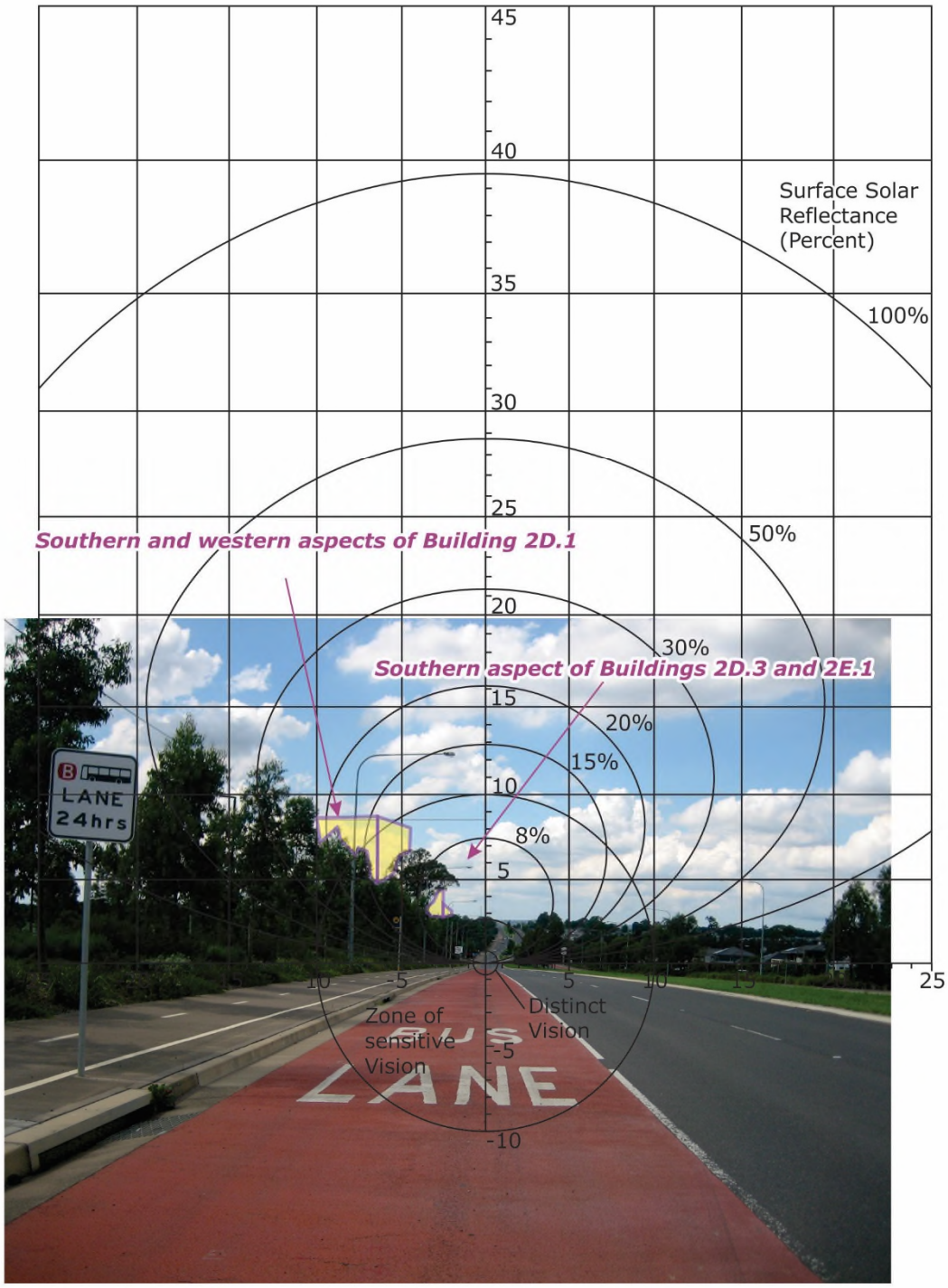

Figure A.25: Glare Overlay of the Viewpoint at Point SR02

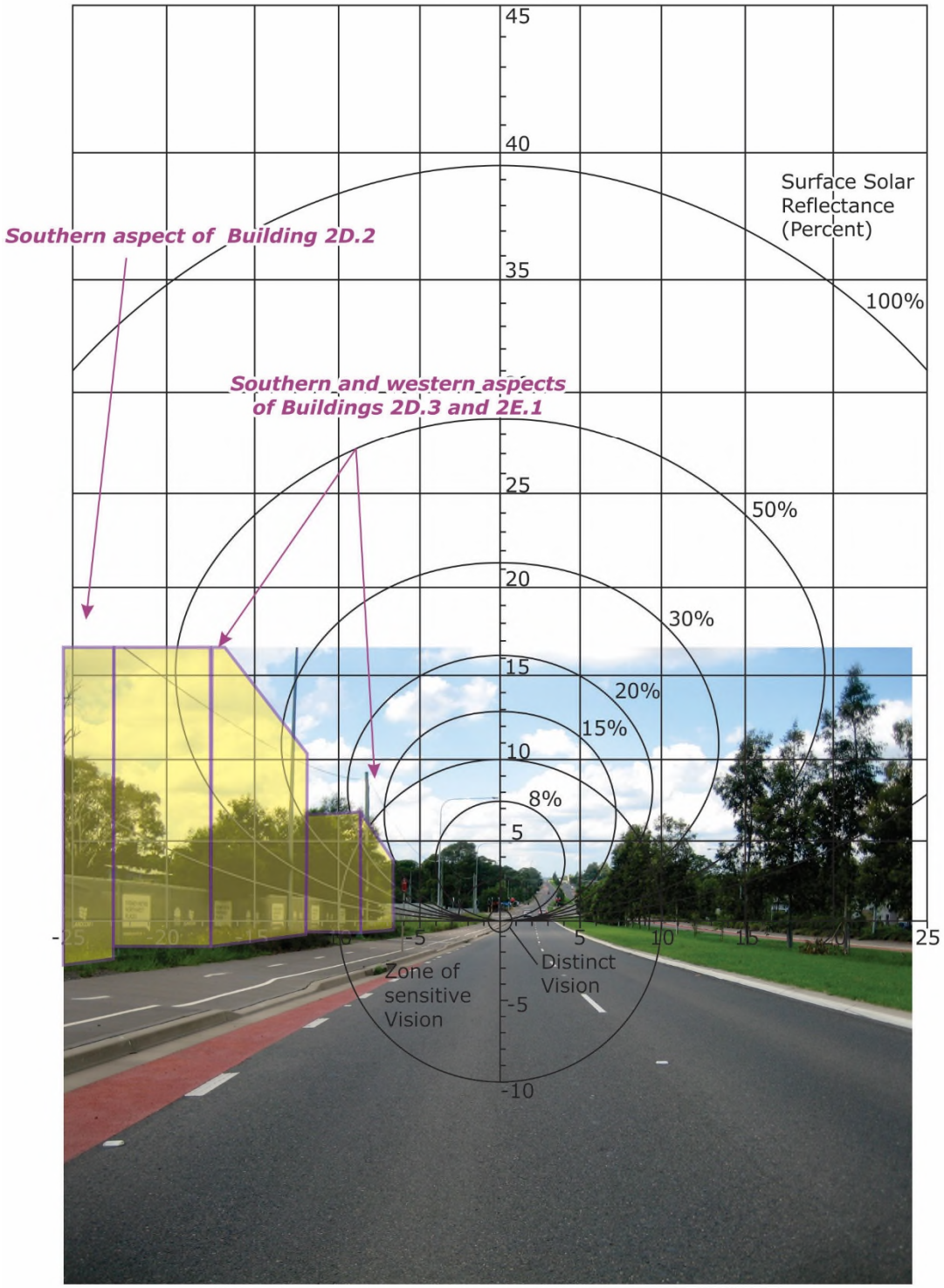

Figure A.26: Glare Overlay of the Viewpoint at Point SR03

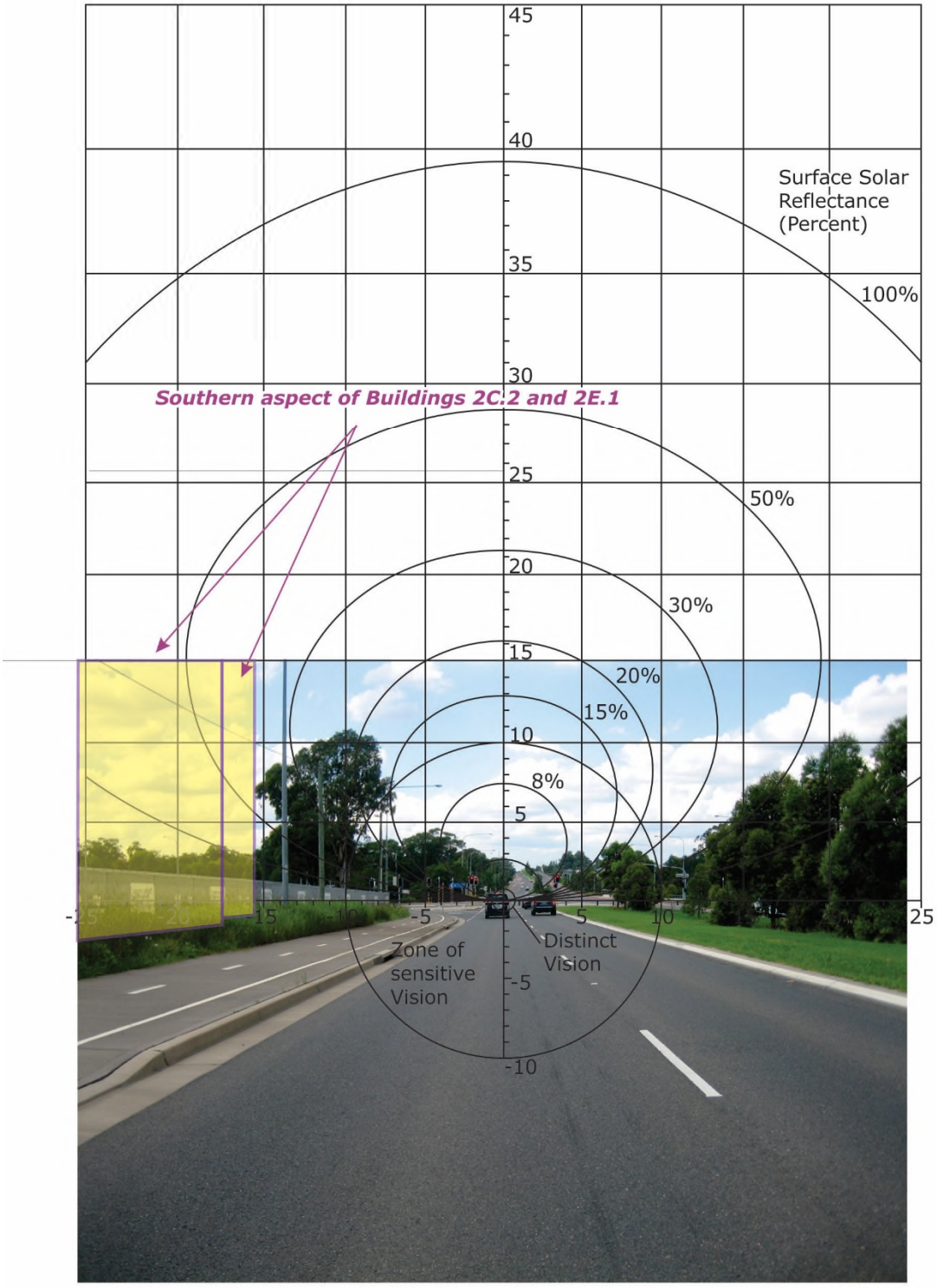

Figure A.27: Glare Overlay of the Viewpoint at Point SR04

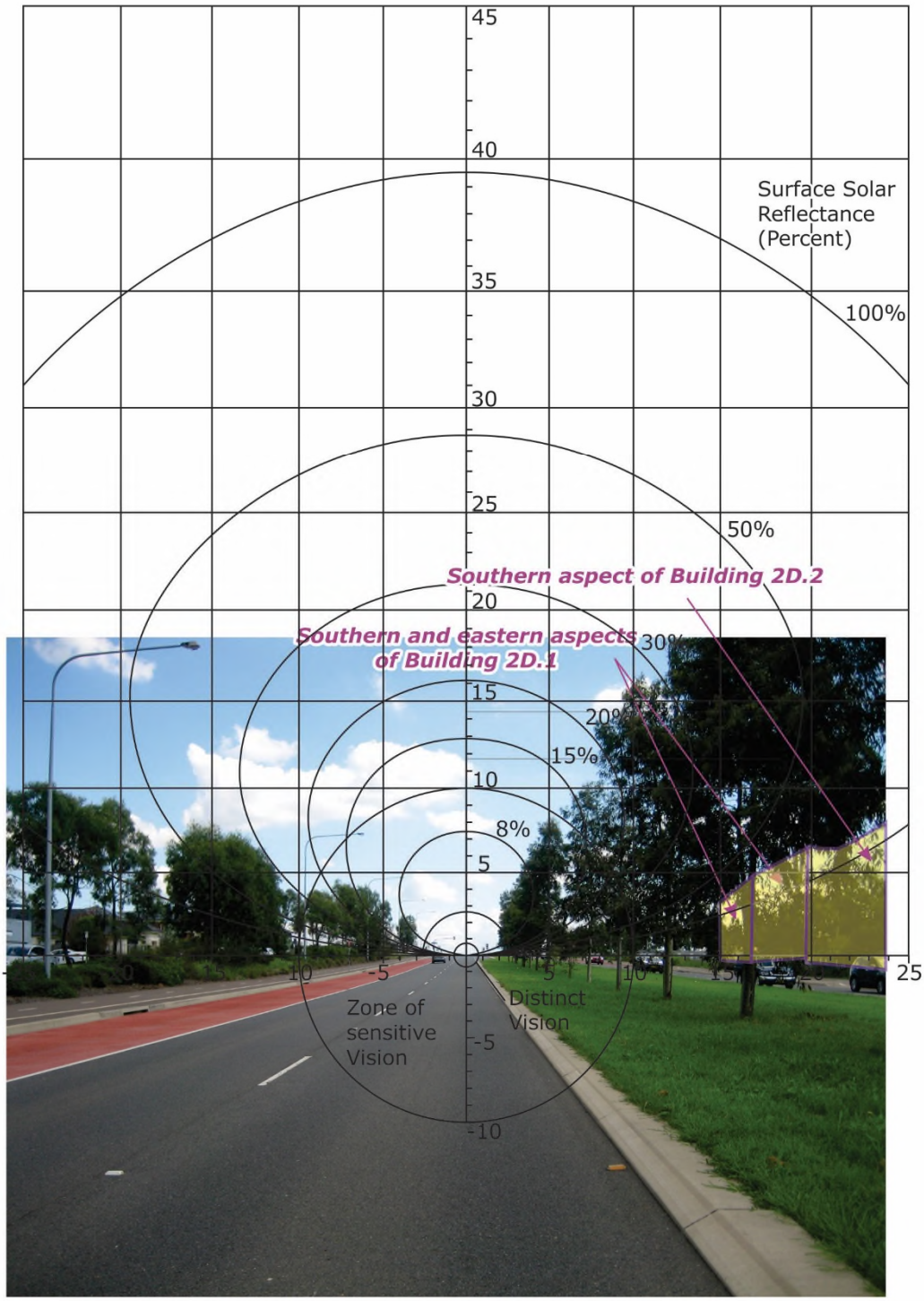

Figure A.28: Glare Overlay of the Viewpoint at Point SR05

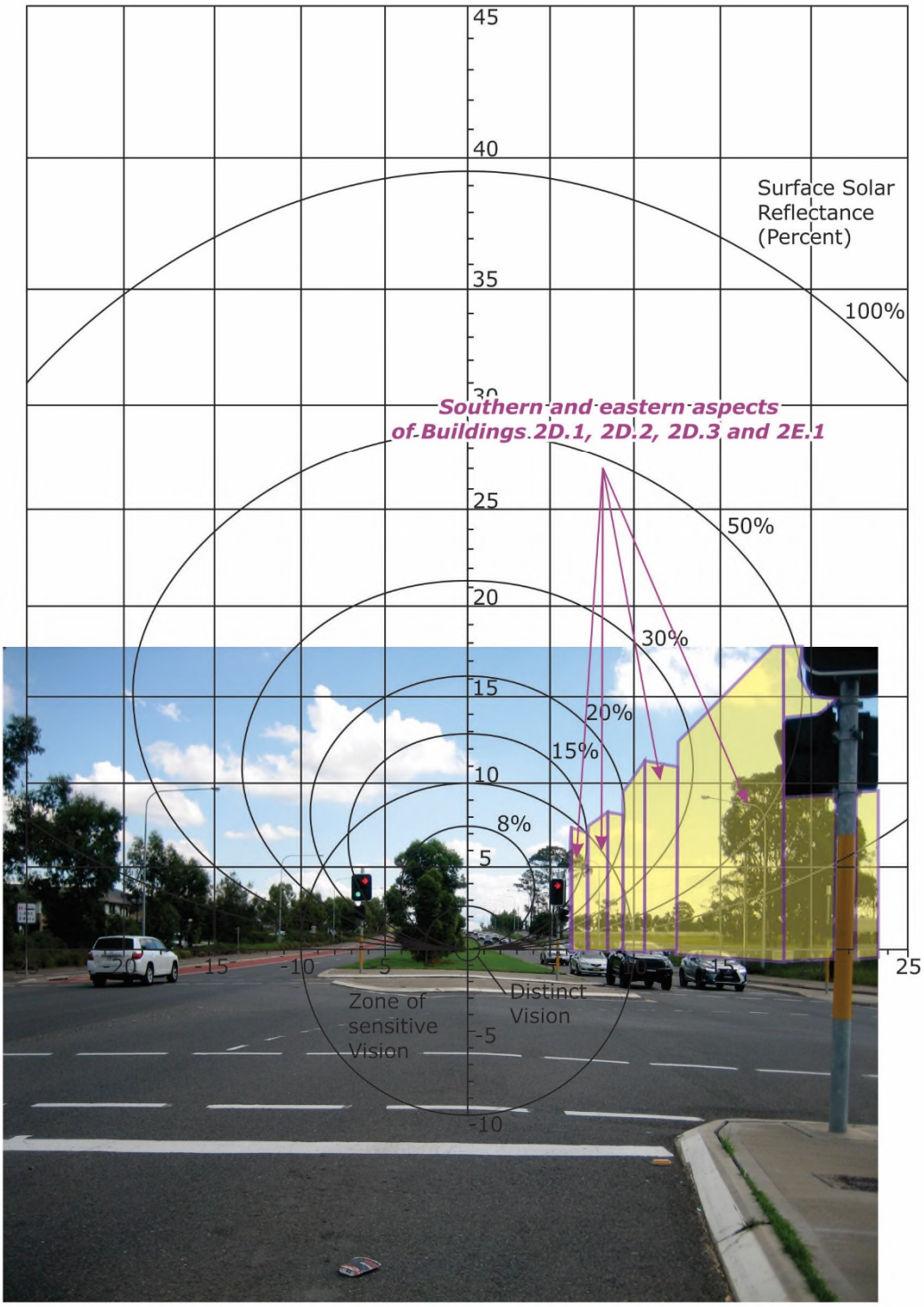

Figure A.29: Glare Overlay of the Viewpoint at Point SR06

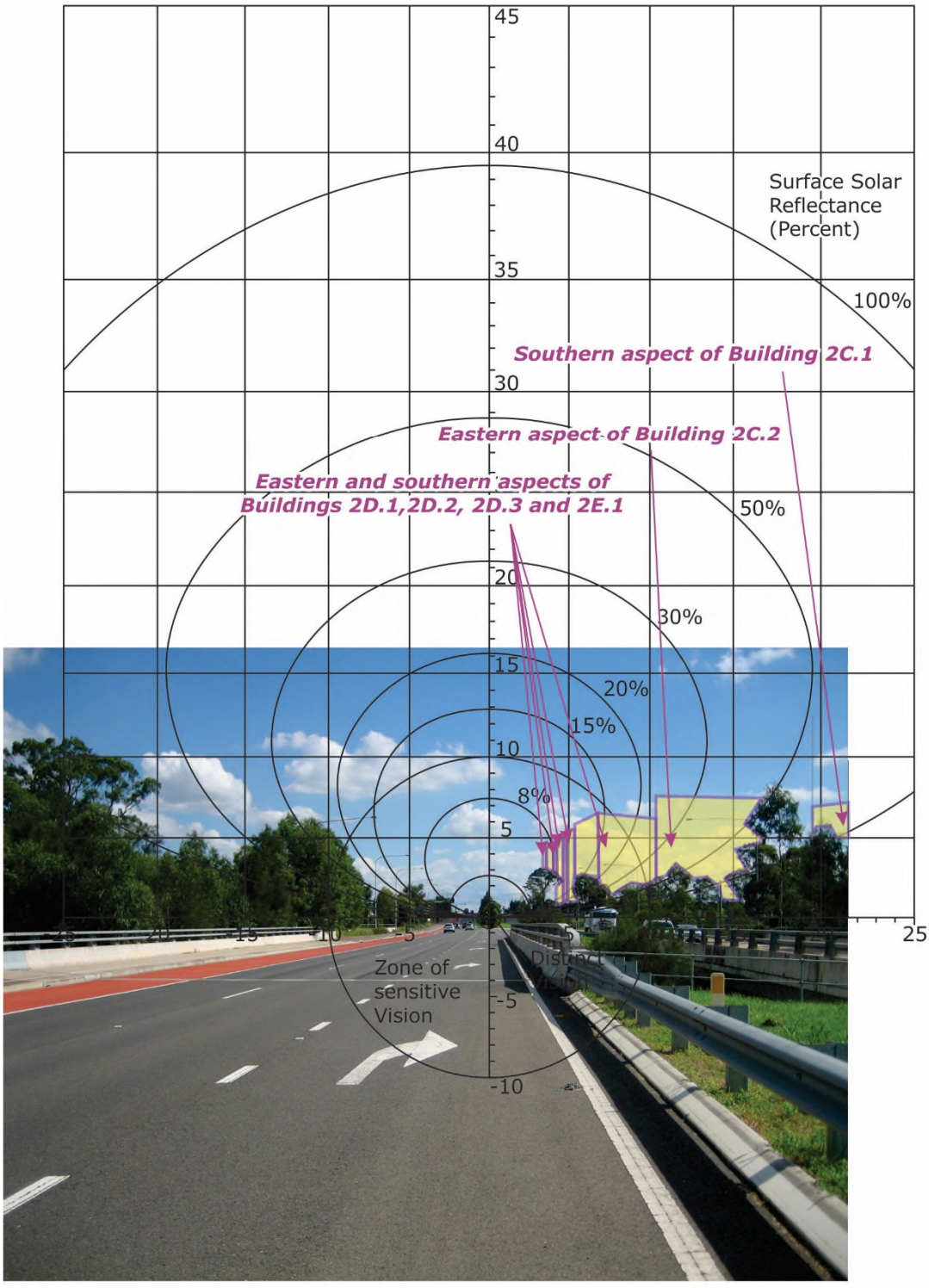

Figure A.30: Glare Overlay of the Viewpoint at Point SR07

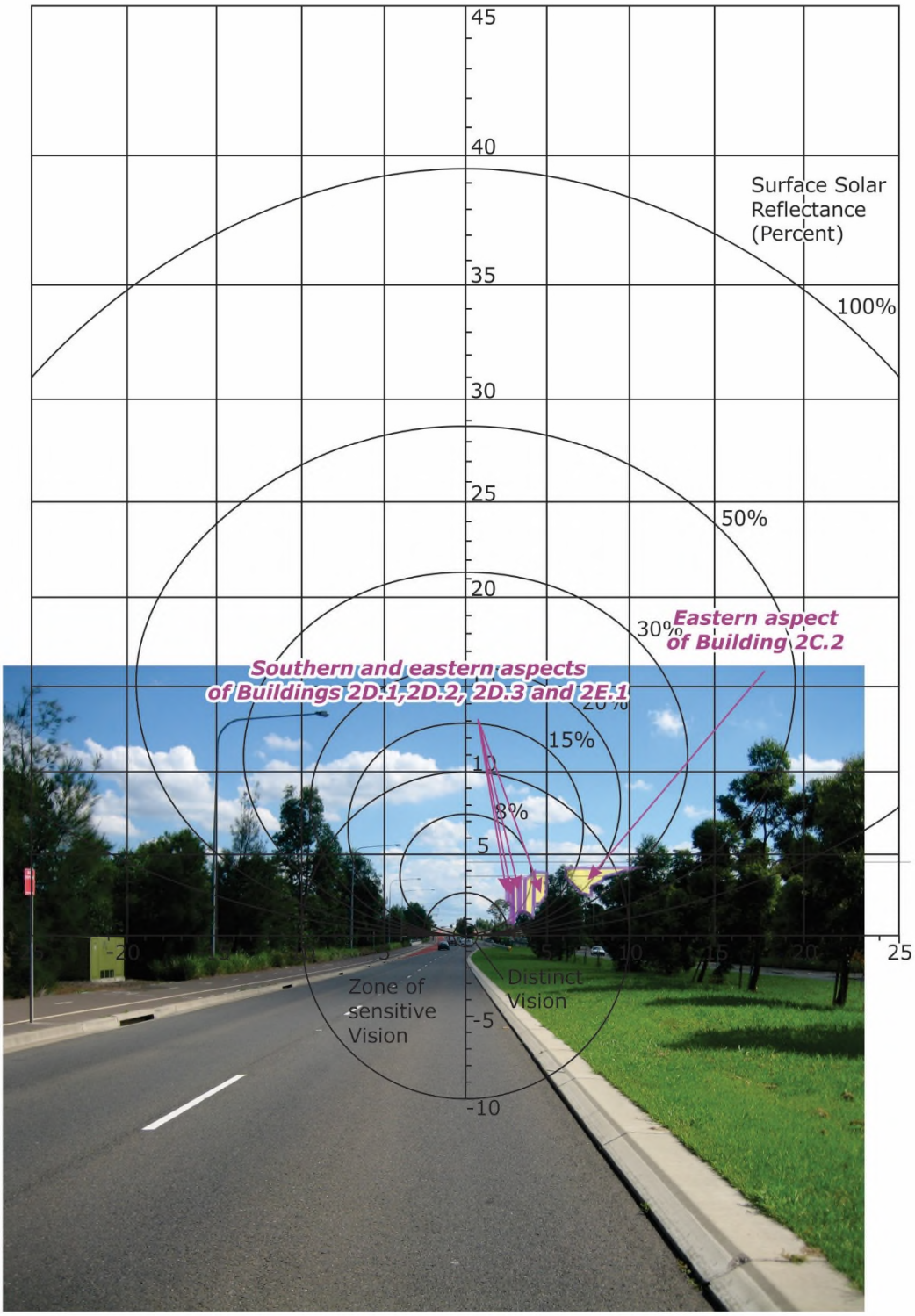

Figure A.31: Glare Overlay of the Viewpoint at Point SR08

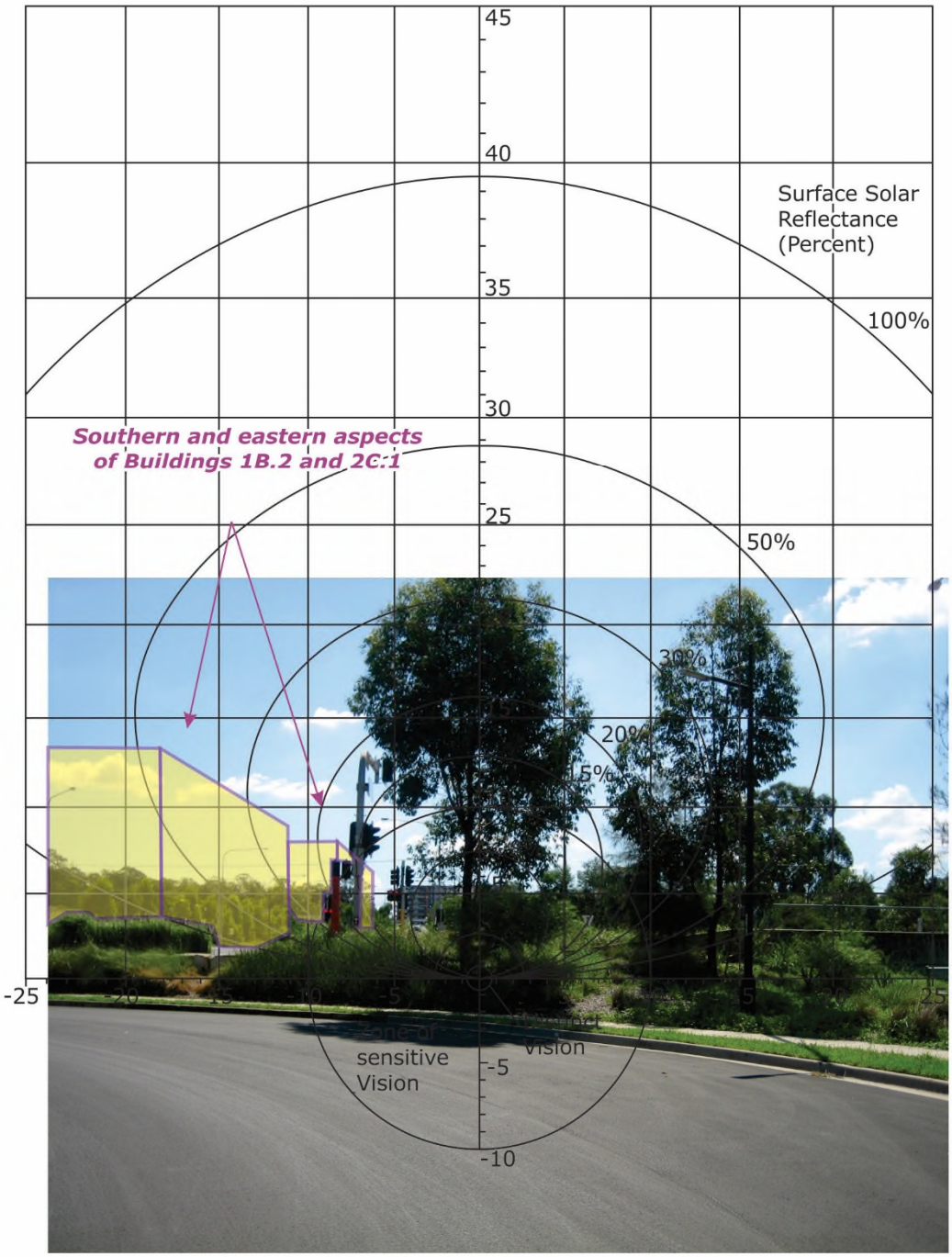

Figure A.32: Glare Overlay of the Viewpoint at Point AC01

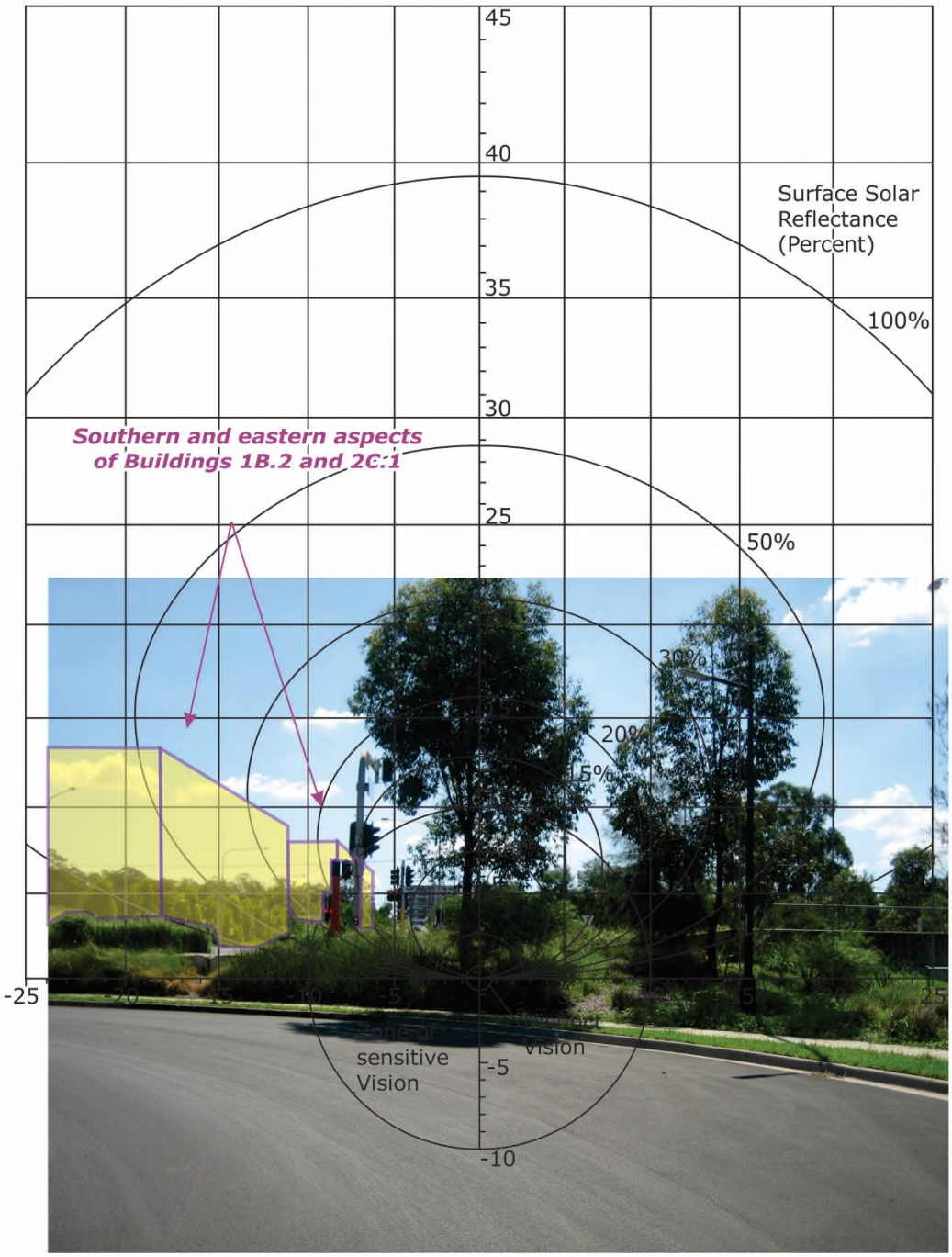

Figure A.33: Glare Overlay of the Viewpoint at Point PS01

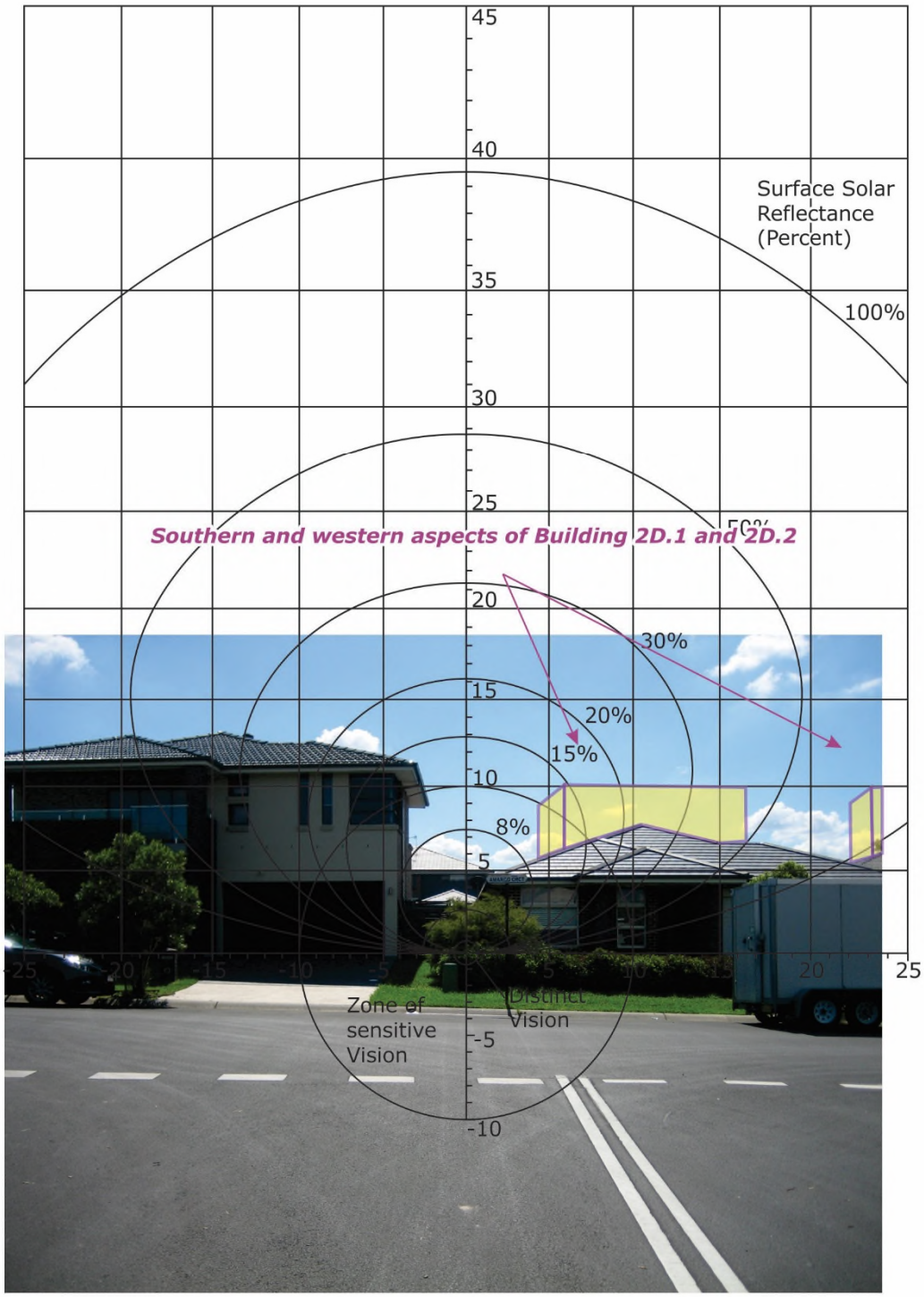

Figure A.34: Glare Overlay of the Viewpoint at Point AP01

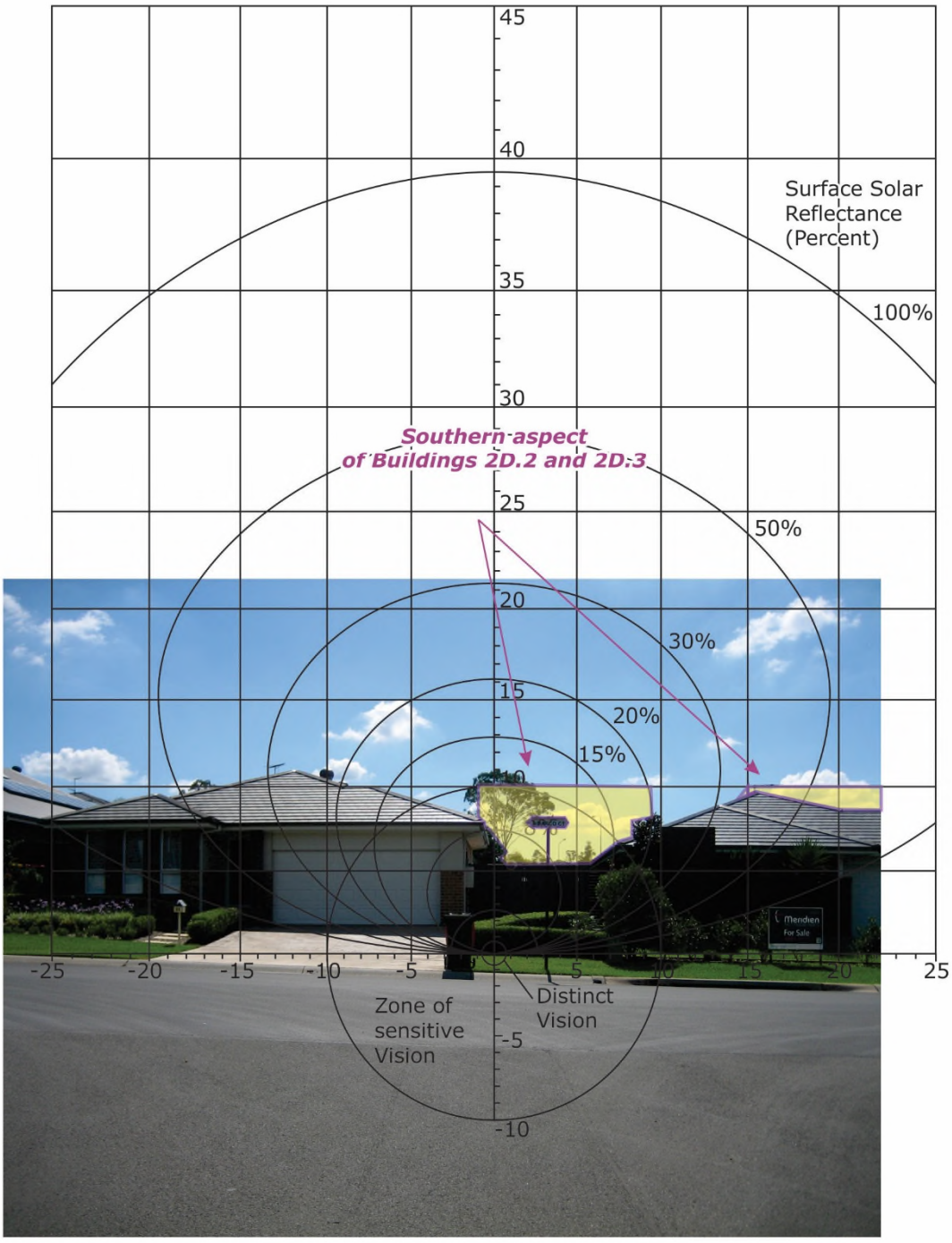

Figure A.35: Glare Overlay of the Viewpoint at Point PD01

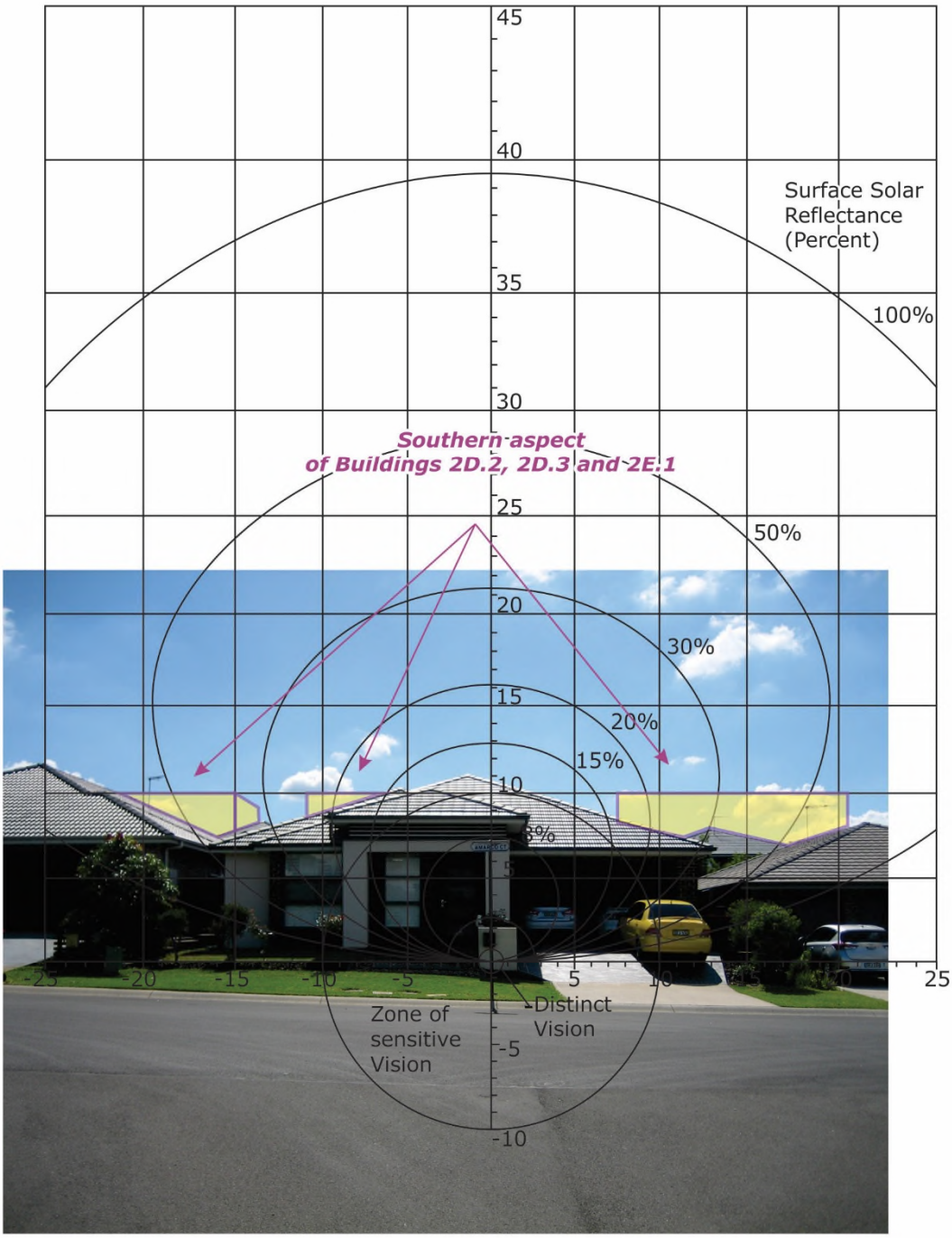

Figure A.36: Glare Overlay of the Viewpoint at Point AS01

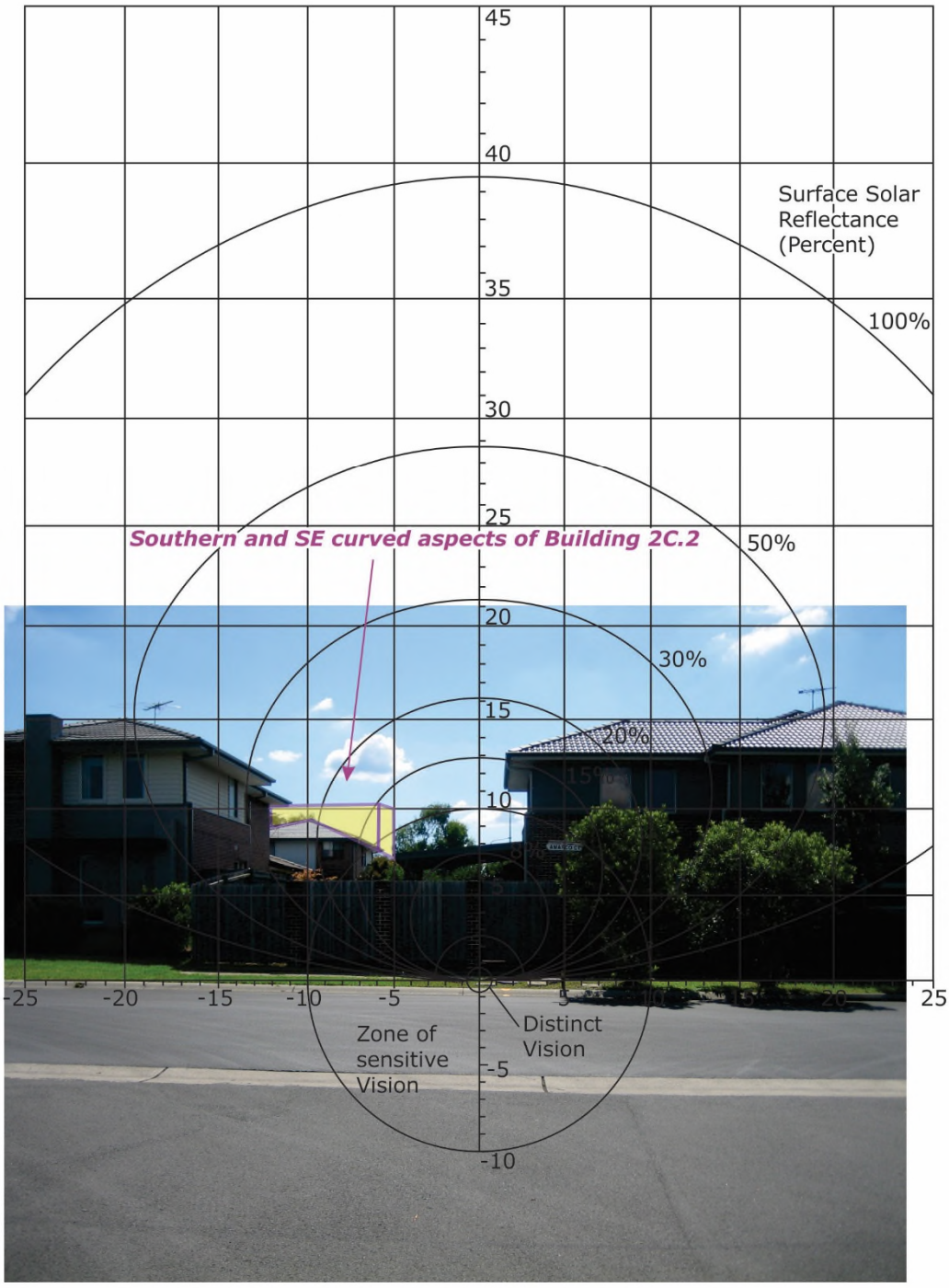

Figure A.37: Glare Overlay of the Viewpoint at Point TD01

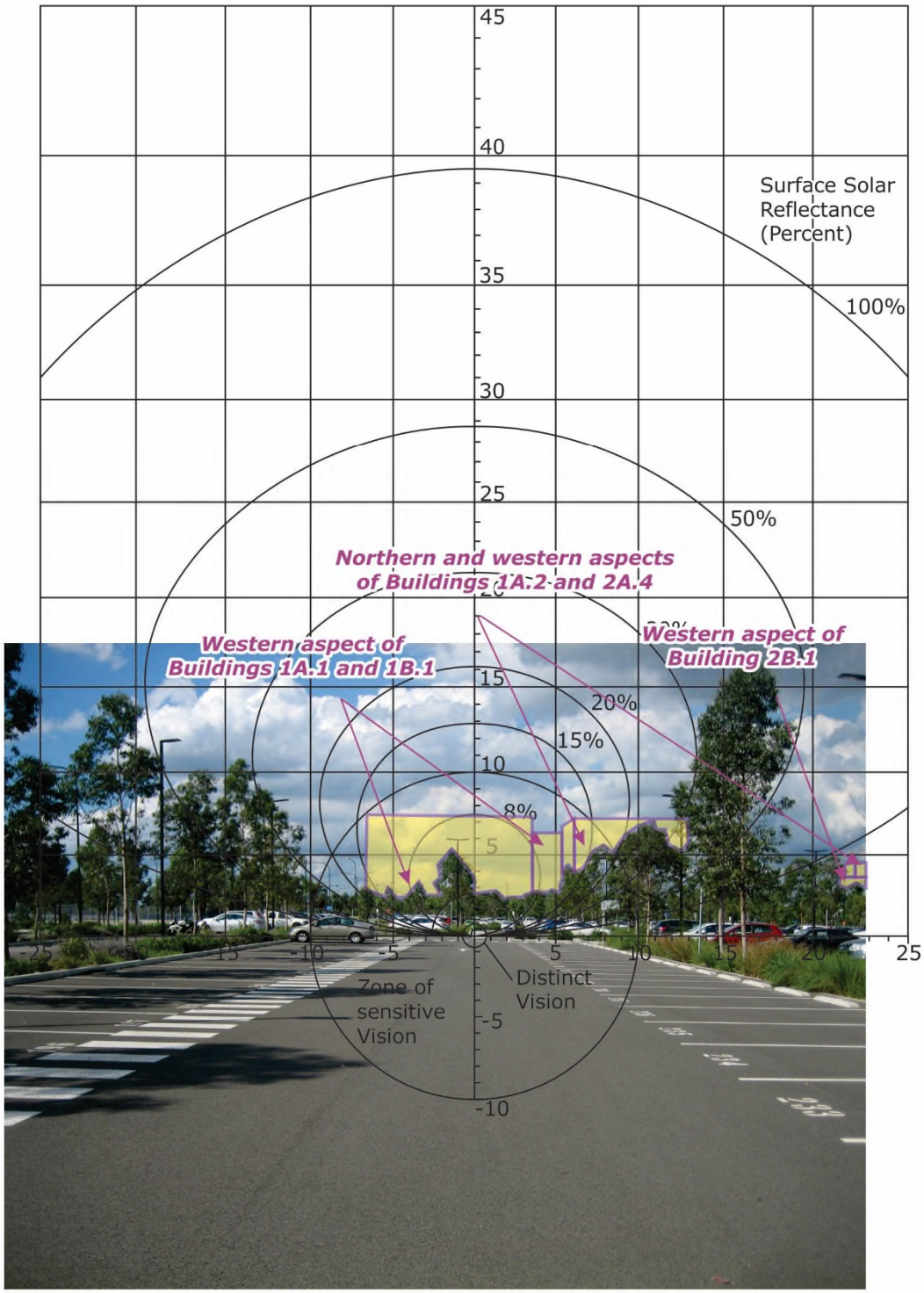

Figure A.38: Glare Overlay of the Viewpoint at Point CP01

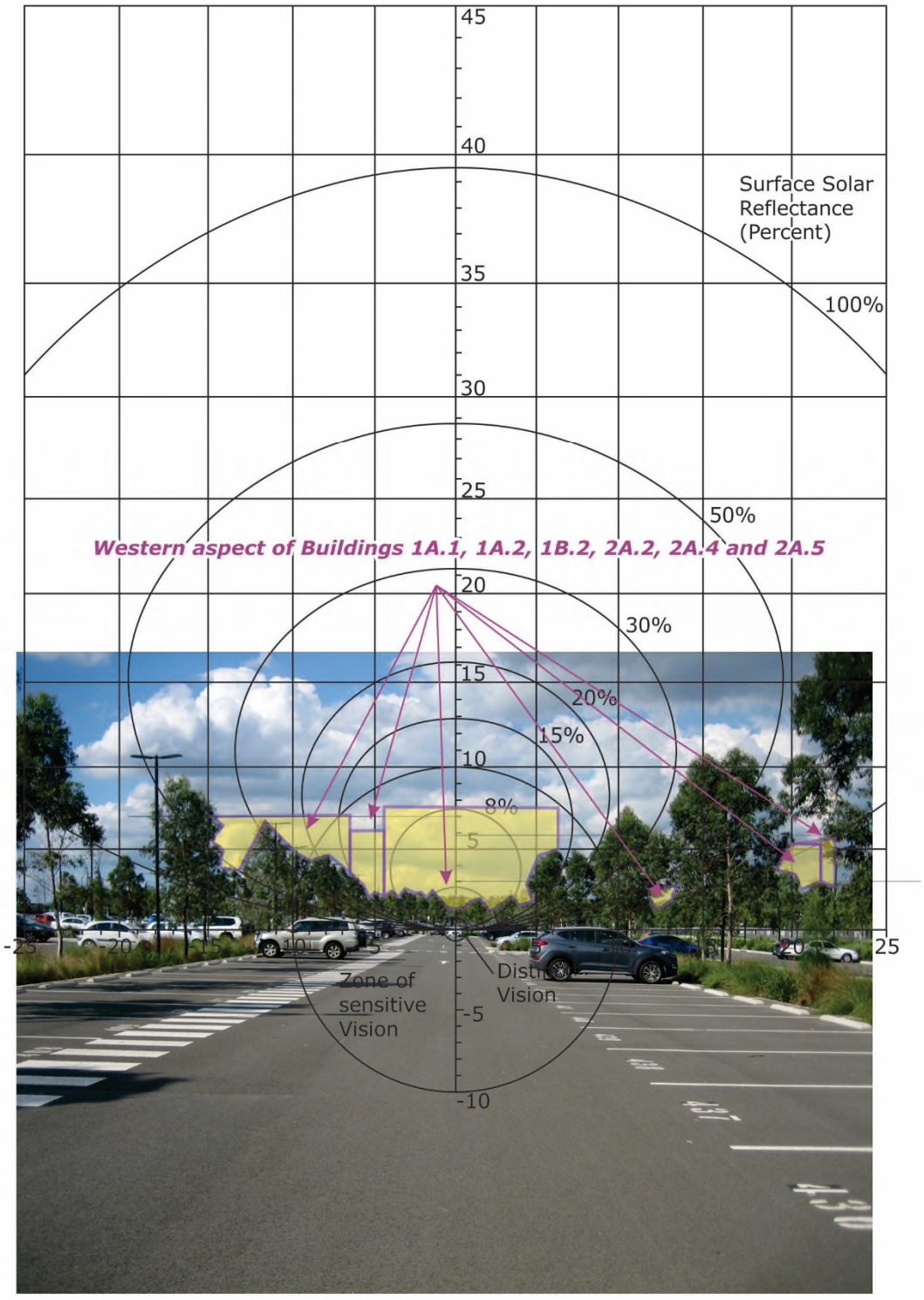

Figure A.39: Glare Overlay of the Viewpoint at Point CP02

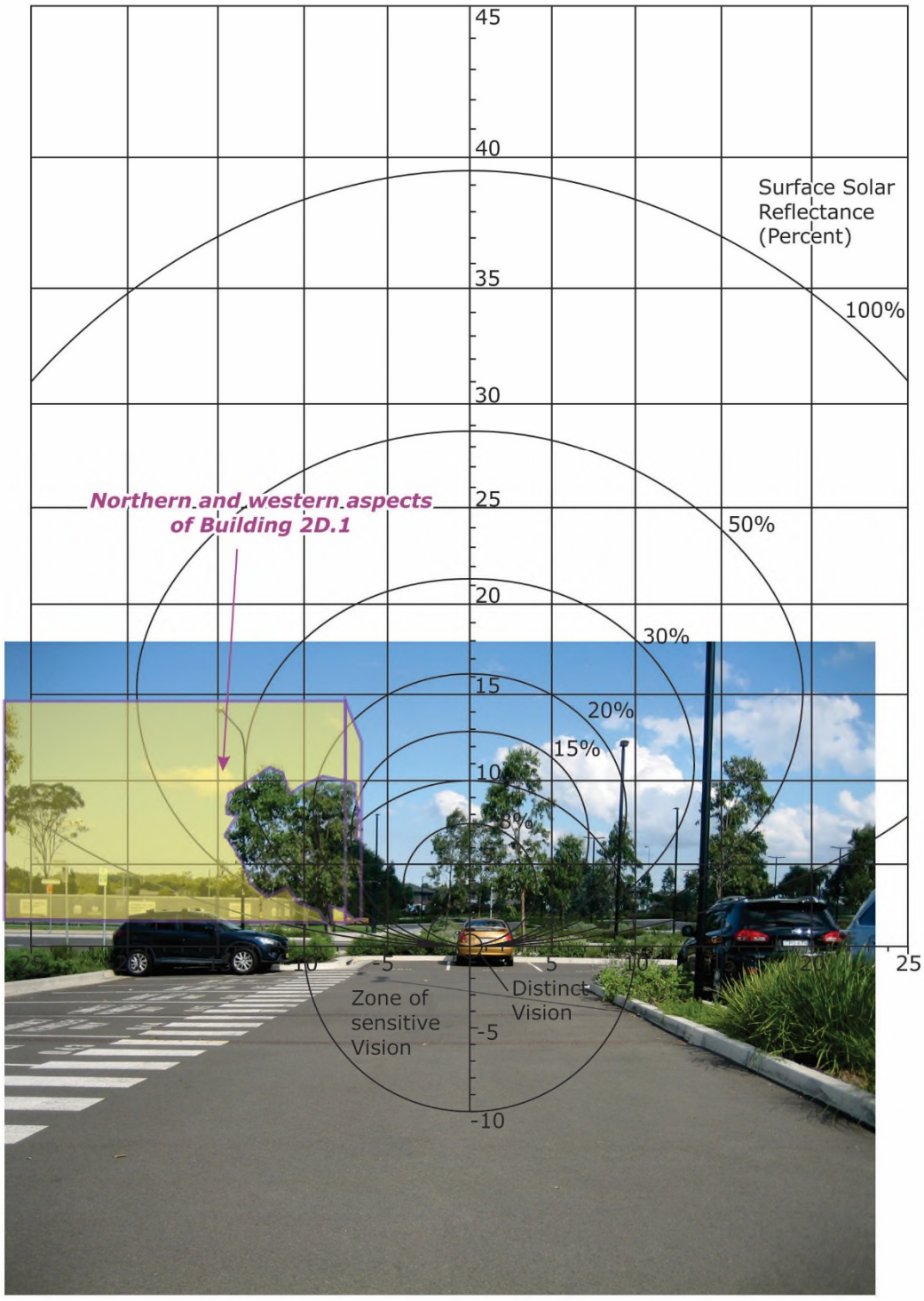

Figure A.40: Glare Overlay of the Viewpoint at Point CP03

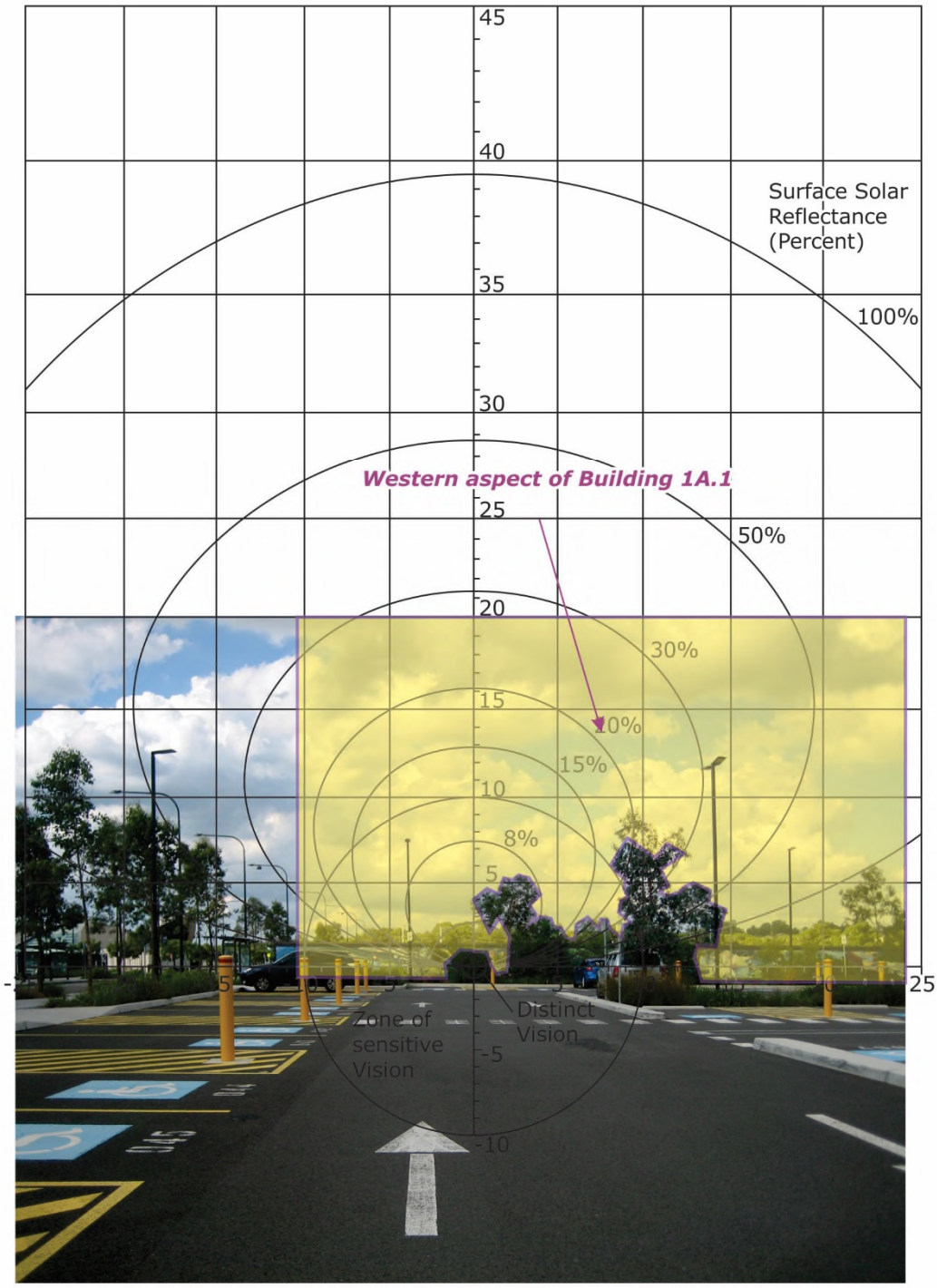

Figure A.41: Glare Overlay of the Viewpoint at Point CP04

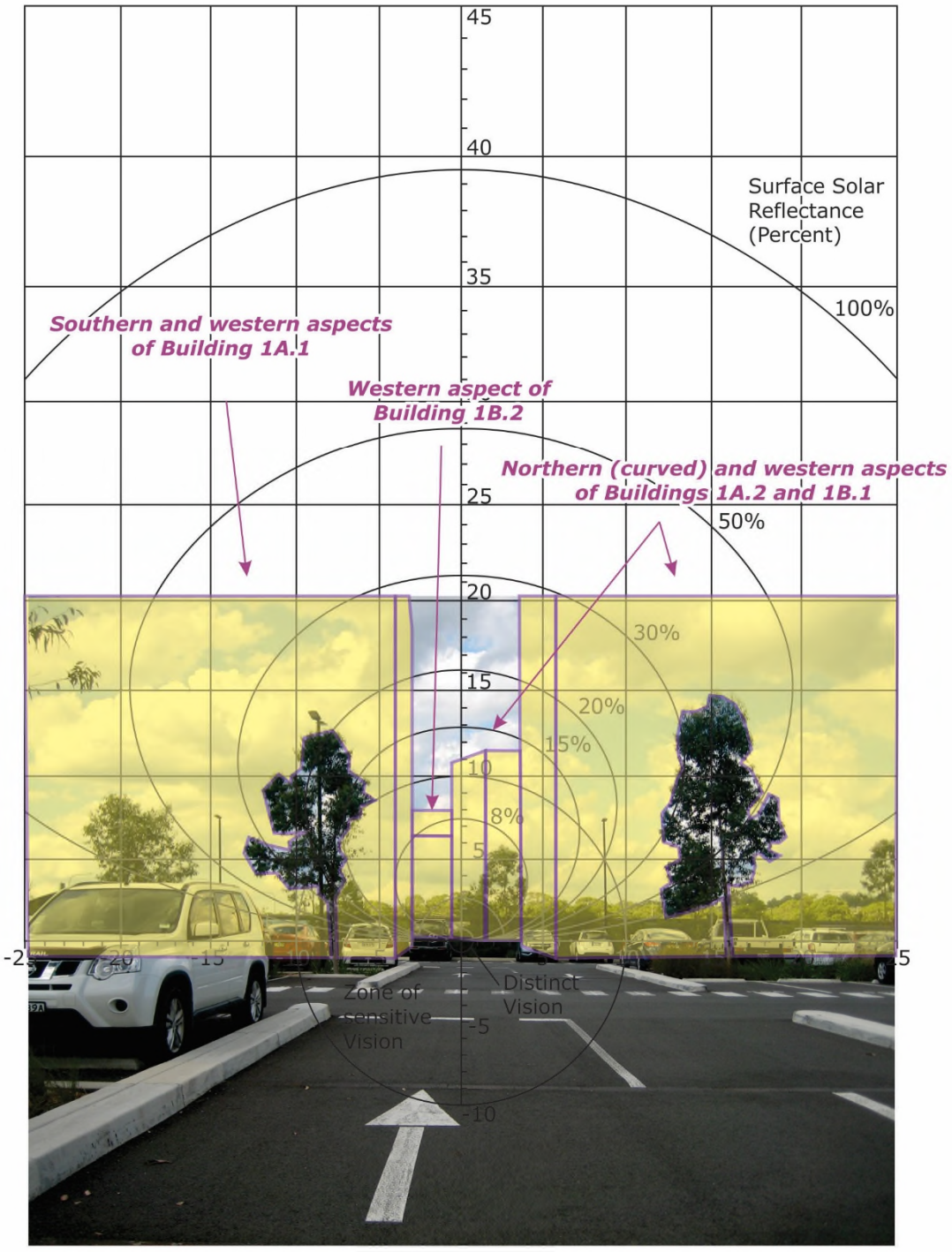

Figure A.42: Glare Overlay of the Viewpoint at Point CP05

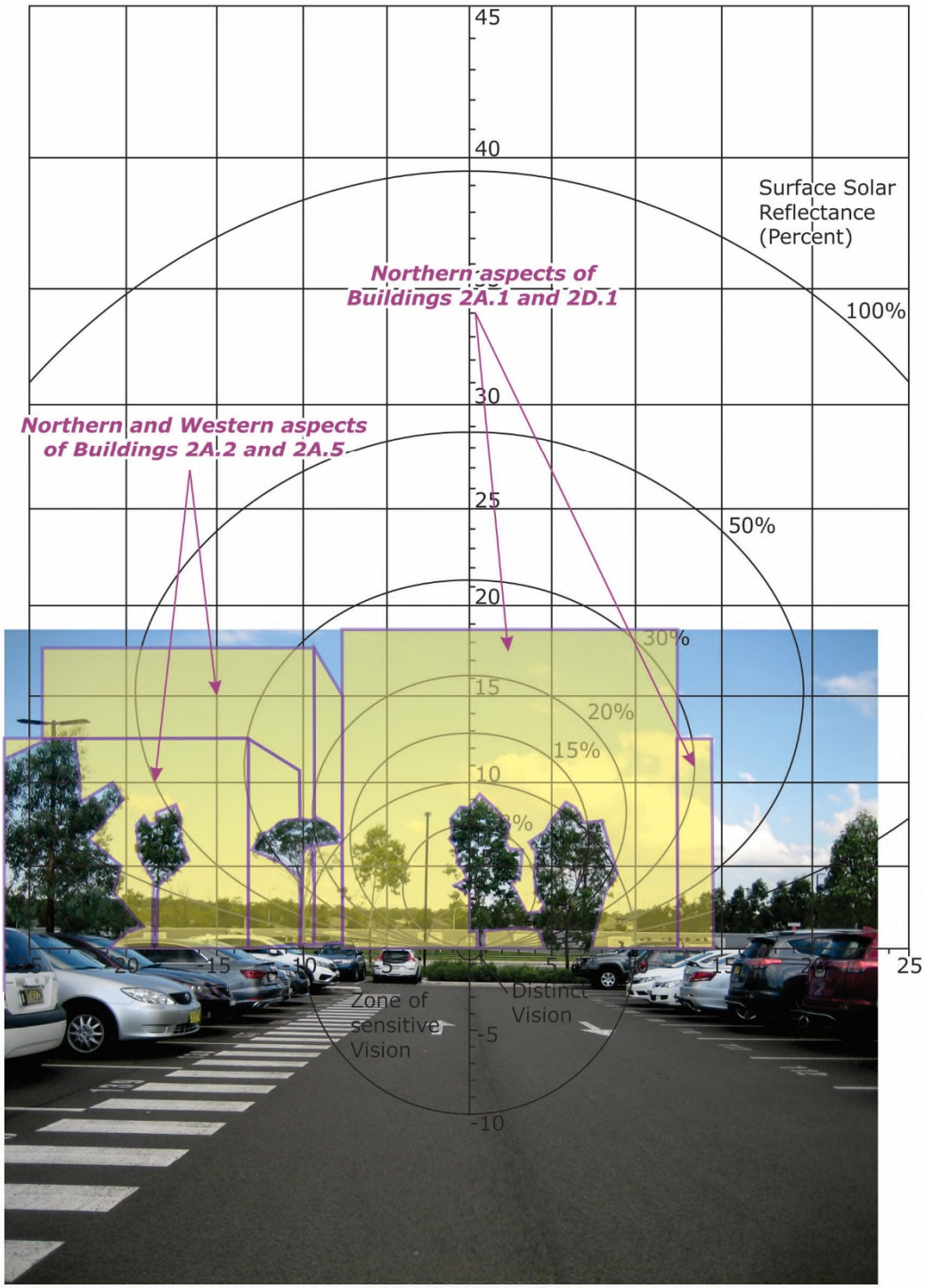

Figure A.43: Glare Overlay of the Viewpoint at Point CP06

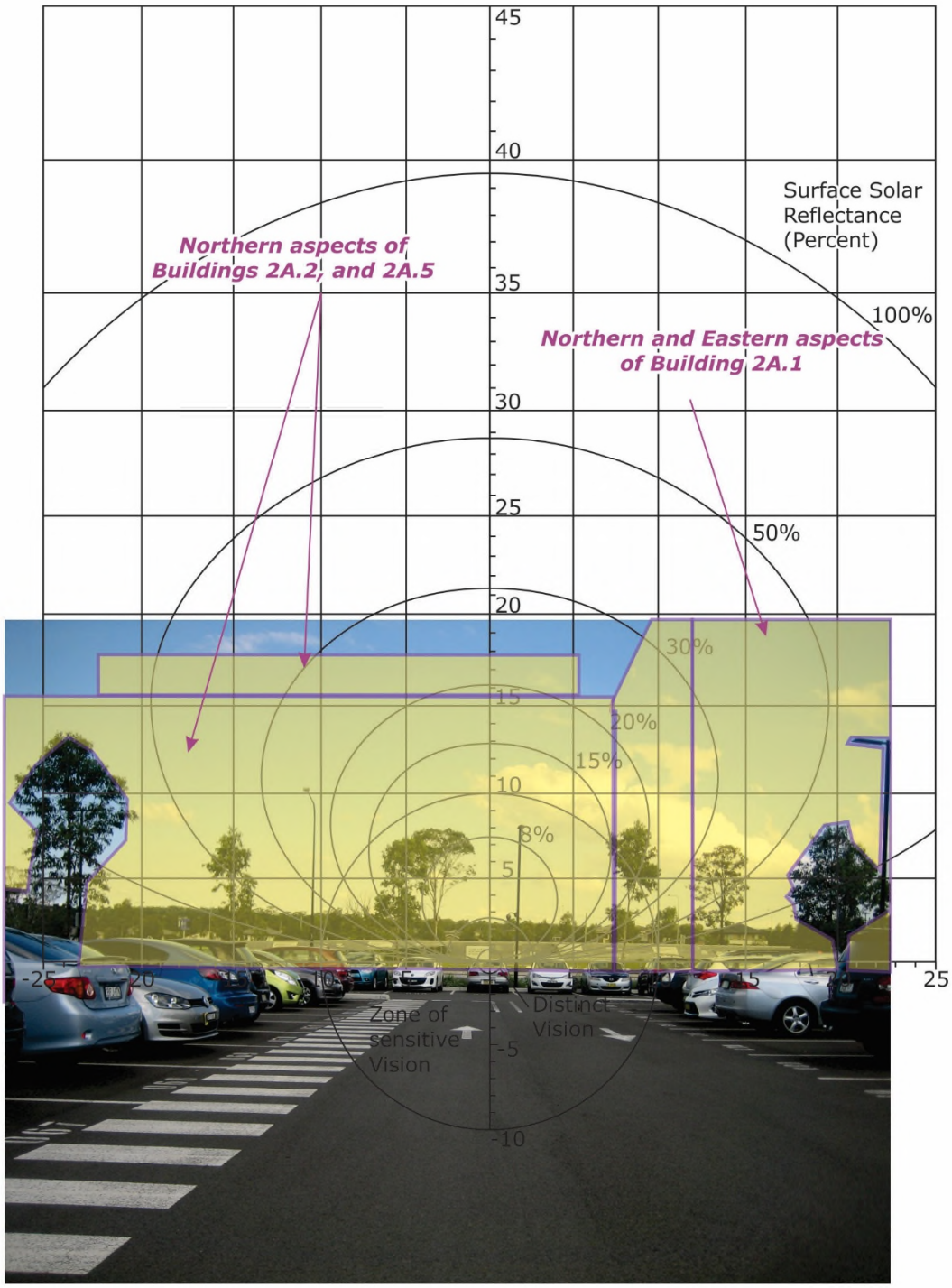

Figure A.44: Glare Overlay of the Viewpoint at Point CP07

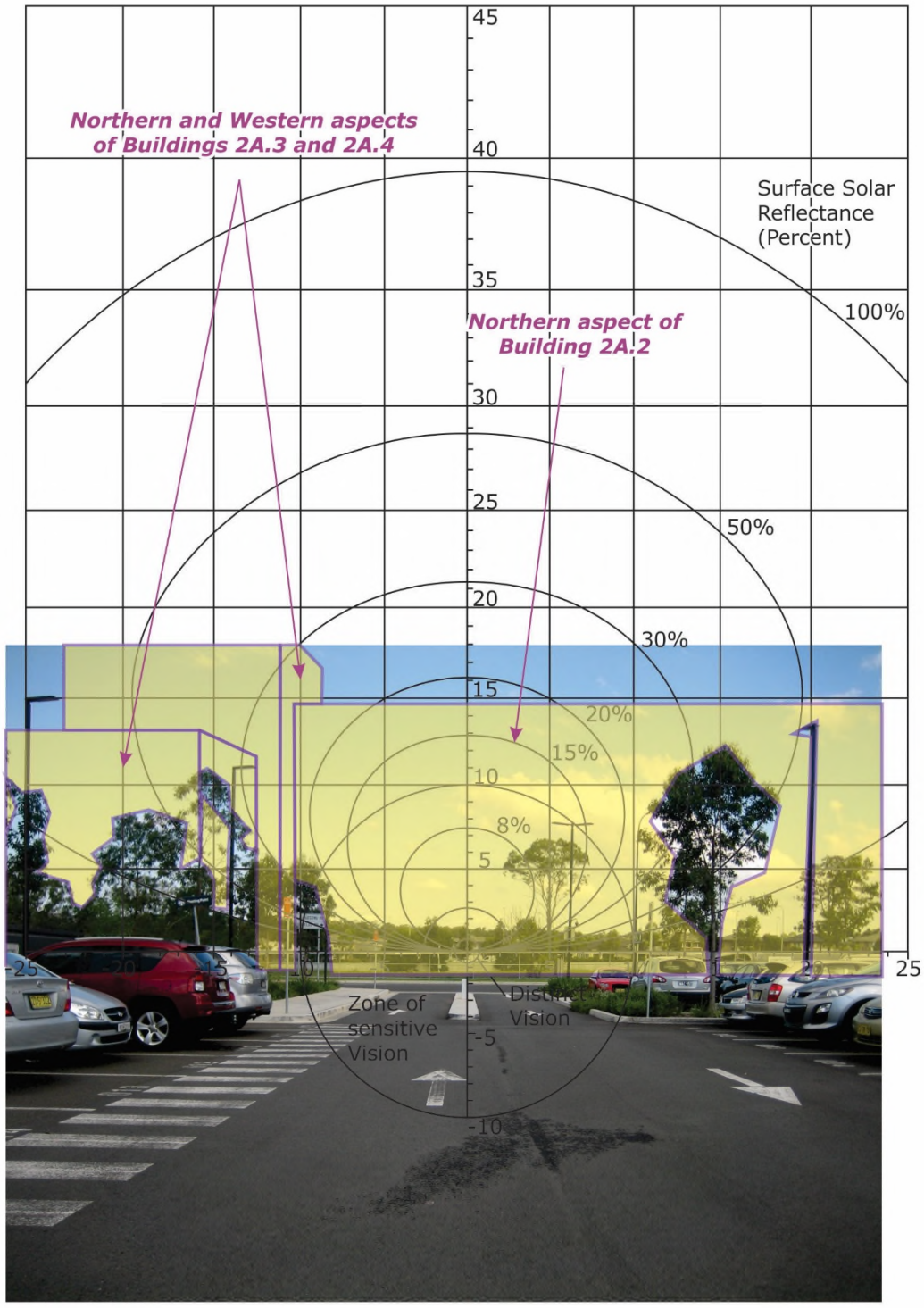

Figure A.45: Glare Overlay of the Viewpoint at Point CP08

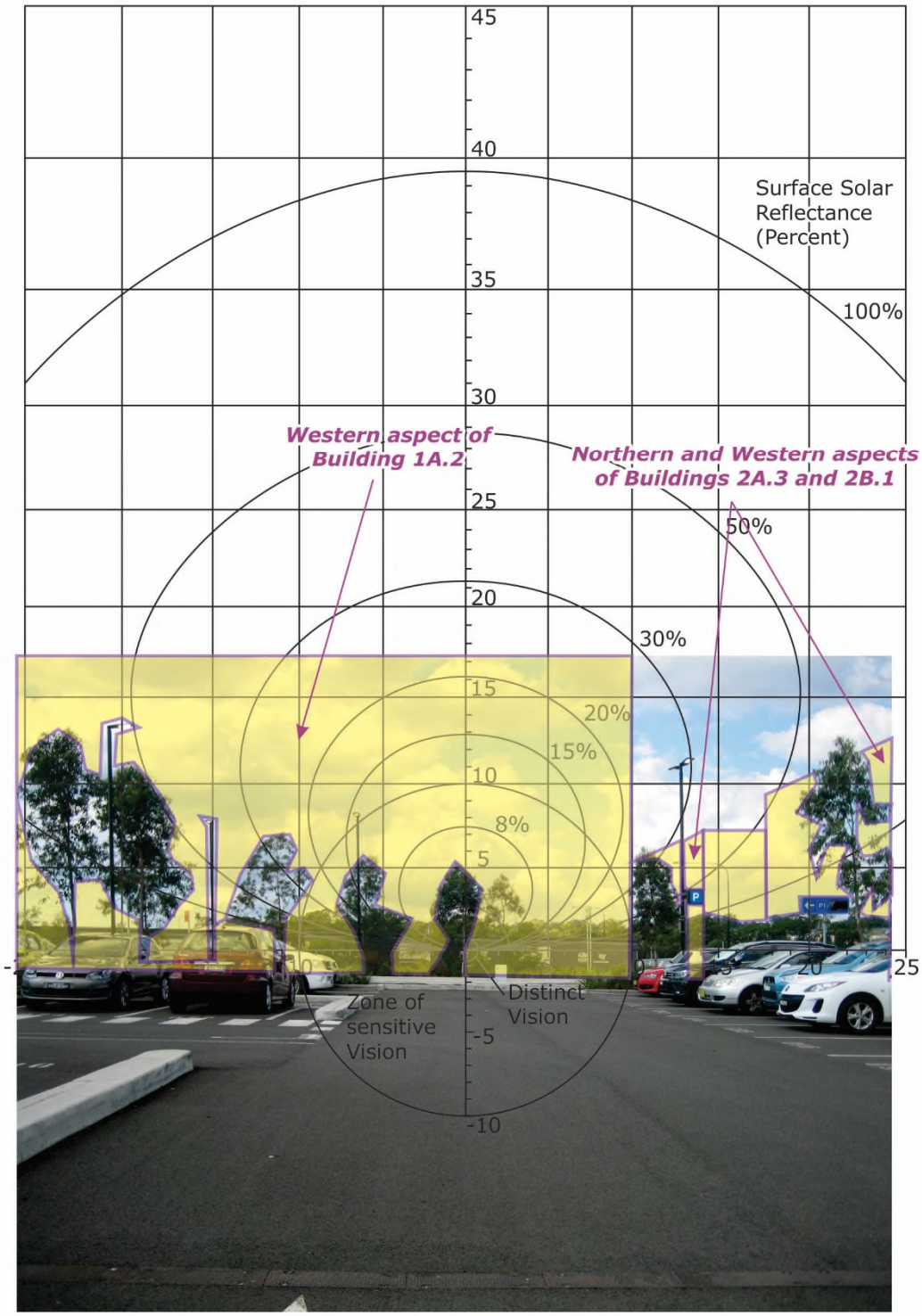

Figure A.46: Glare Overlay of the Viewpoint at Point CP09

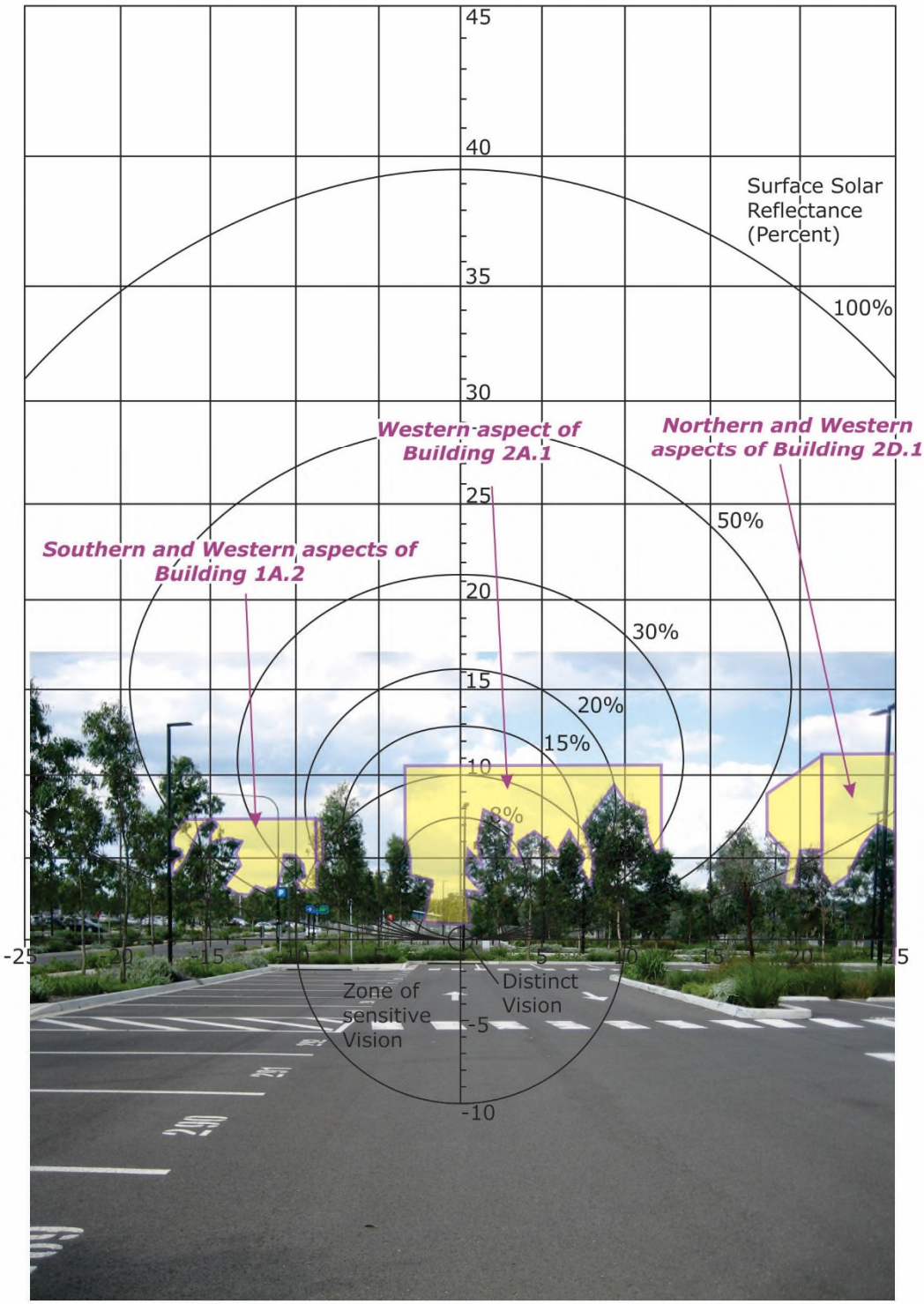

Figure A.47: Glare Overlay of the Viewpoint at Point CP10

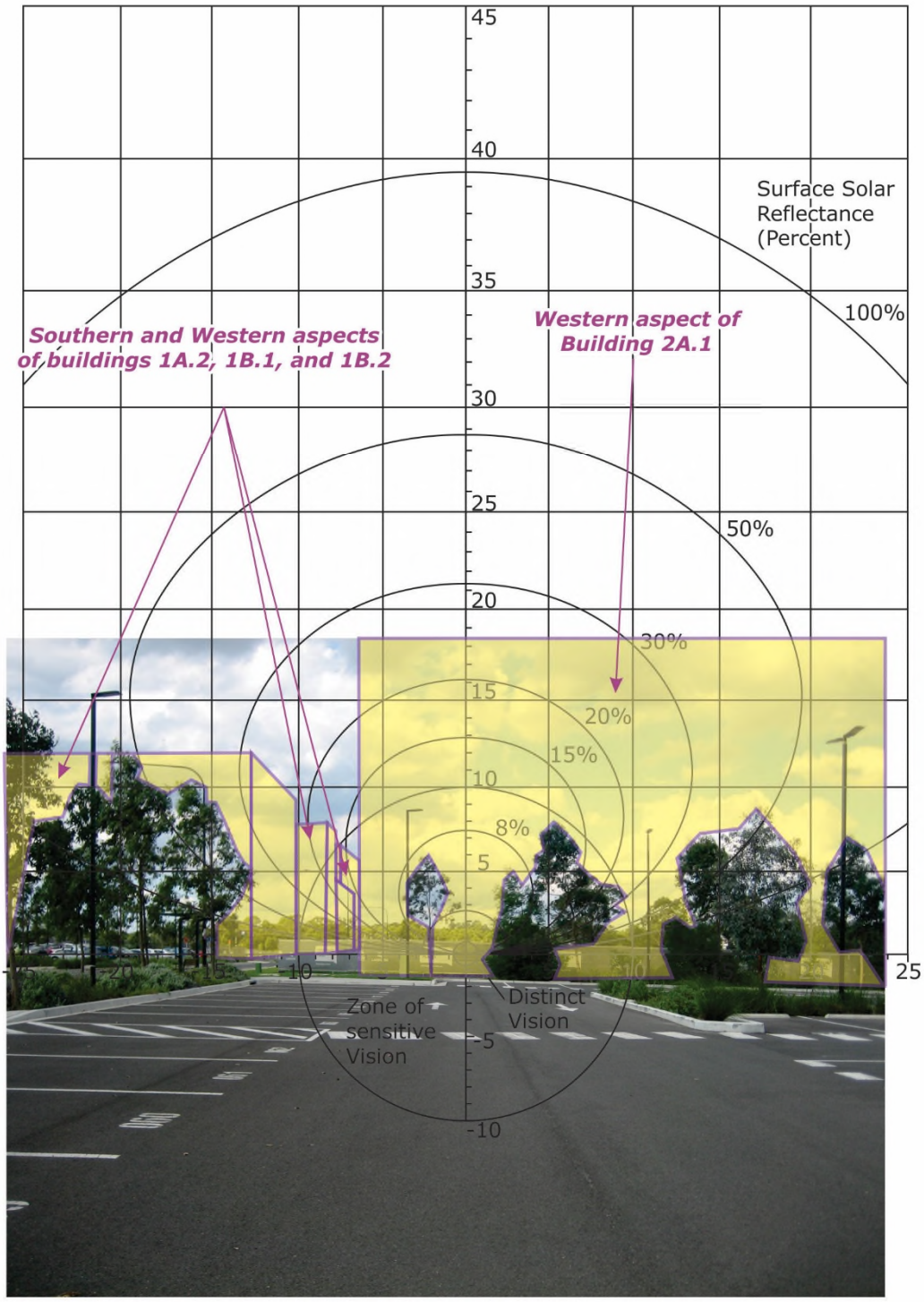

Figure A.48: Glare Overlay of the Viewpoint at Point CP11

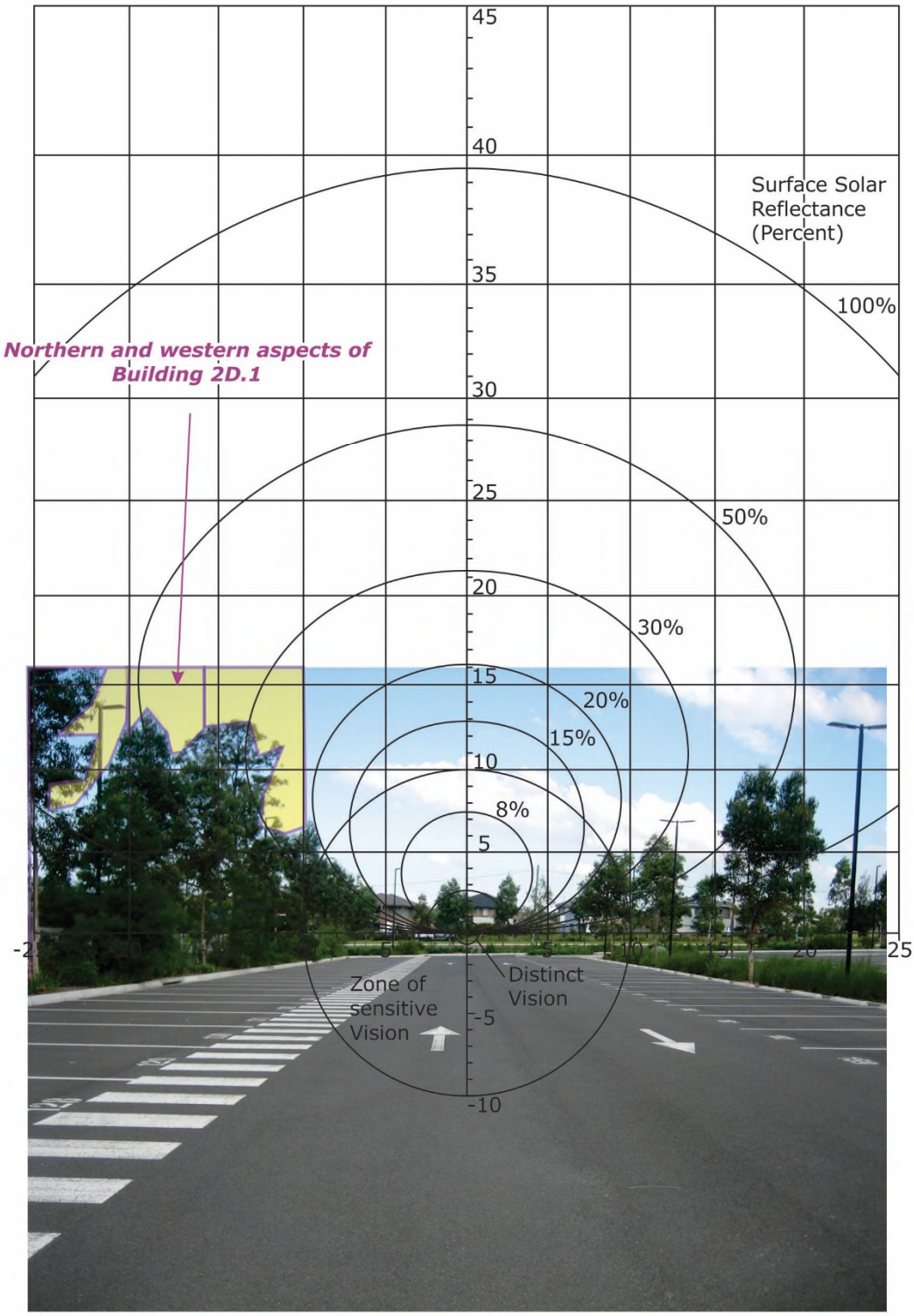

Figure A.49: Glare Overlay of the Viewpoint at Point CP12

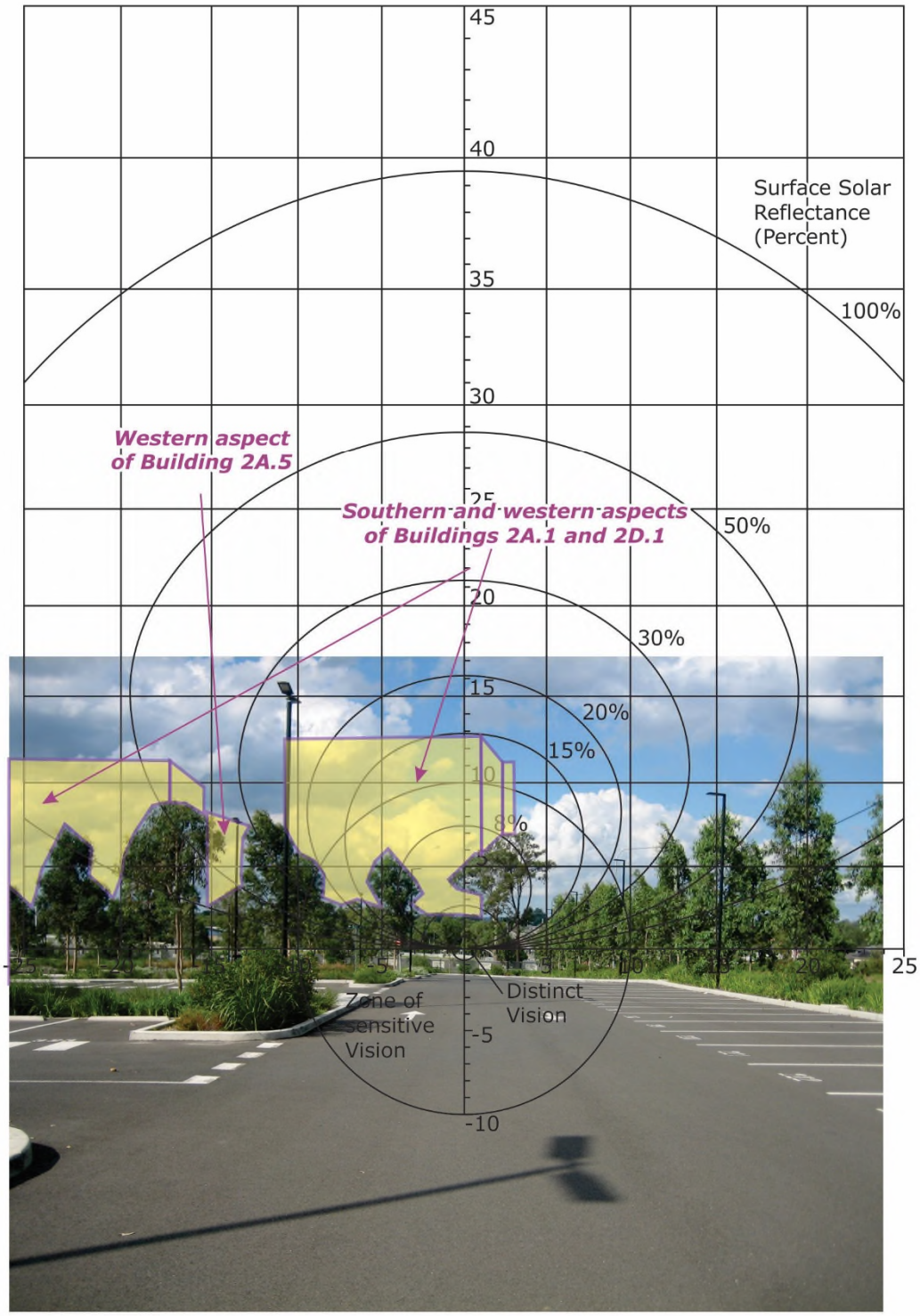

Figure A.50: Glare Overlay of the Viewpoint at Point CP13

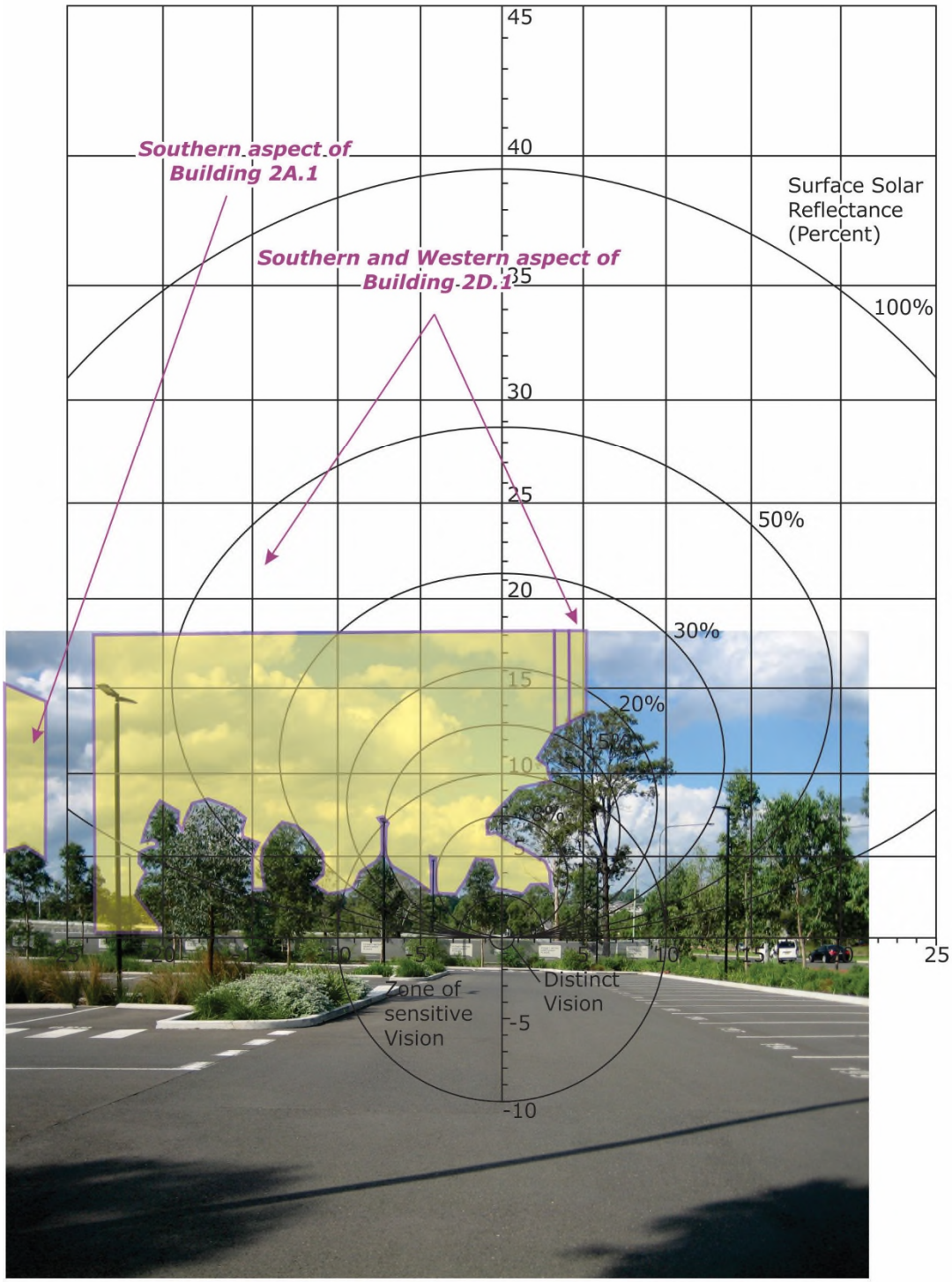

Figure A.51: Glare Overlay of the Viewpoint at Point CP14

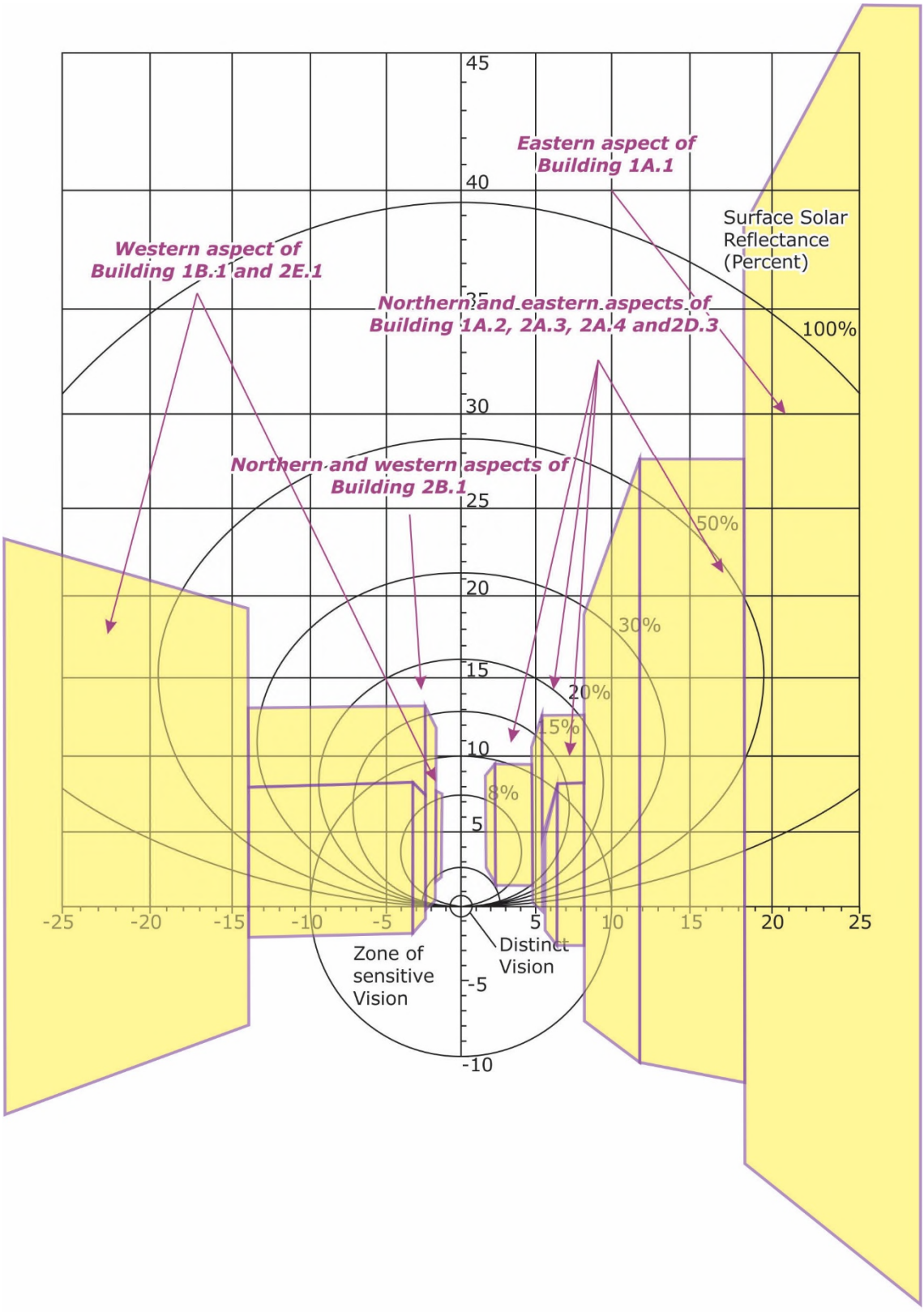

Figure A.52: Glare Overlay of the Viewpoint at Point I01

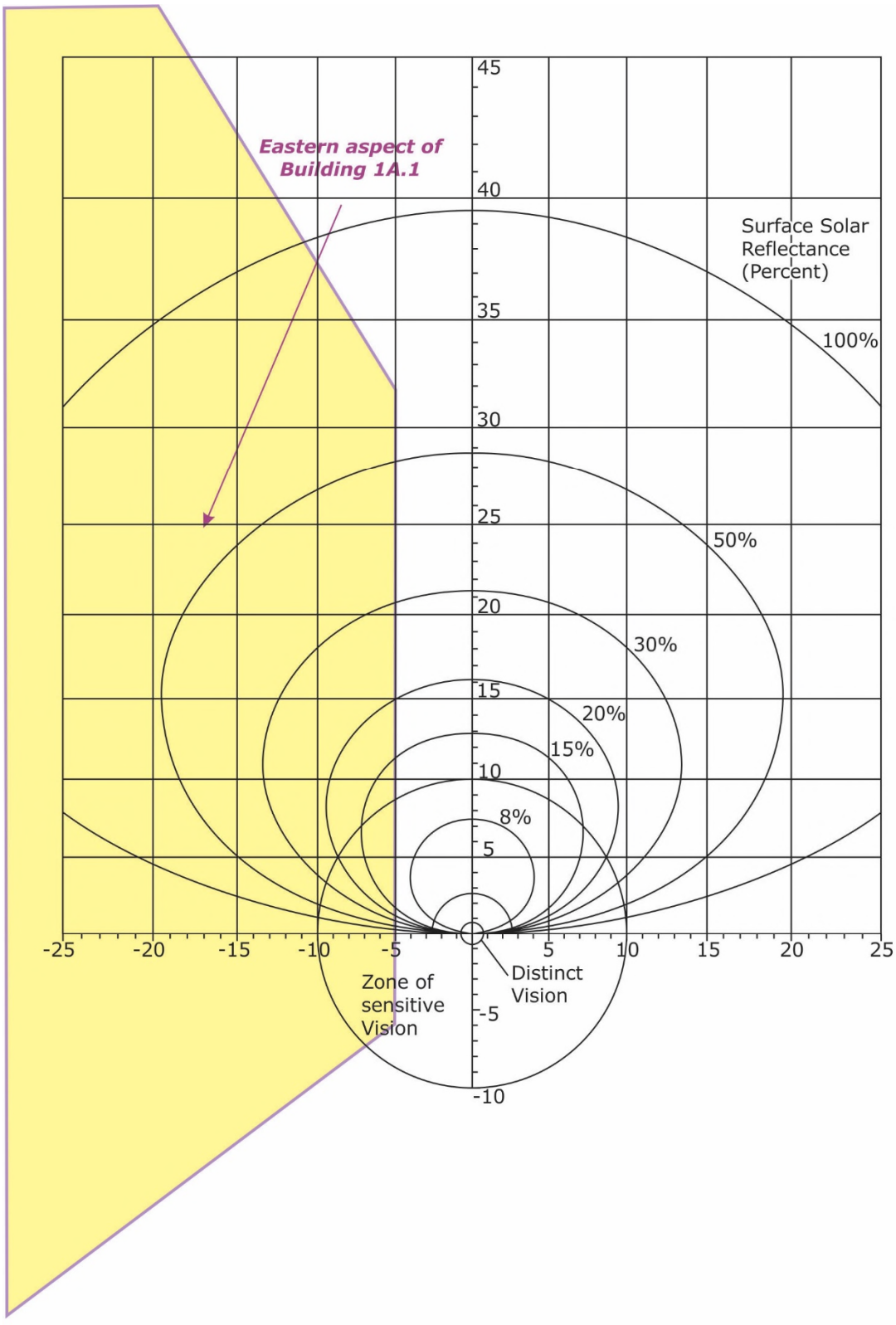

Figure A.53: Glare Overlay of the Viewpoint at Point I02

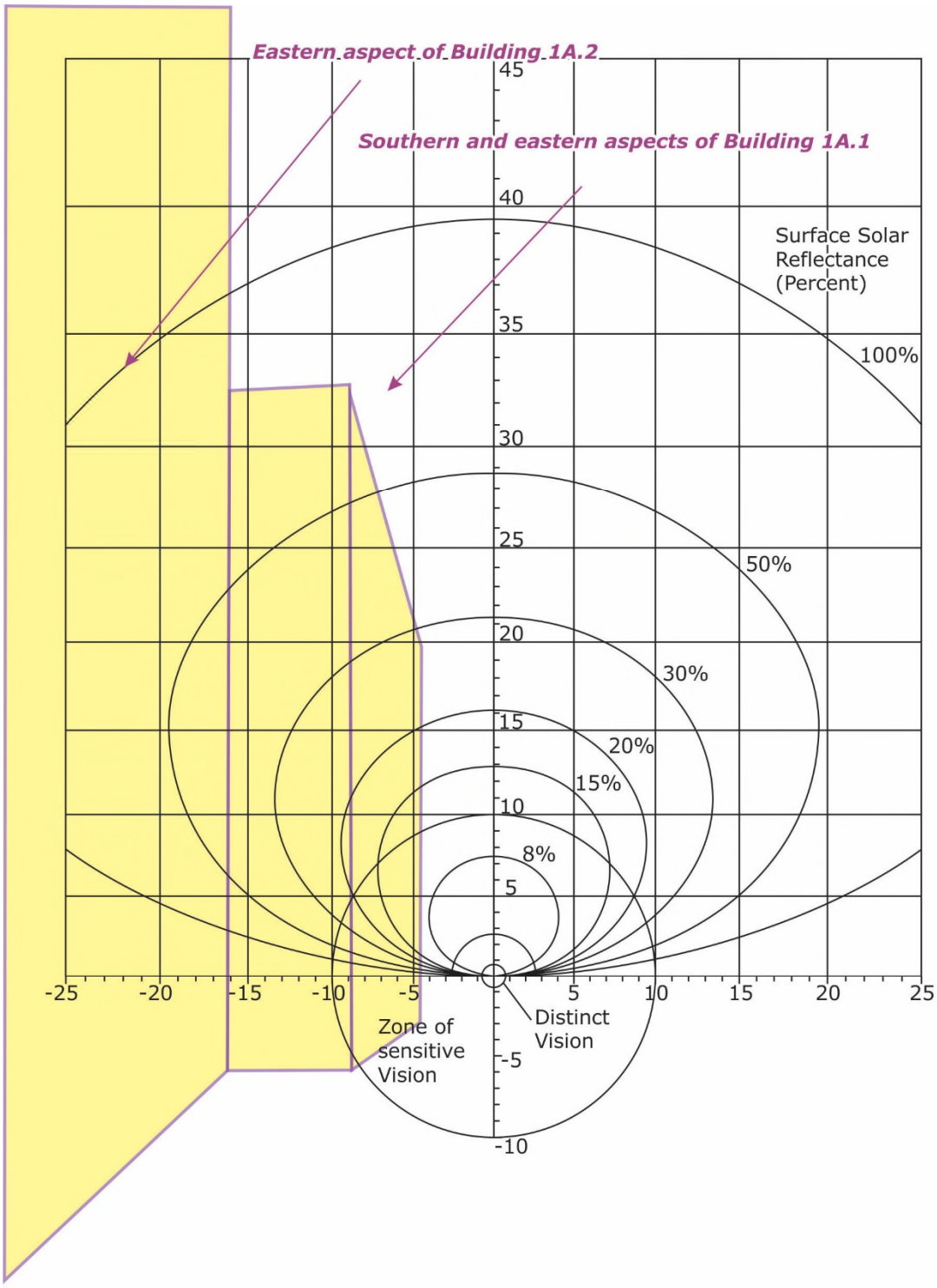

Figure A.54: Glare Overlay of the Viewpoint at Point I03

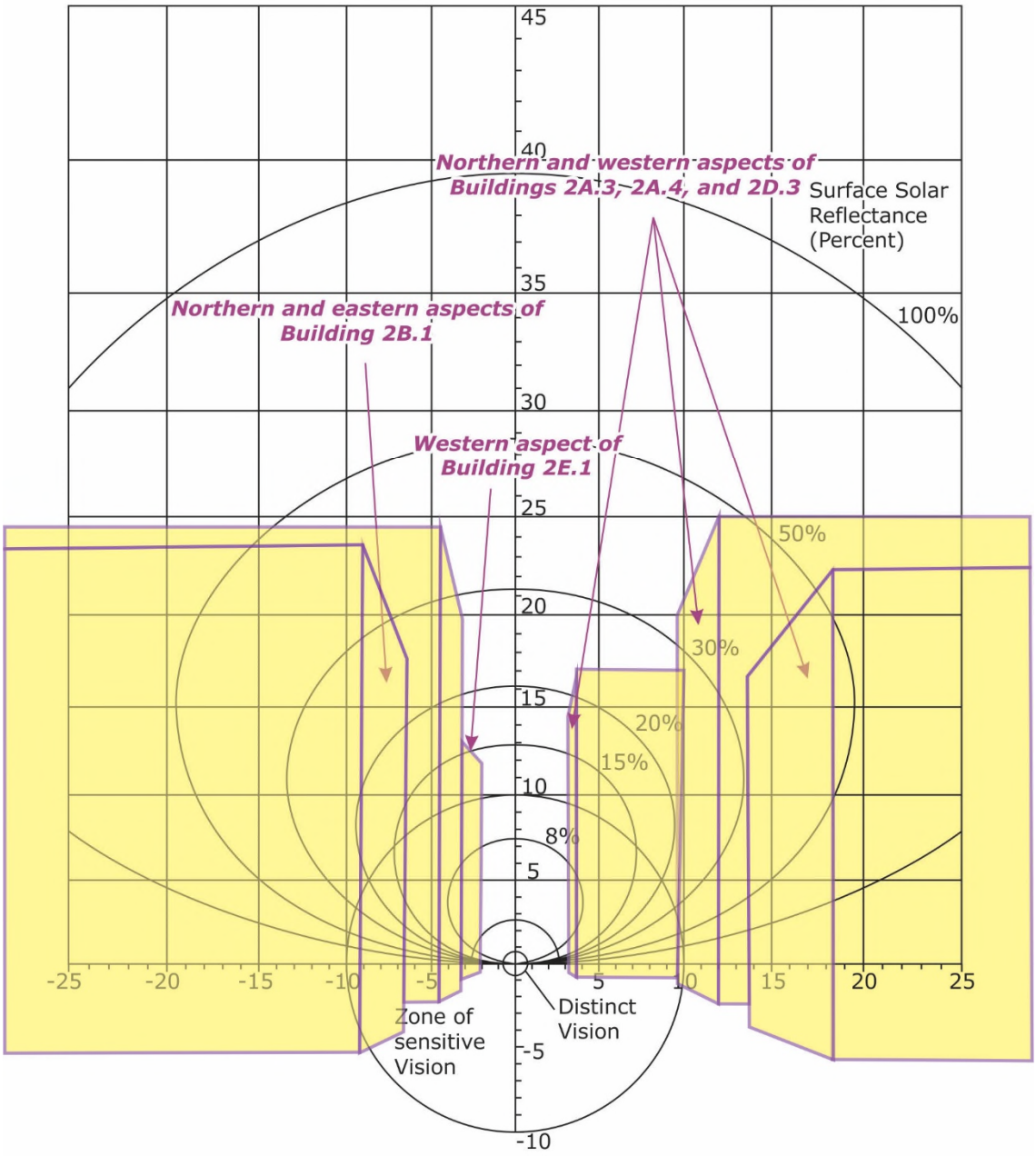

Figure A.55: Glare Overlay of the Viewpoint at Point I04

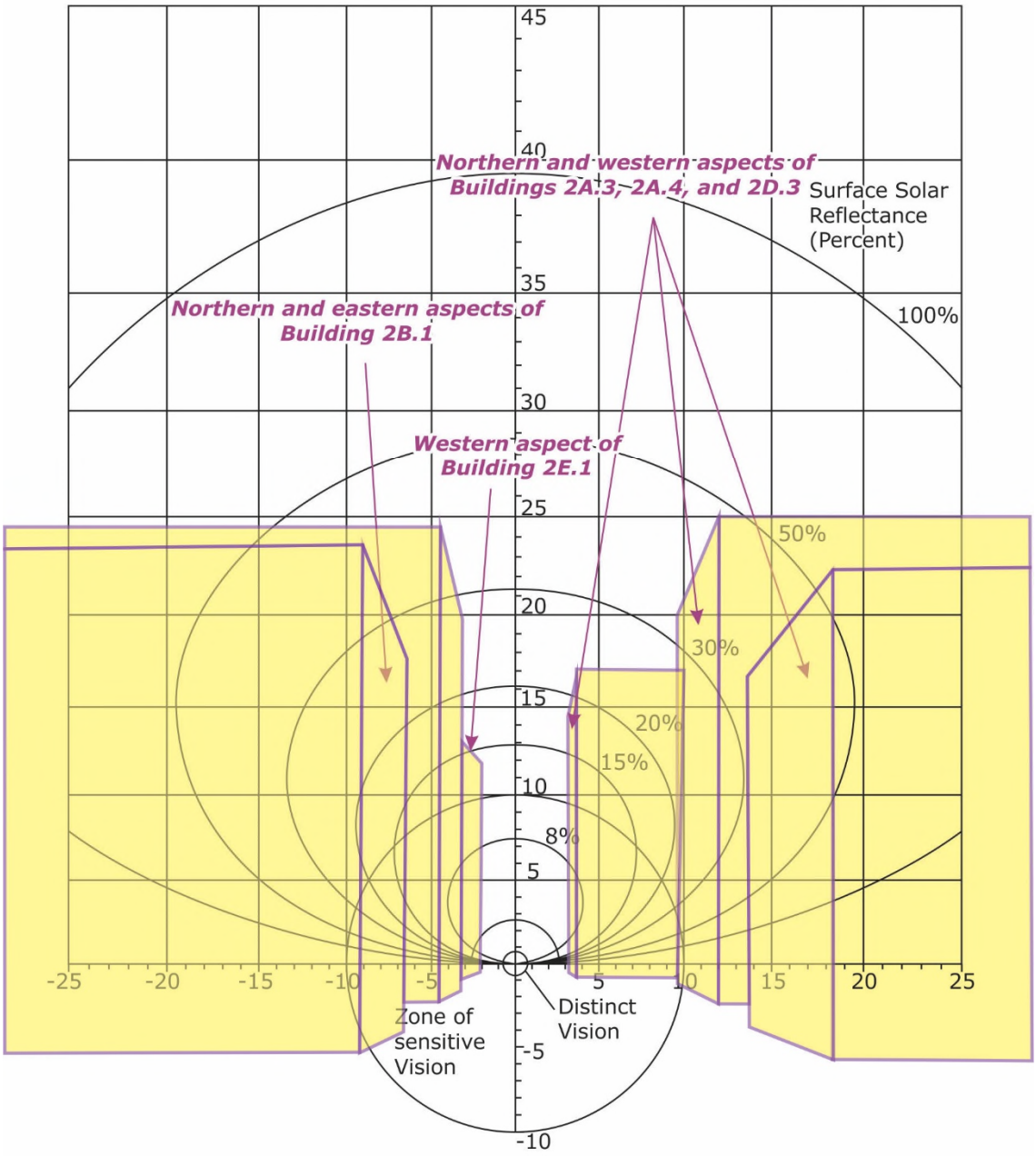

Figure A.56: Glare Overlay of the Viewpoint at Point I05

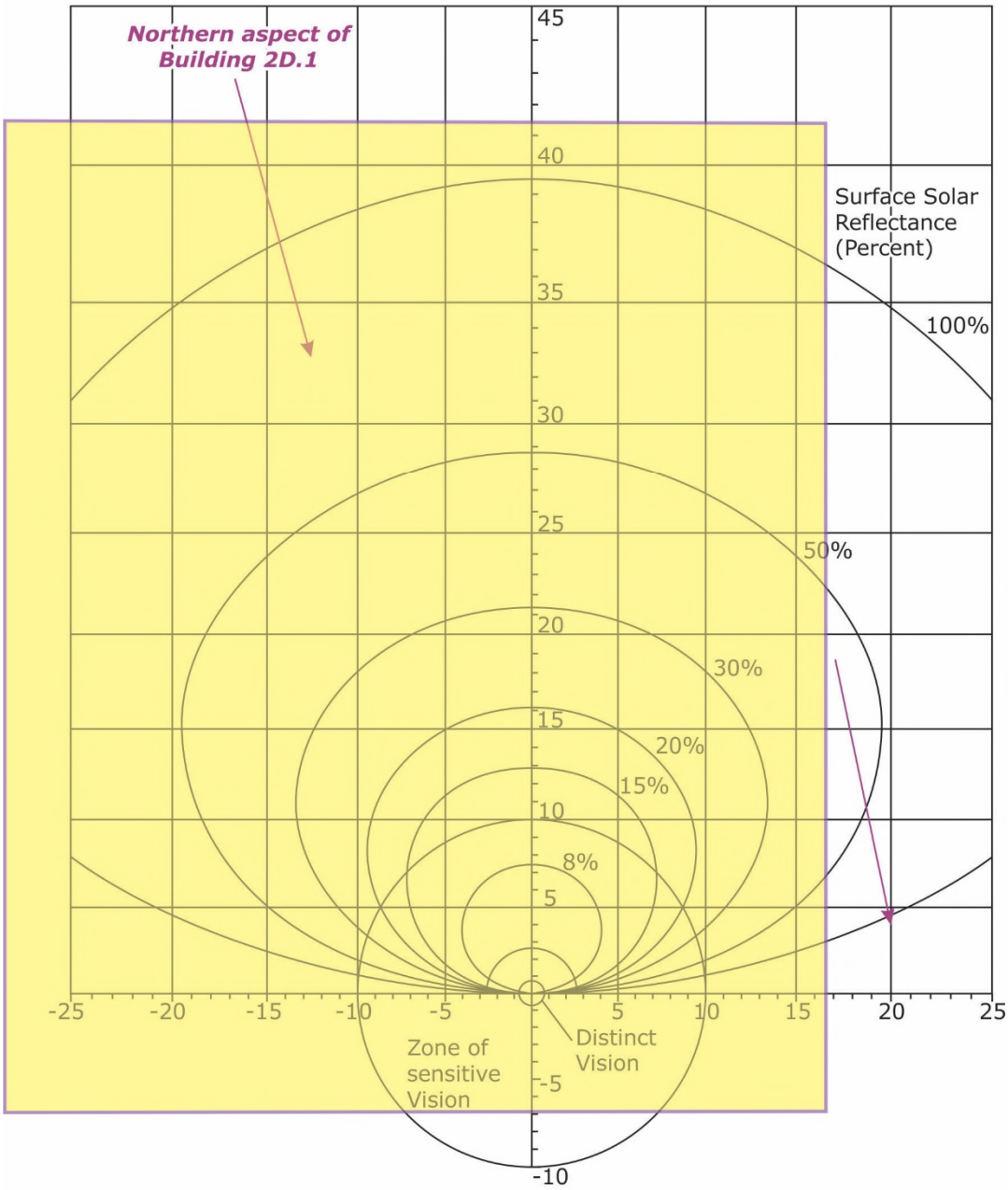

Figure A.57: Glare Overlay of the Viewpoint at Point I06

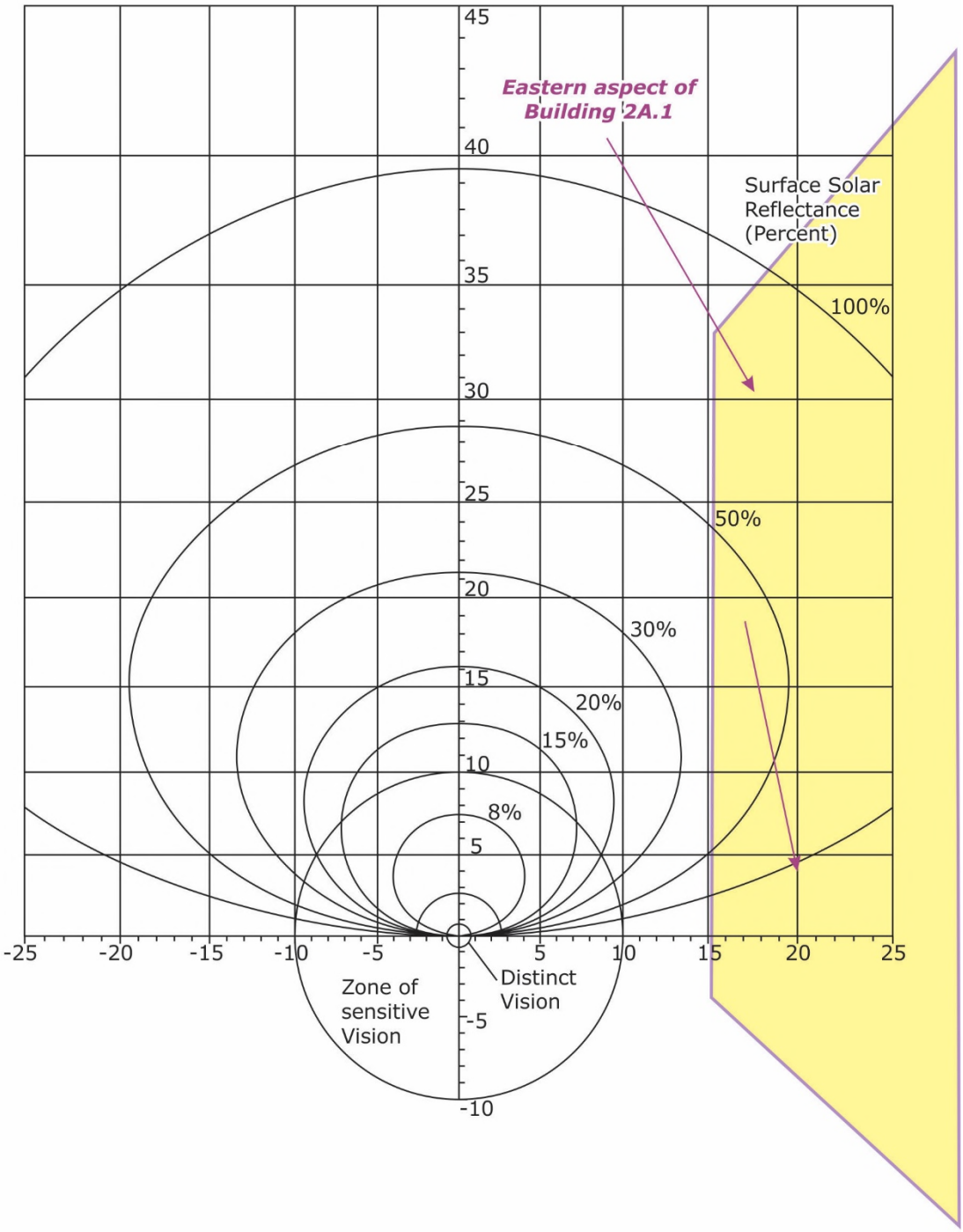

Figure A.58: Glare Overlay of the Viewpoint at Point I07

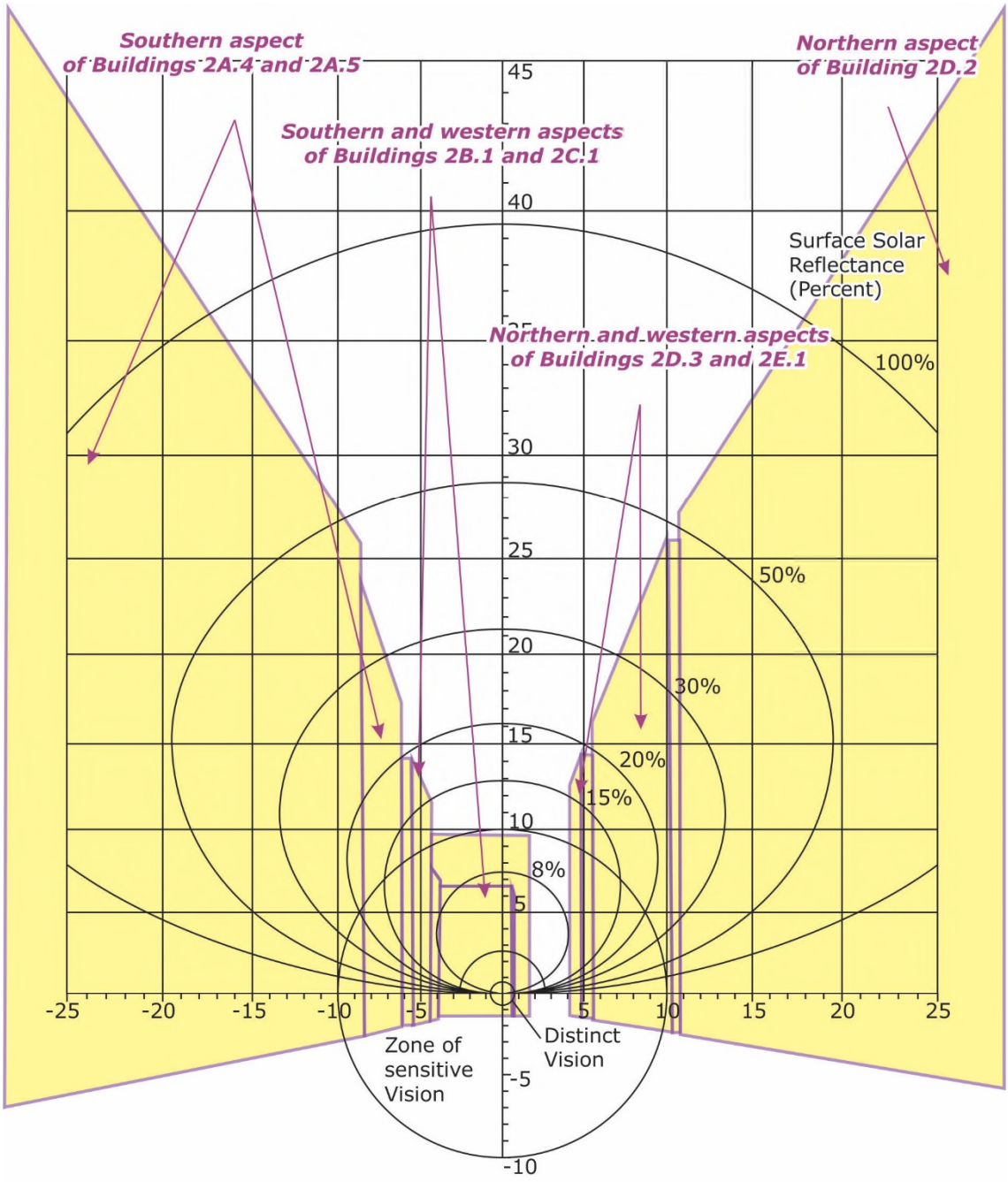

Figure A.59: Glare Overlay of the Viewpoint at Point I08

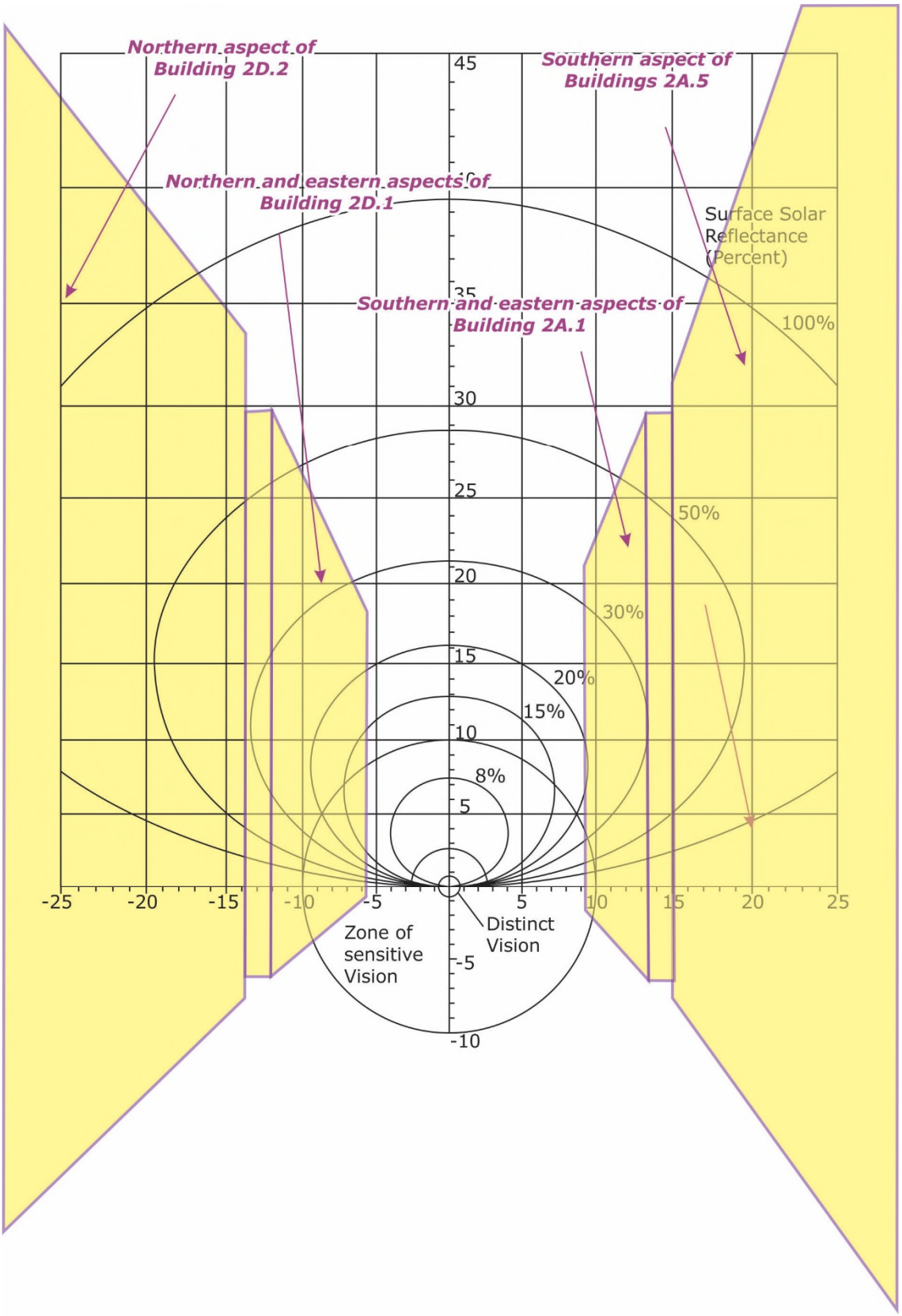

Figure A.60: Glare Overlay of the Viewpoint at Point I09

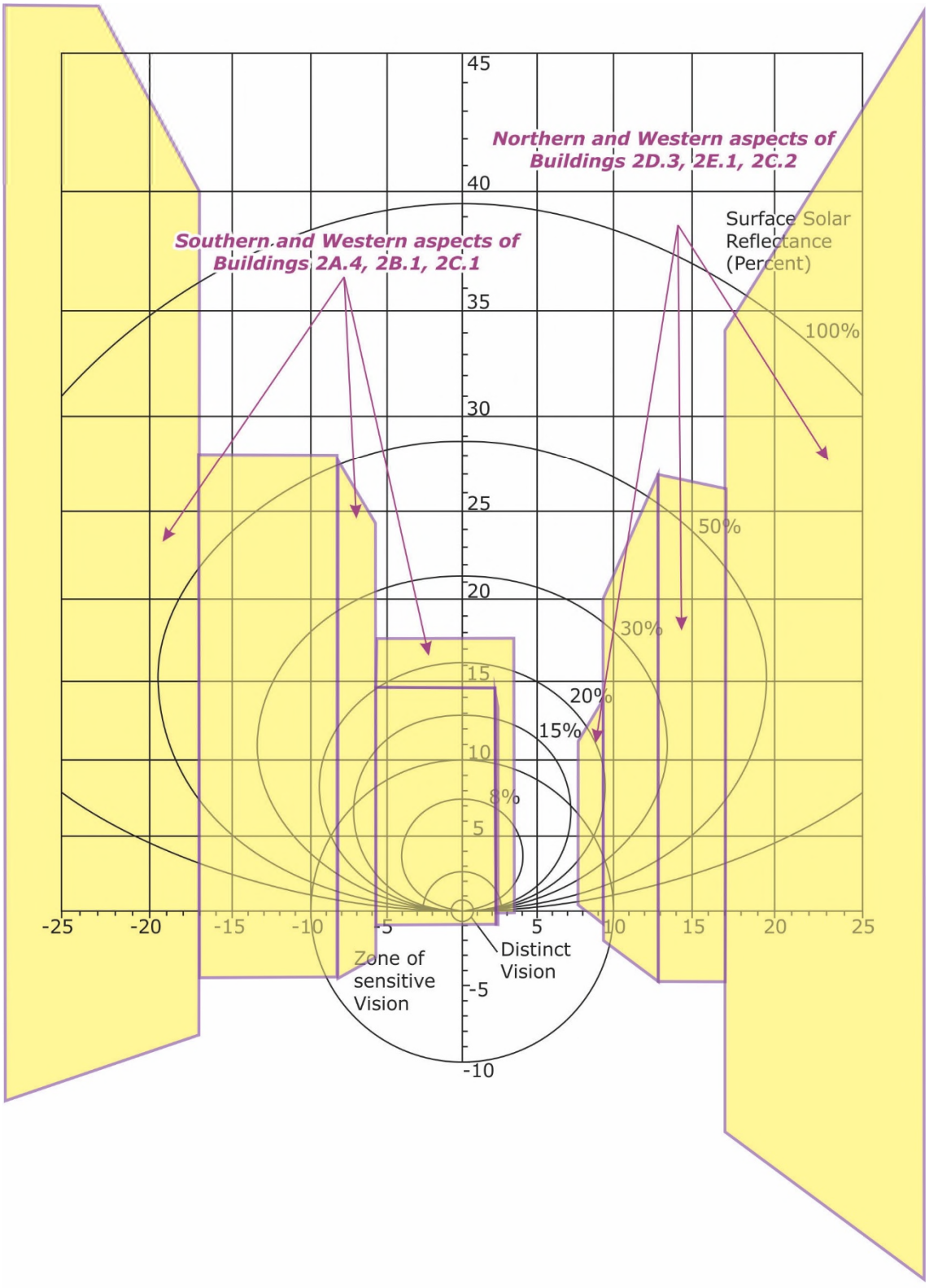

Figure A.61: Glare Overlay of the Viewpoint at Point I10

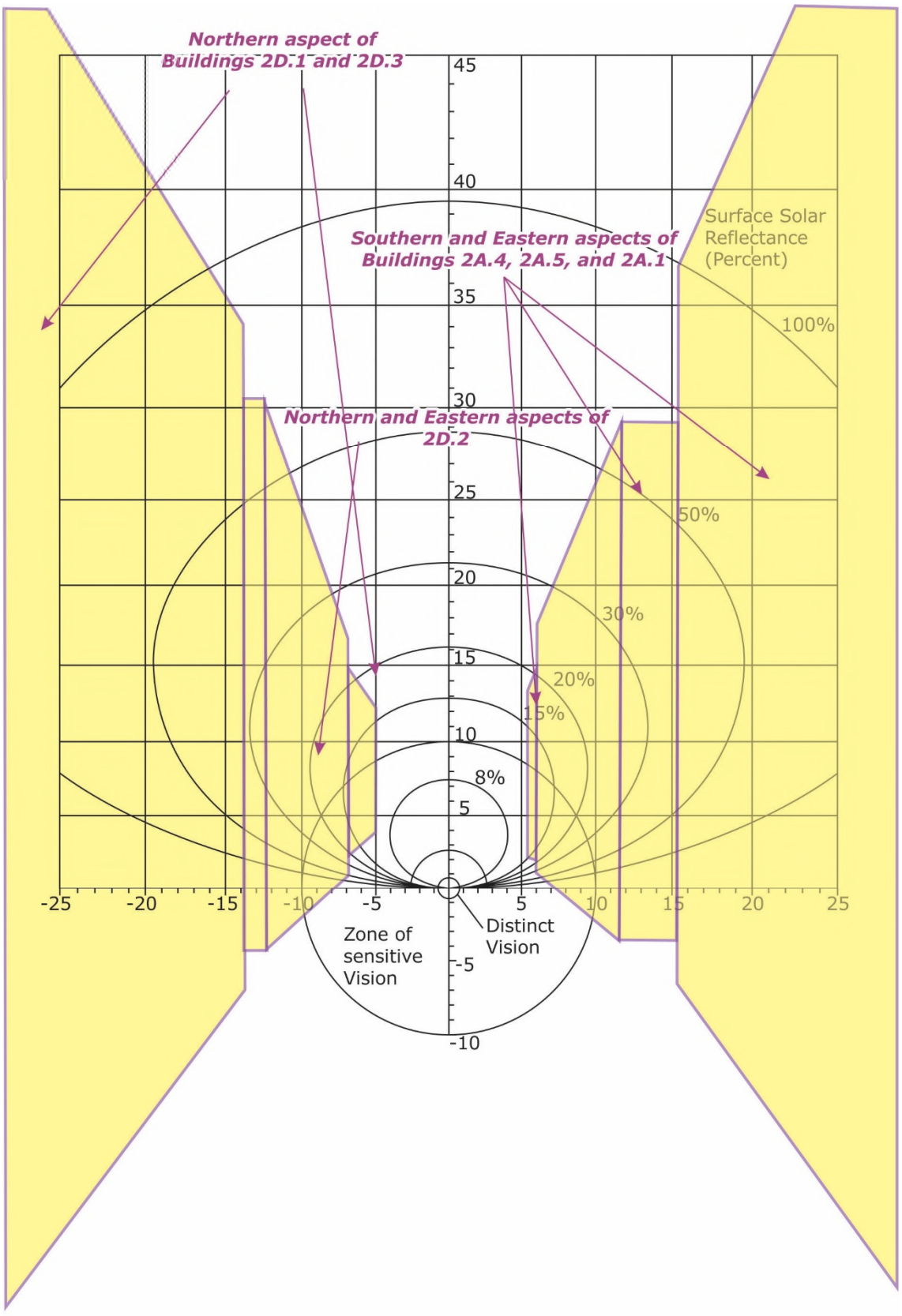

Figure A.62: Glare Overlay of the Viewpoint at Point I11

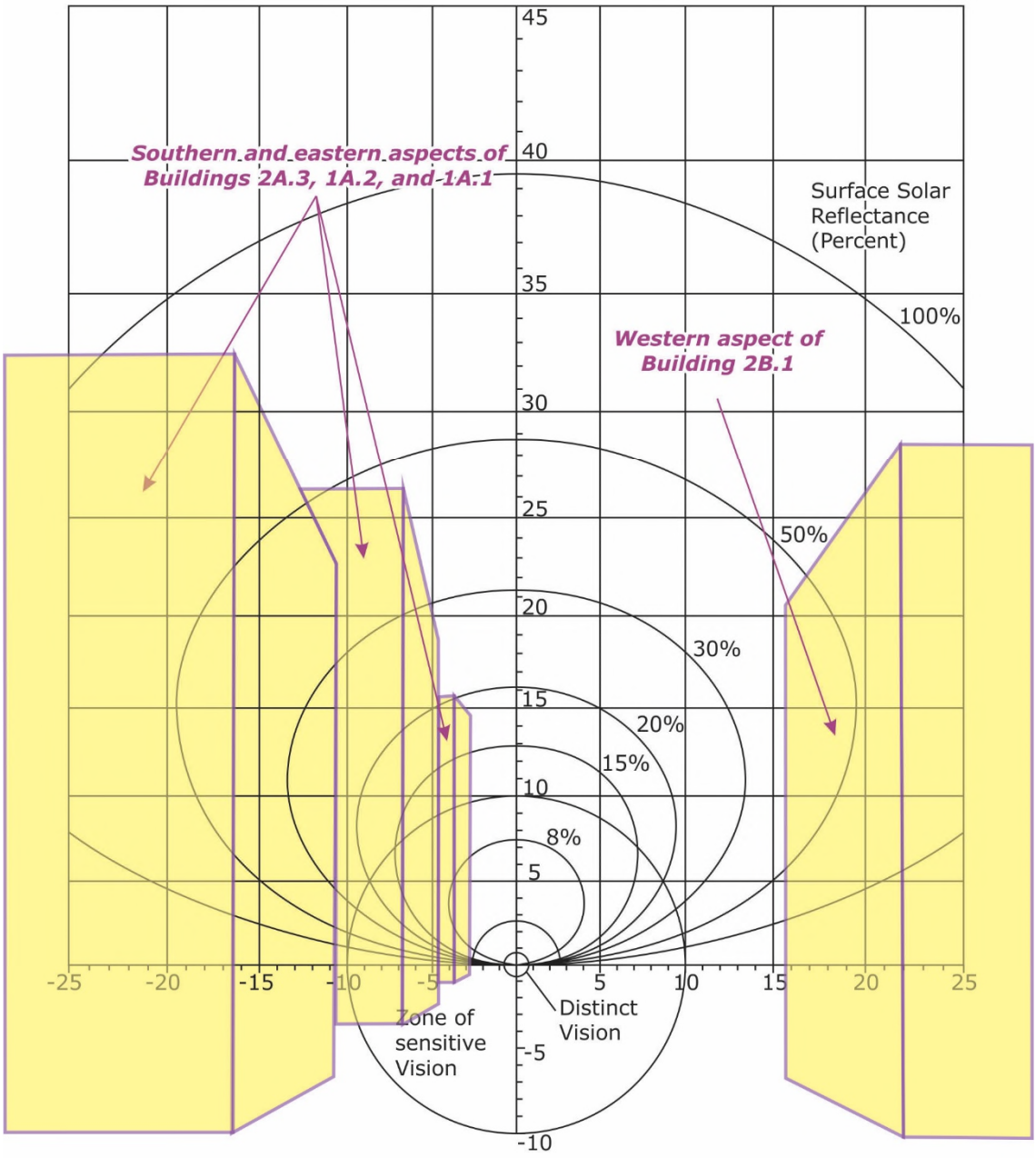

Figure A.63: Glare Overlay of the Viewpoint at Point I12

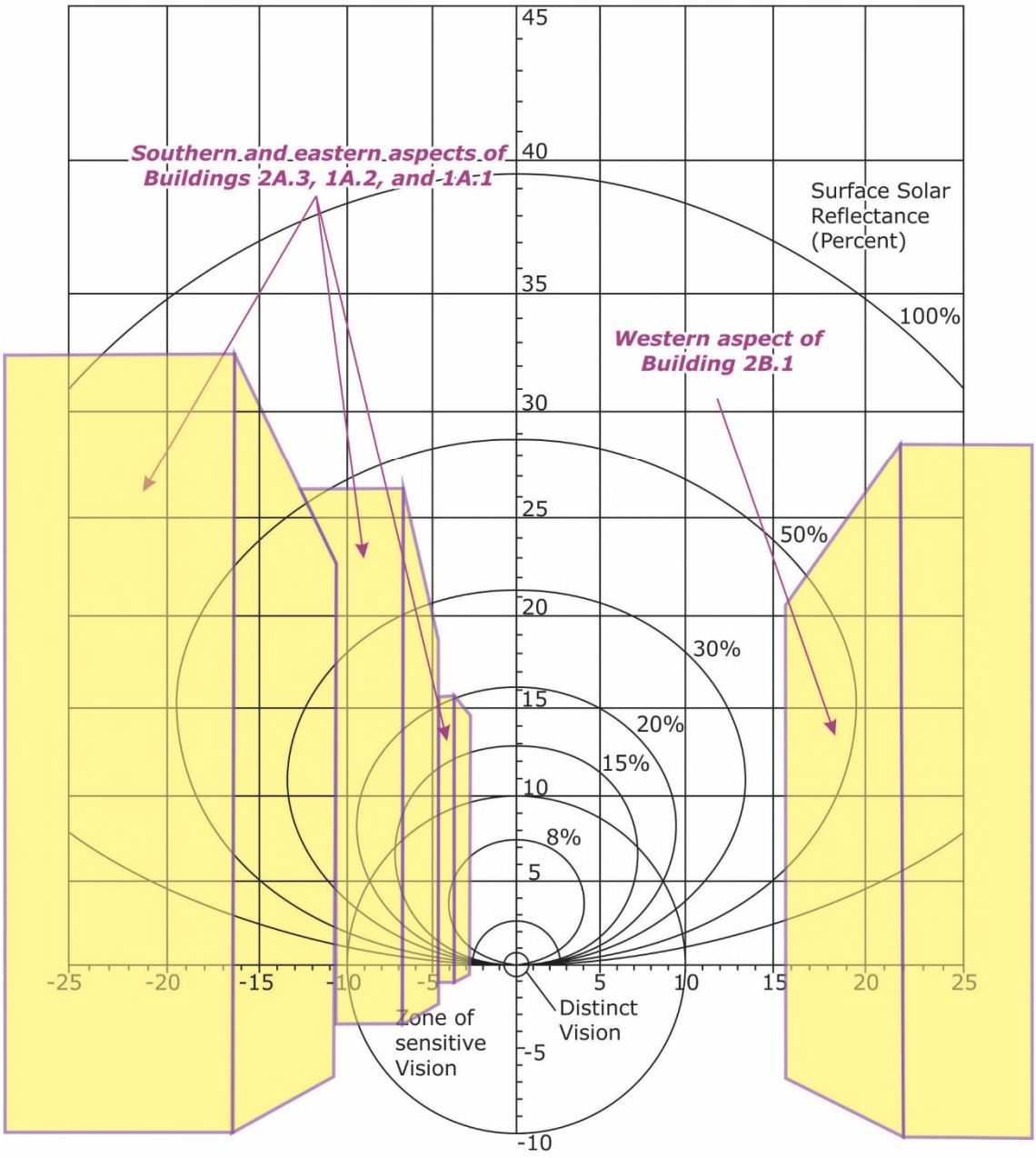

Figure A.64: Glare Overlay of the Viewpoint at Point I13

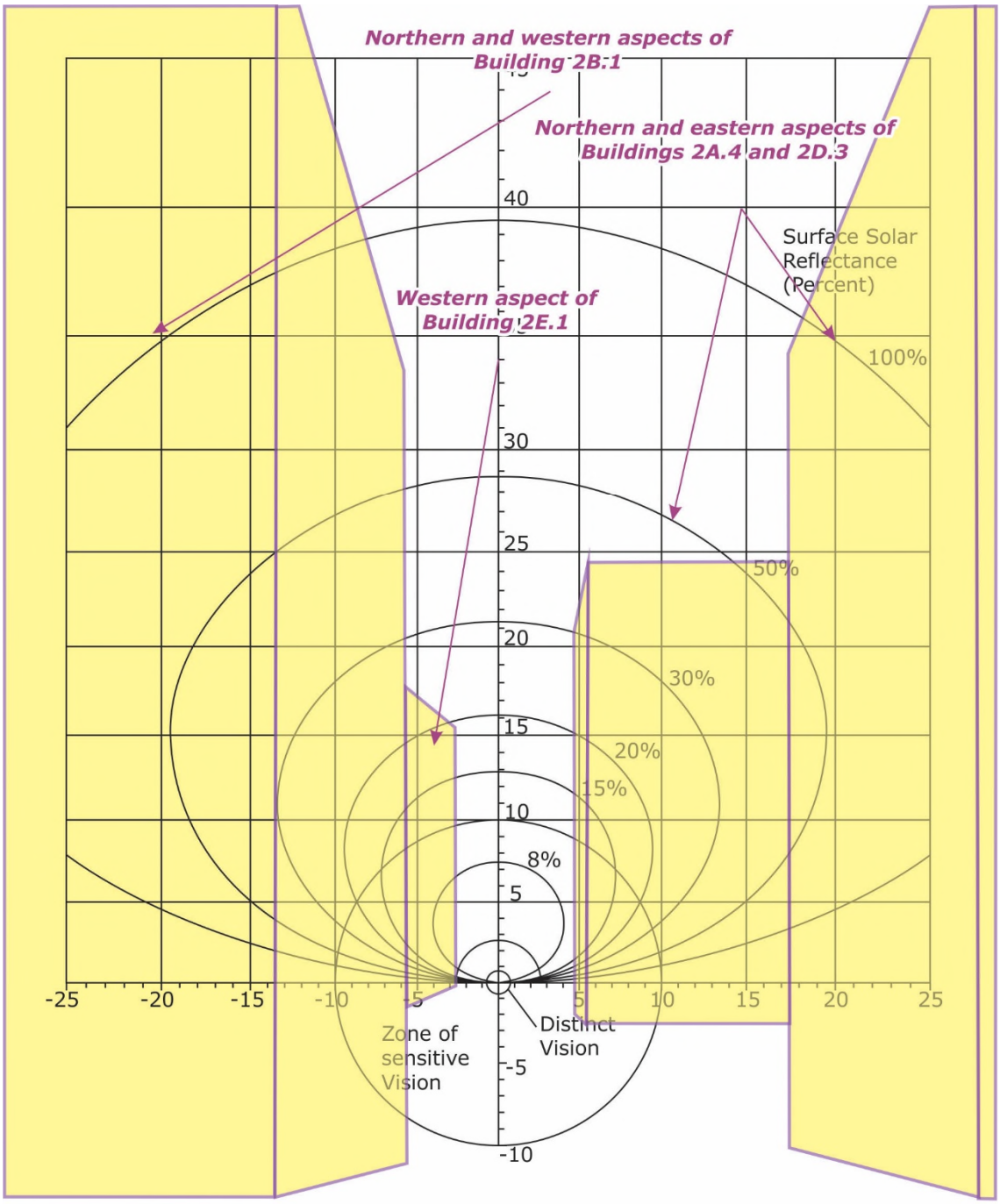

Figure A.65: Glare Overlay of the Viewpoint at Point I14

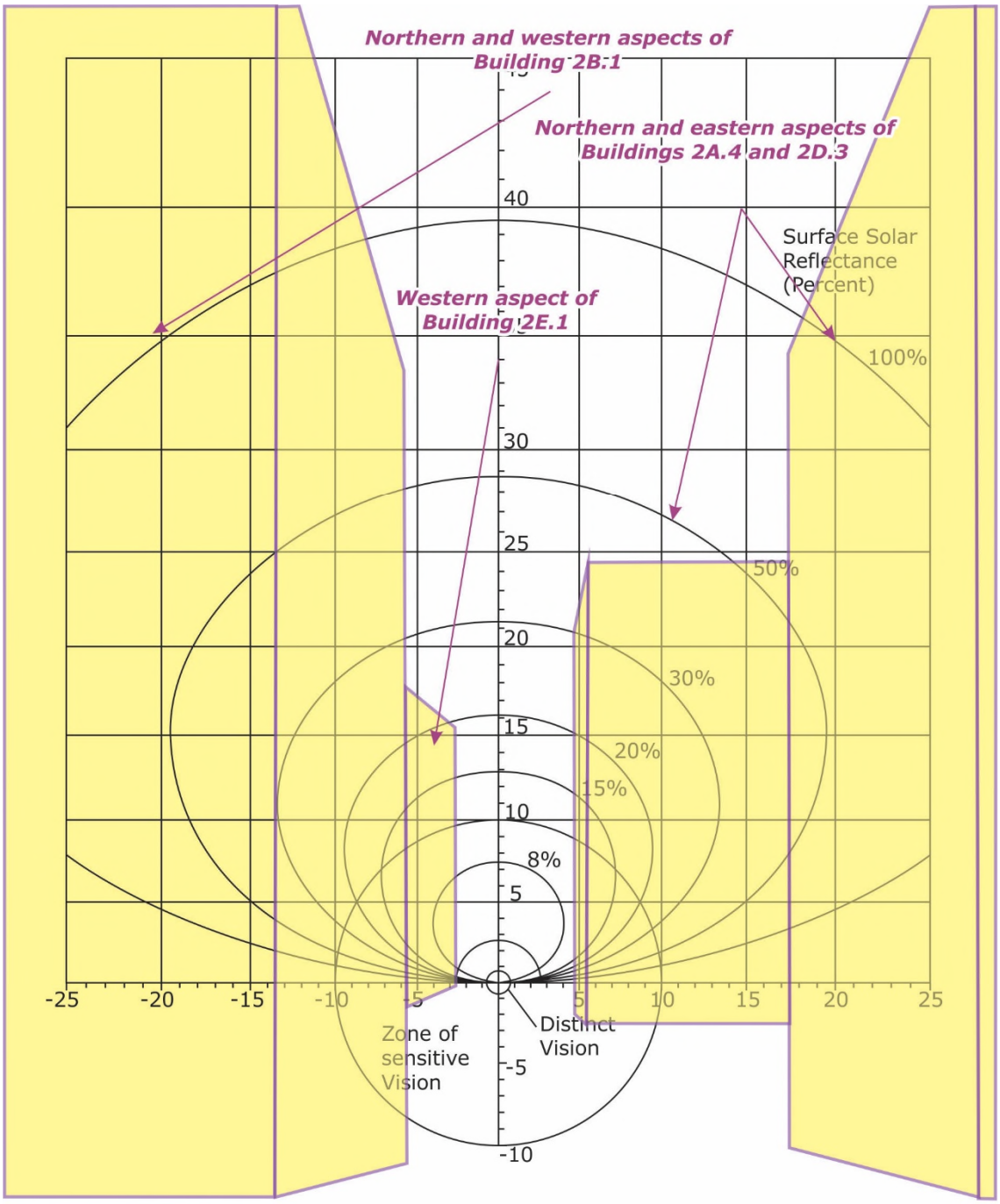

Figure A.66: Glare Overlay of the Viewpoint at Point I15

APPENDIX B SOLAR CHARTS FOR THE VARIOUS CRITICAL ASPECTS

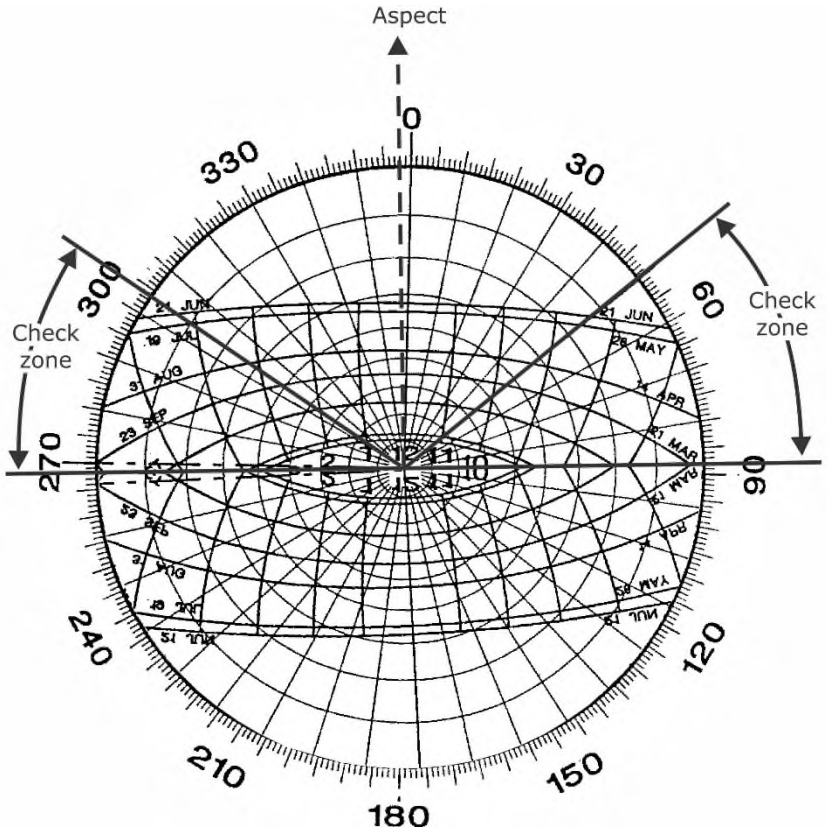

Figure B.1: Sun Chart for the 358° Aspect

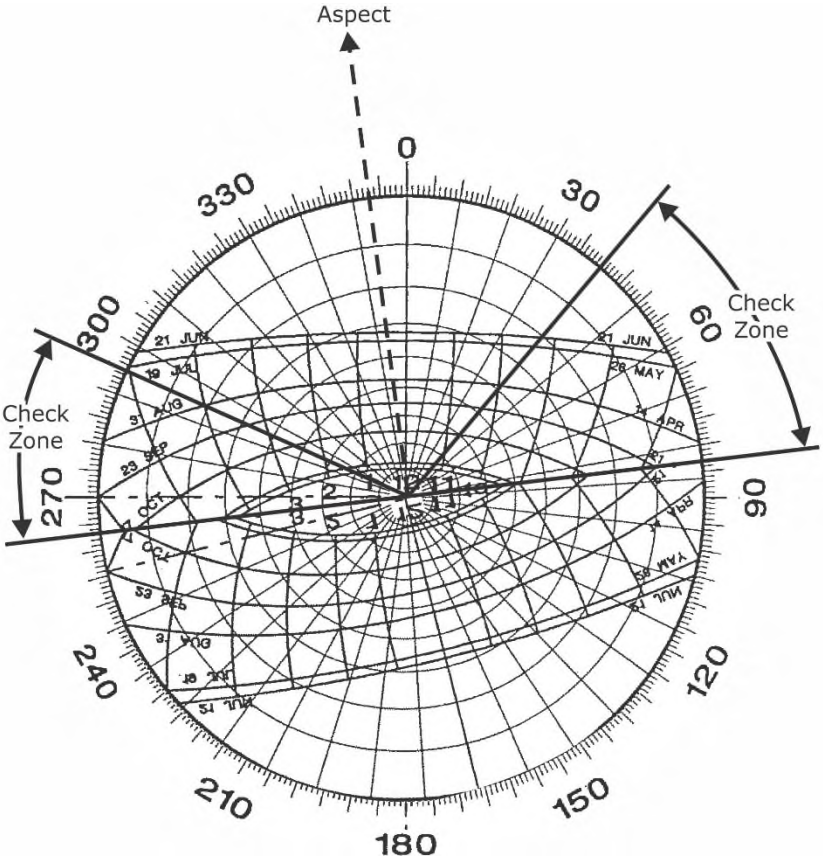

Figure B.2: Sun Chart for the 353° Aspect

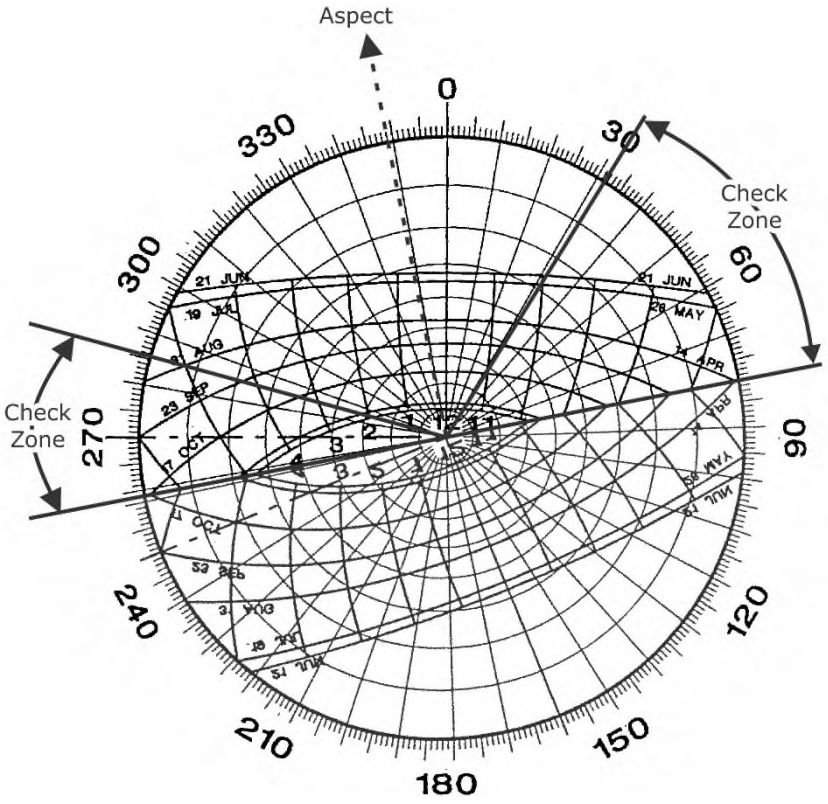

Figure B.3: Sun Chart for the 349° Aspect

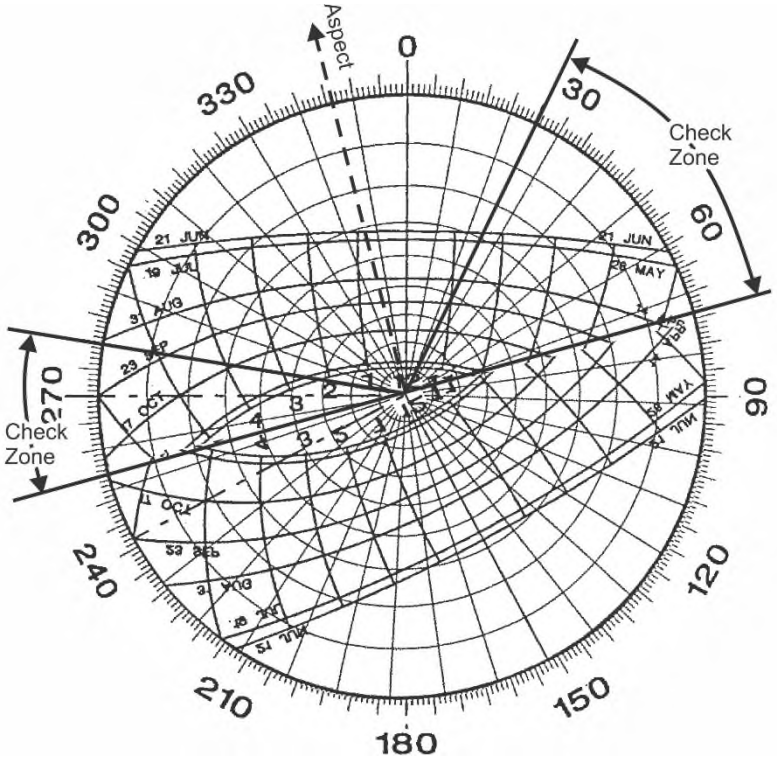

Figure B.4: Sun Chart for the 346° Aspect

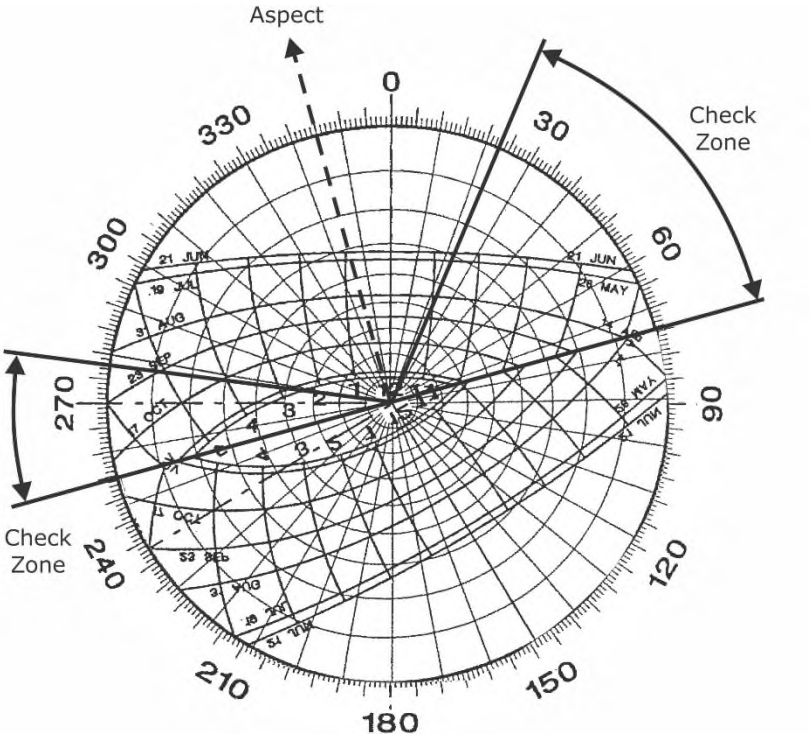

Figure B.5: Sun Chart for the 345° Aspect

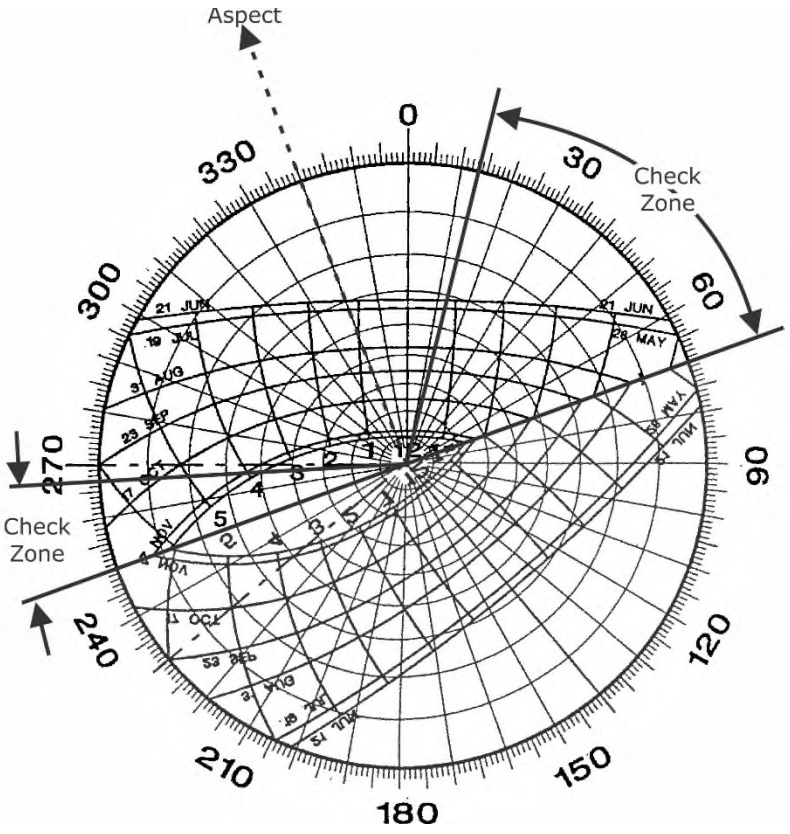

Figure B.6: Sun Chart for the 340° Aspect

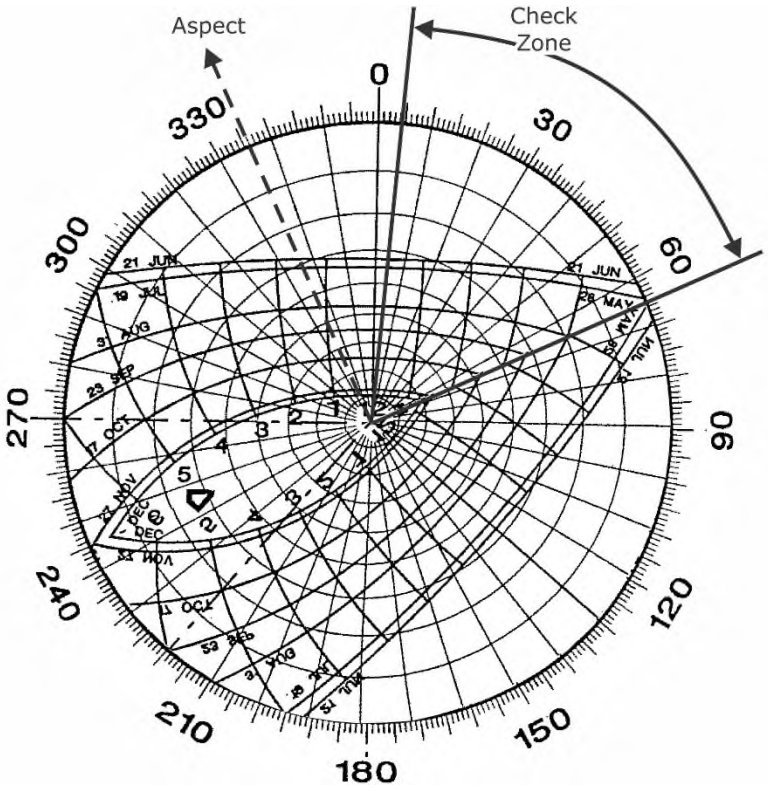

Figure B.7: Sun Chart for the 336° Aspect

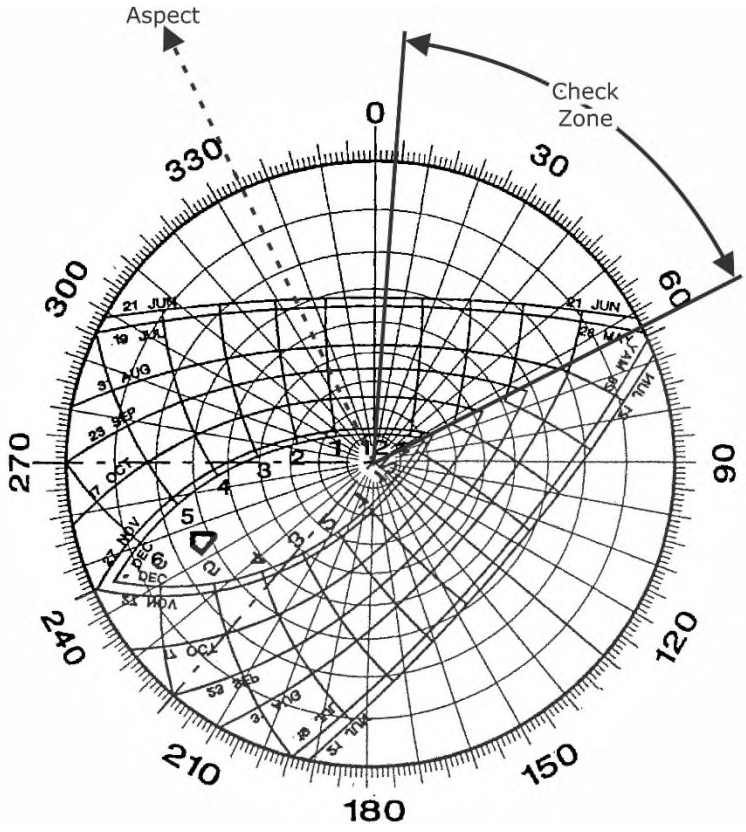

Figure B.8: Sun Chart for the 335° Aspect

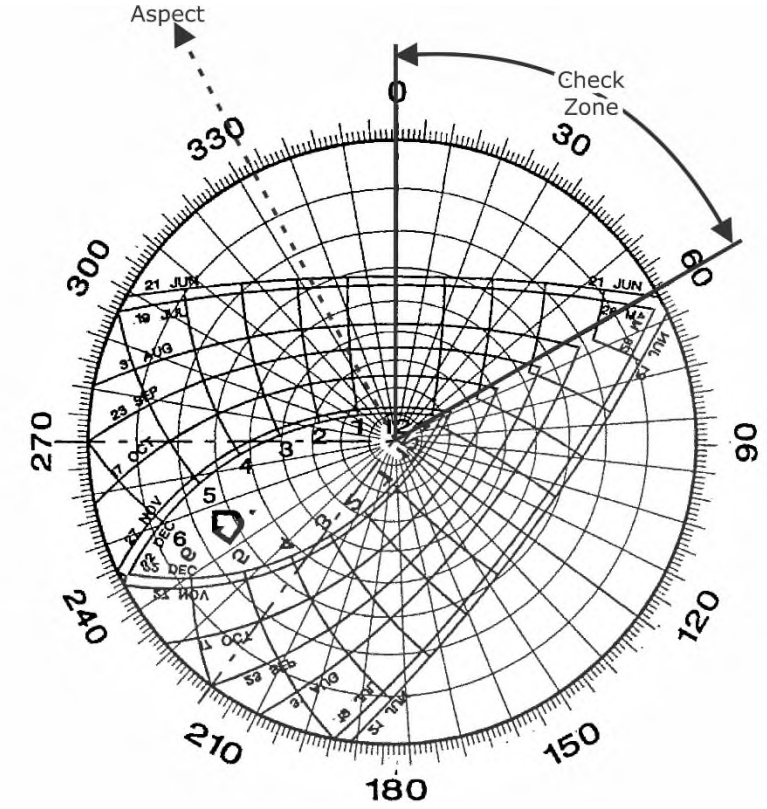

Figure B.9: Sun Chart for the 333° Aspect

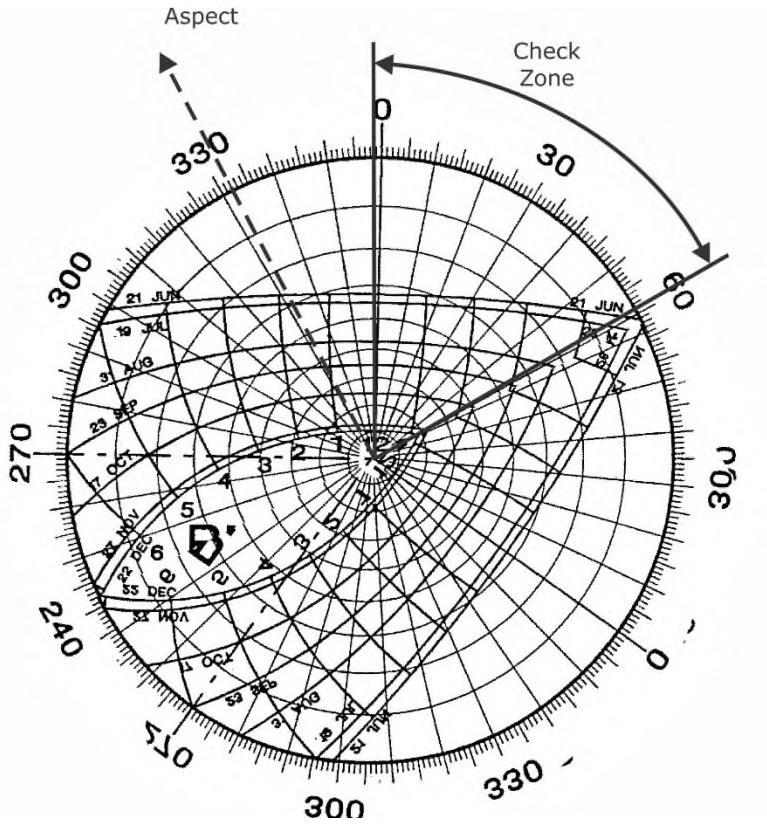

Figure B.10: Sun Chart for the 332° Aspect

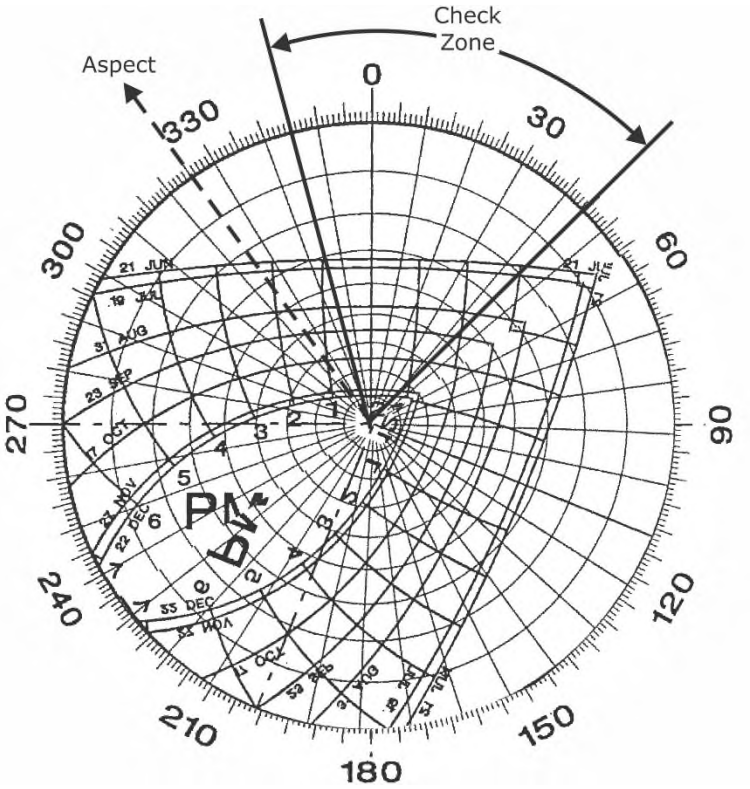

Figure B.11: Sun Chart for the 325° Aspect

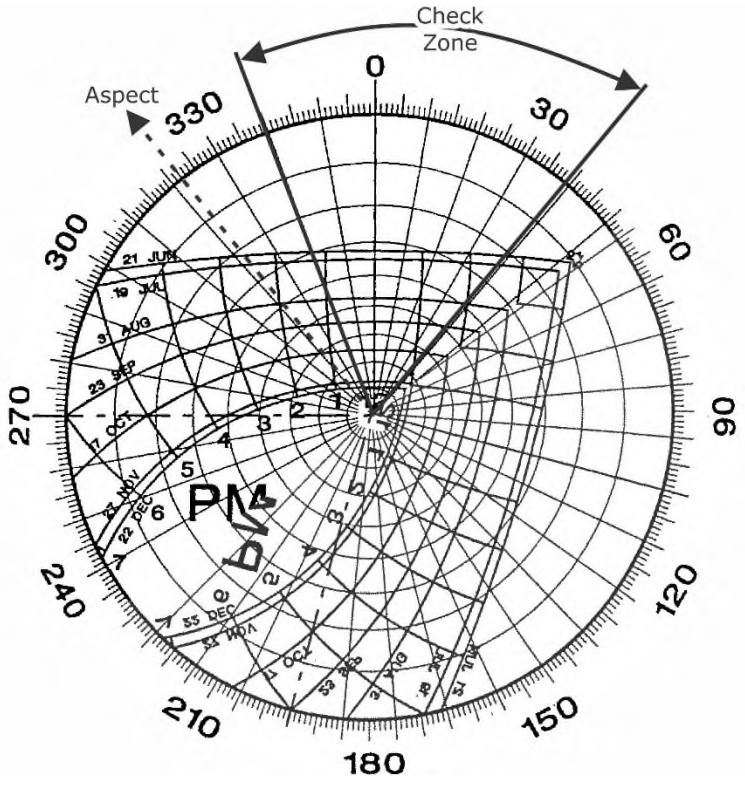

Figure B.12: Sun Chart for the 322° Aspect

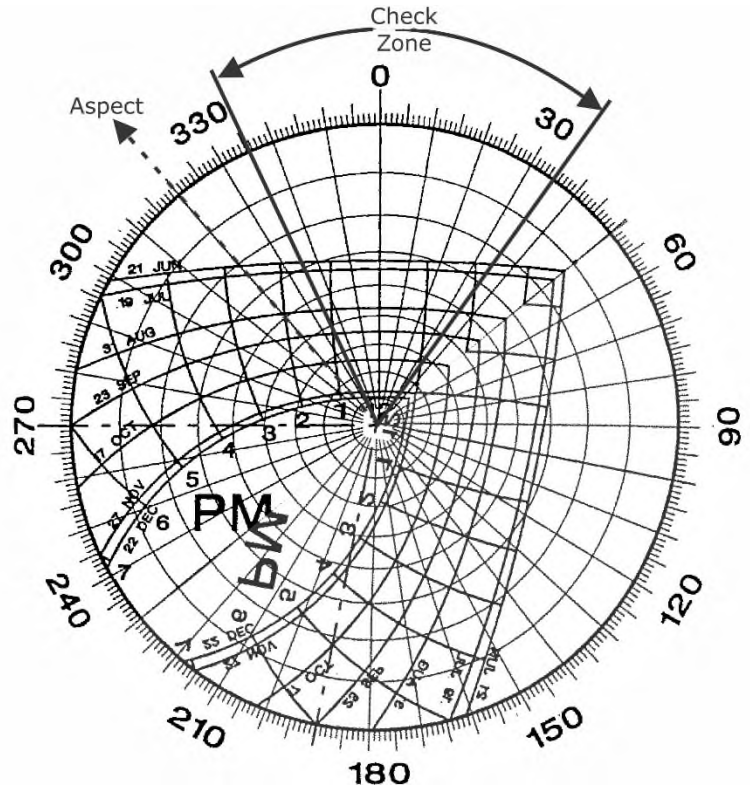

Figure B.13: Sun Chart for the 320° Aspect

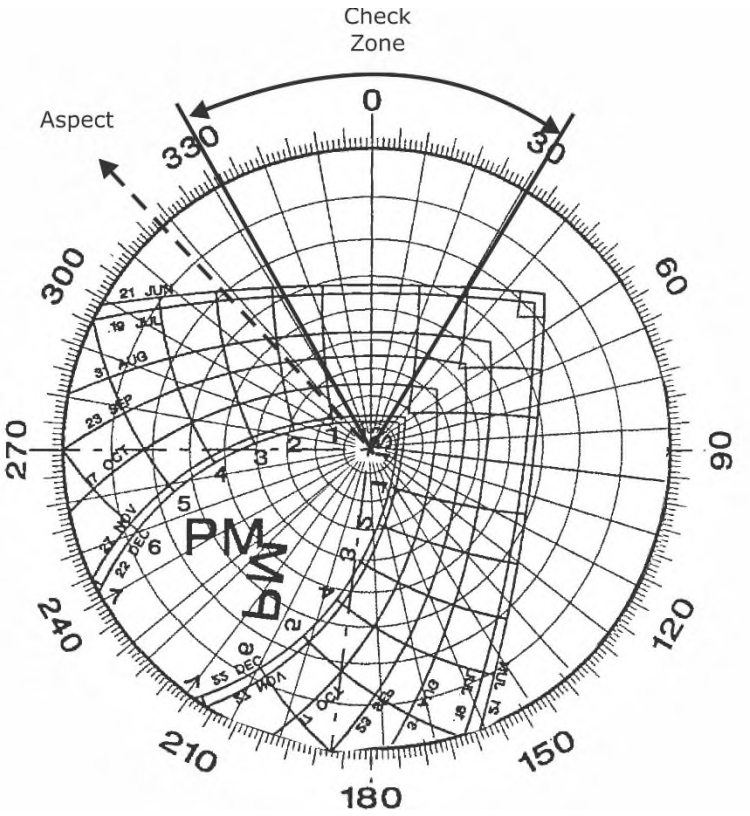

Figure B.14: Sun Chart for the 318° Aspect

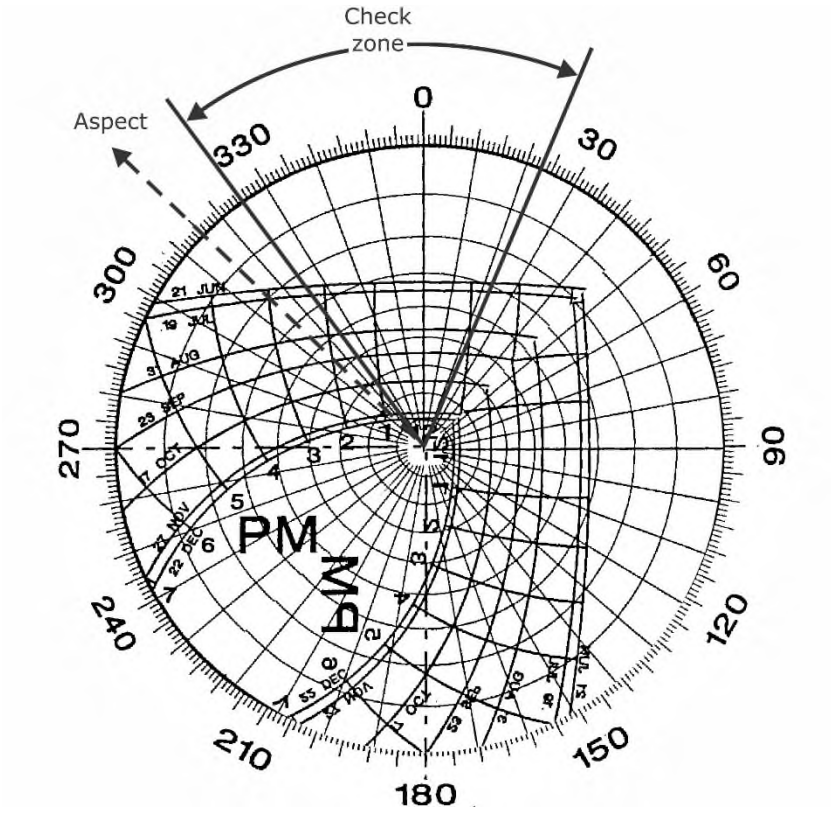

Figure B.15: Sun Chart for the 315° Aspect

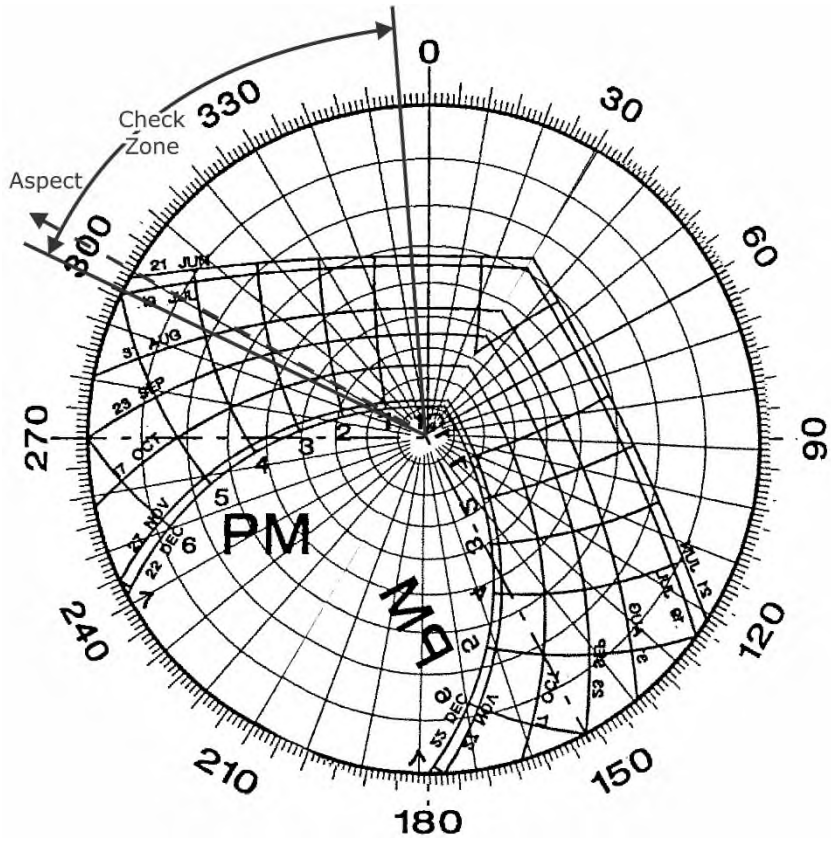

Figure B.16: Sun Chart for the 300° Aspect

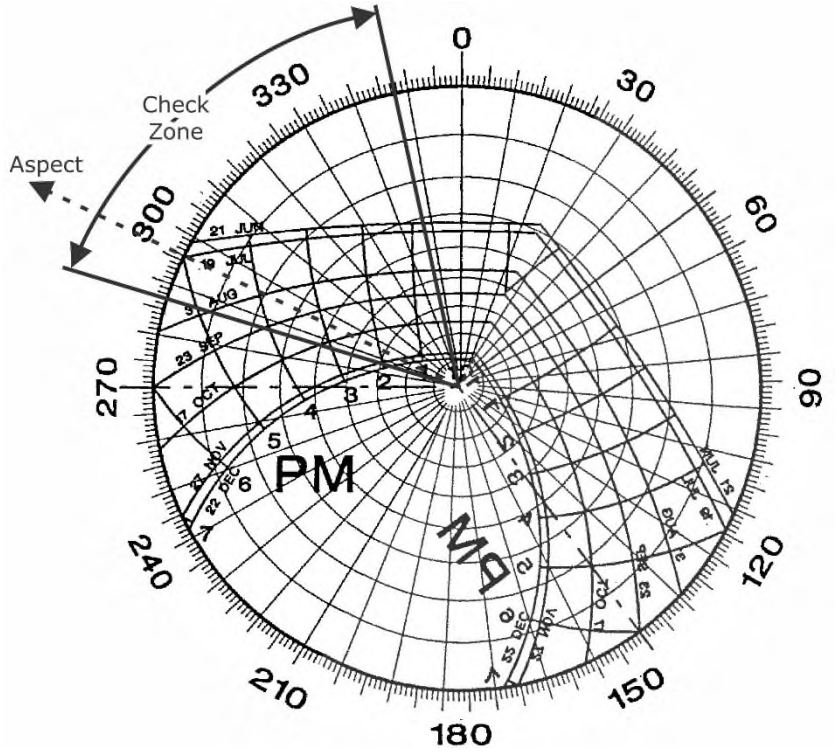

Figure B.17: Sun Chart for the 296° Aspect

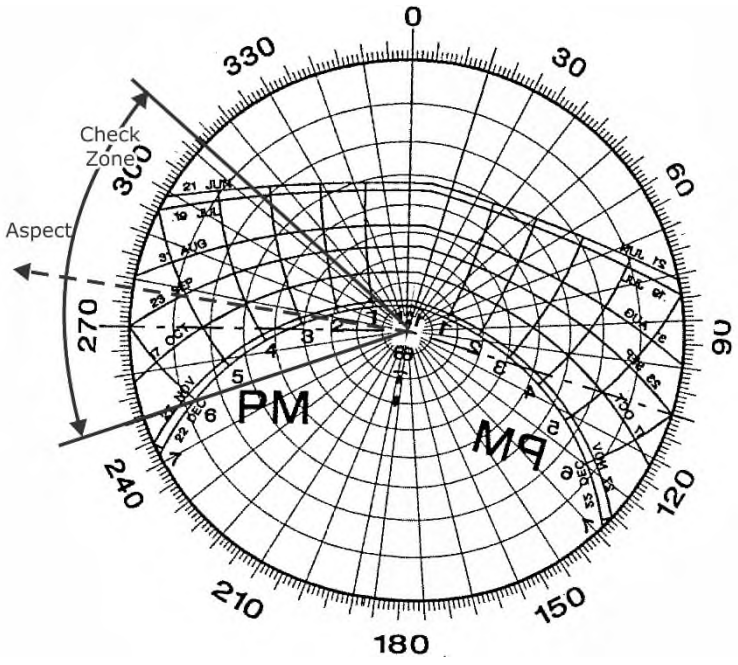

Figure B.18: Sun Chart for the 278° Aspect

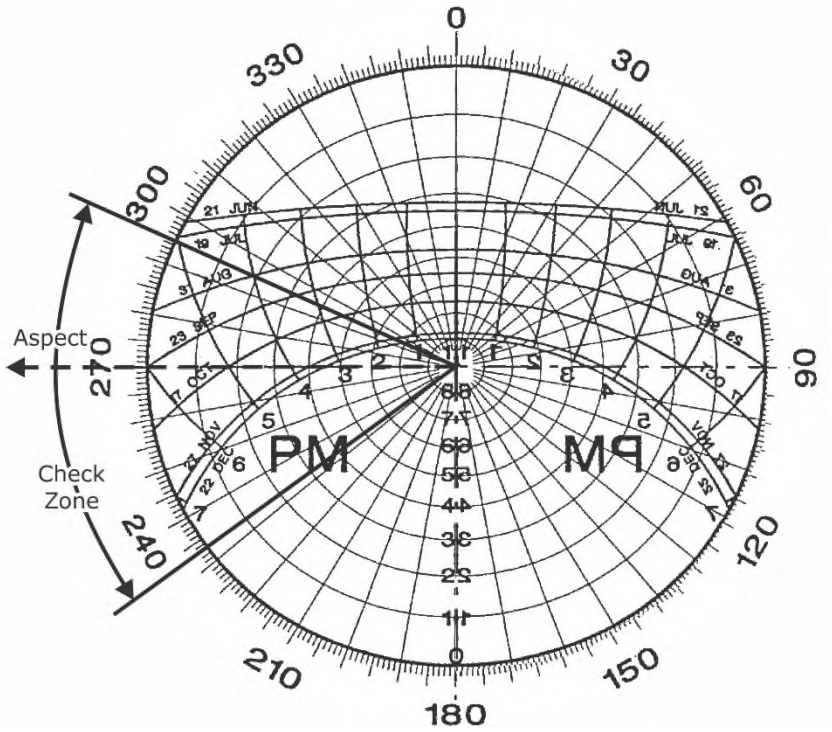

Figure B.19: Sun Chart for the 270° Aspect

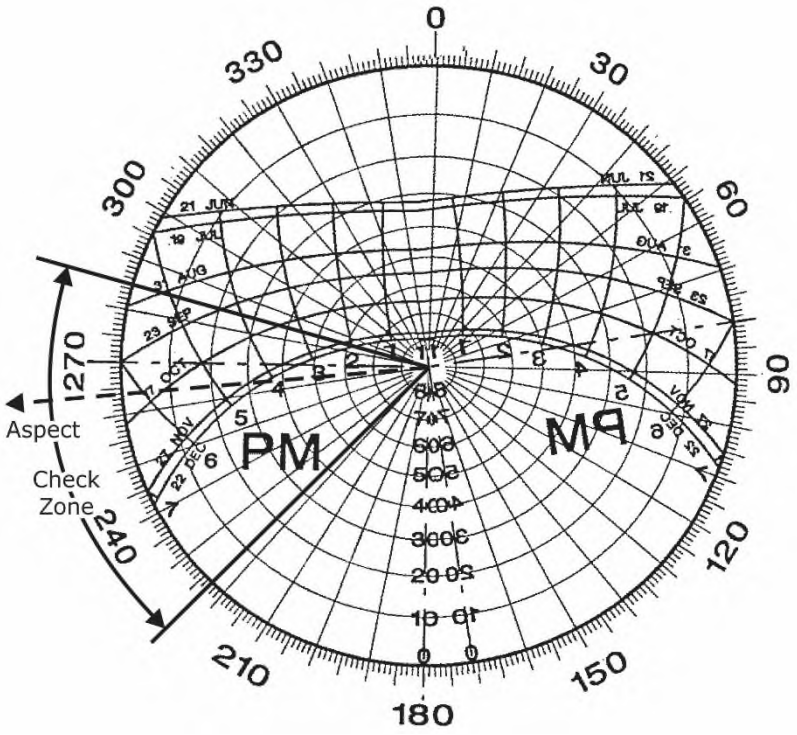

Figure B.20: Sun Chart for the 265 Aspect

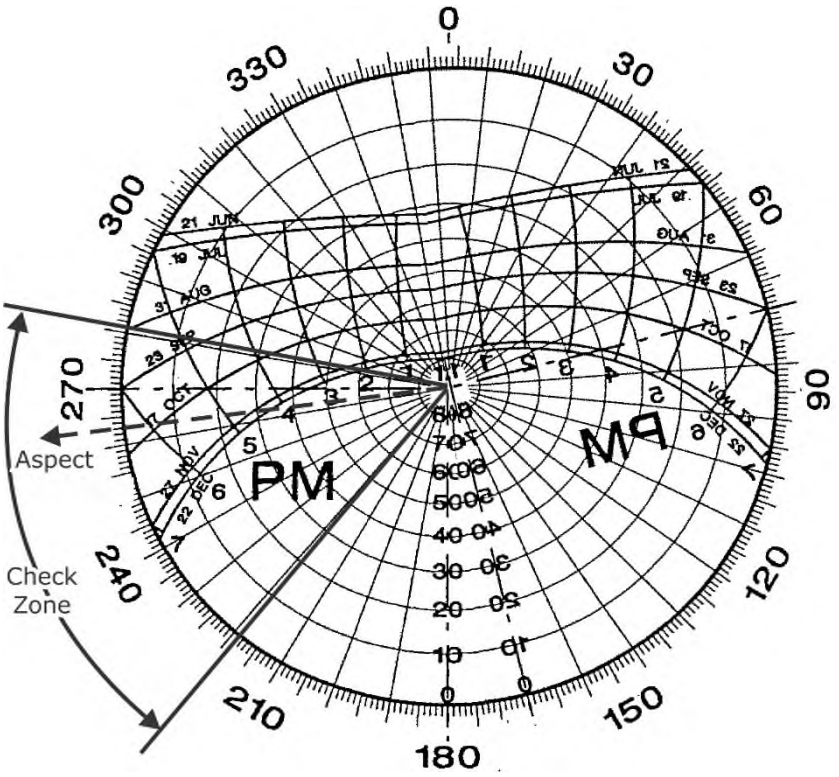

Figure B.21: Sun Chart for the 263° Aspect

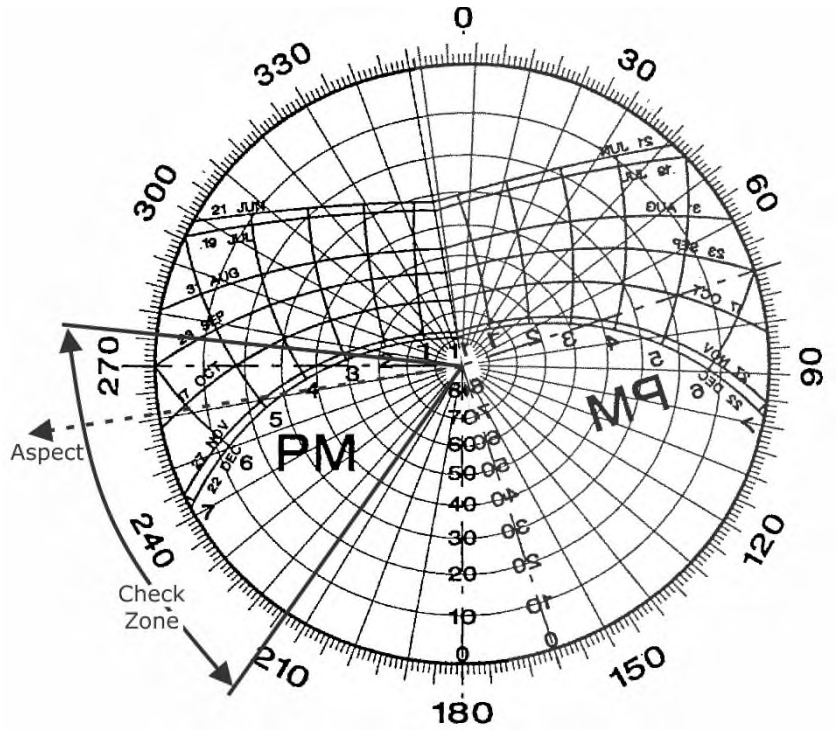

Figure B.22: Sun Chart for the 261° Aspect

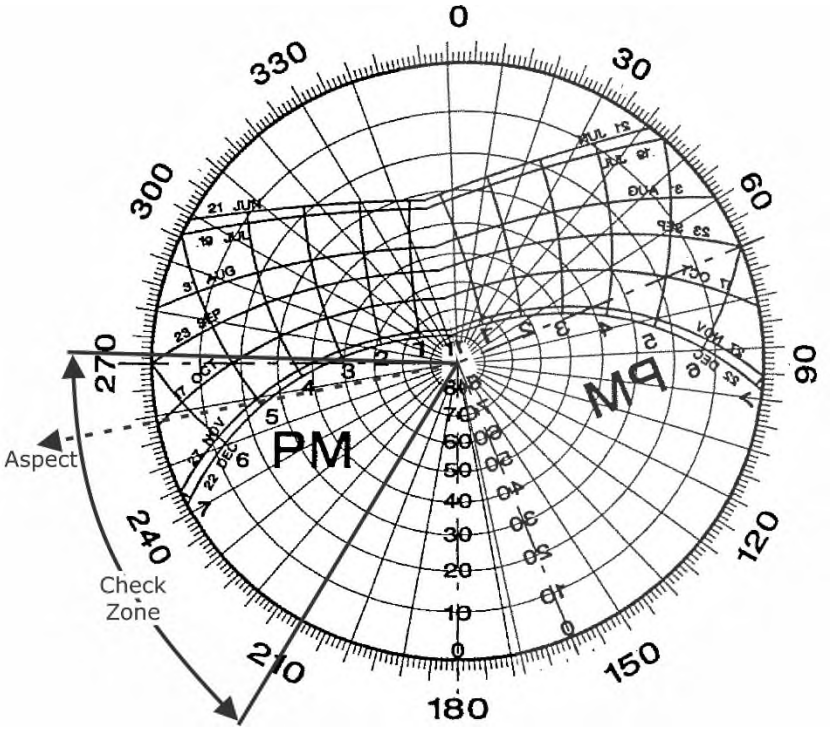

Figure B.23: Sun Chart for the 259° Aspect

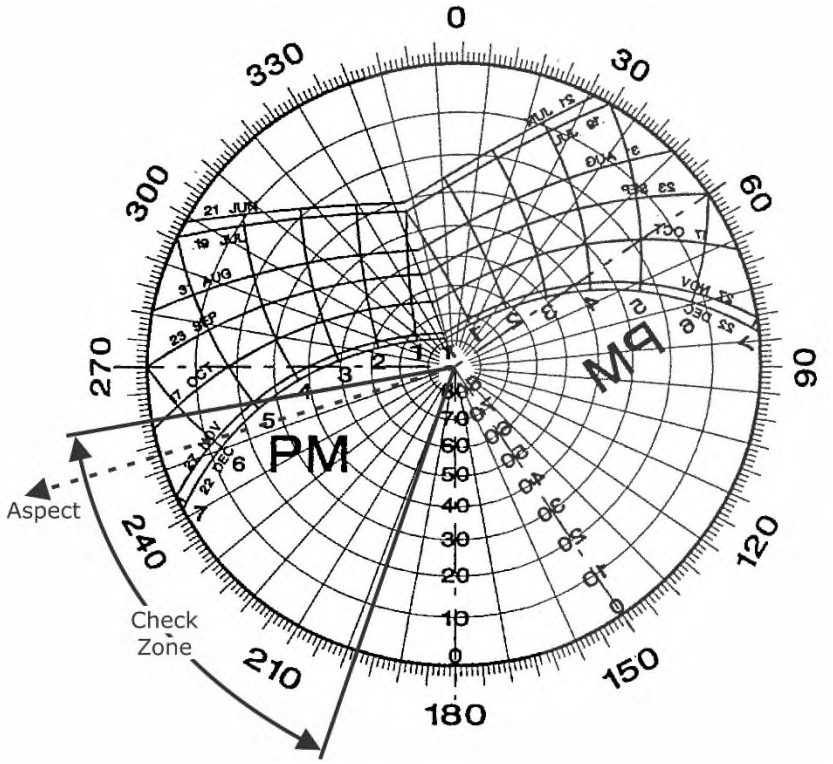

Figure B.24: Sun Chart for the 253° Aspect

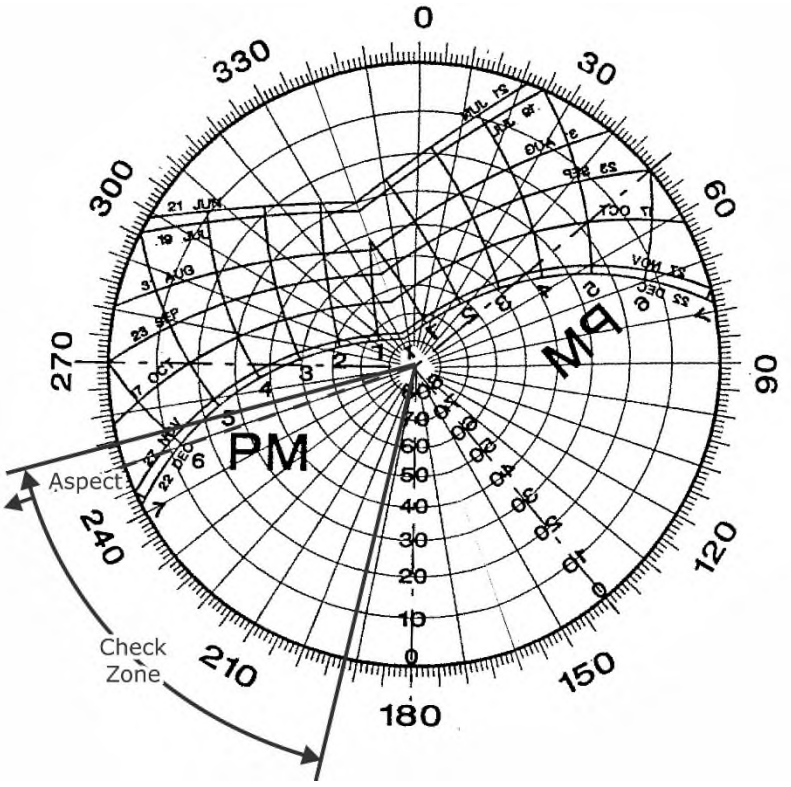

Figure B.25: Sun Chart for the 250° Aspect

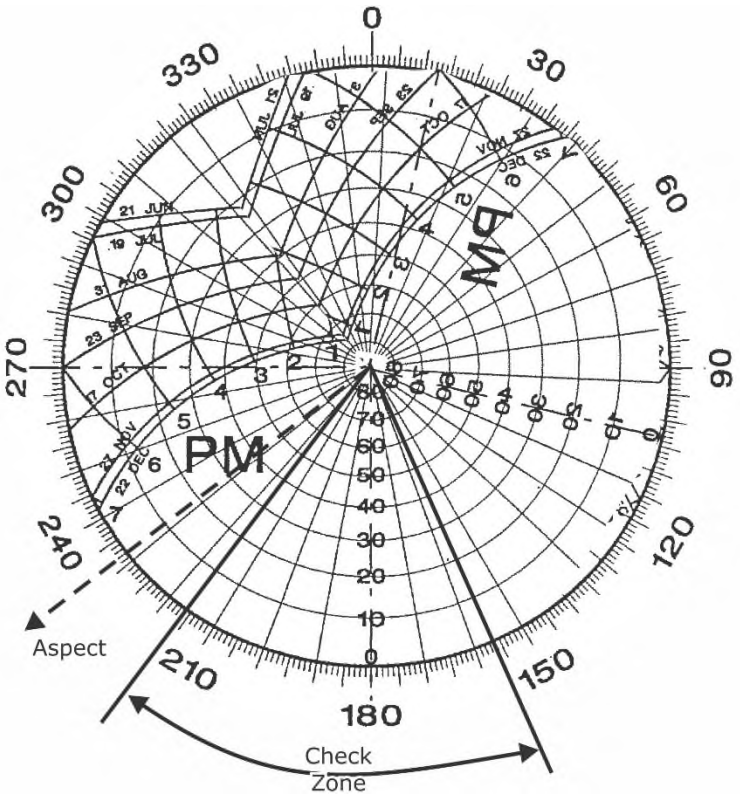

Figure B.26: Sun Chart for the 232° Aspect

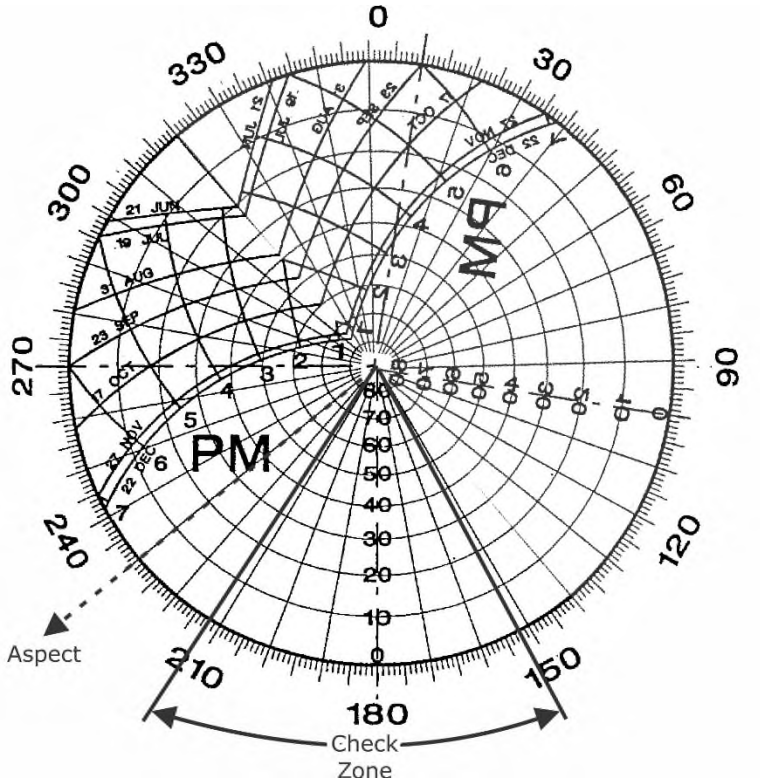

Figure B.27: Sun Chart for the 230° Aspect

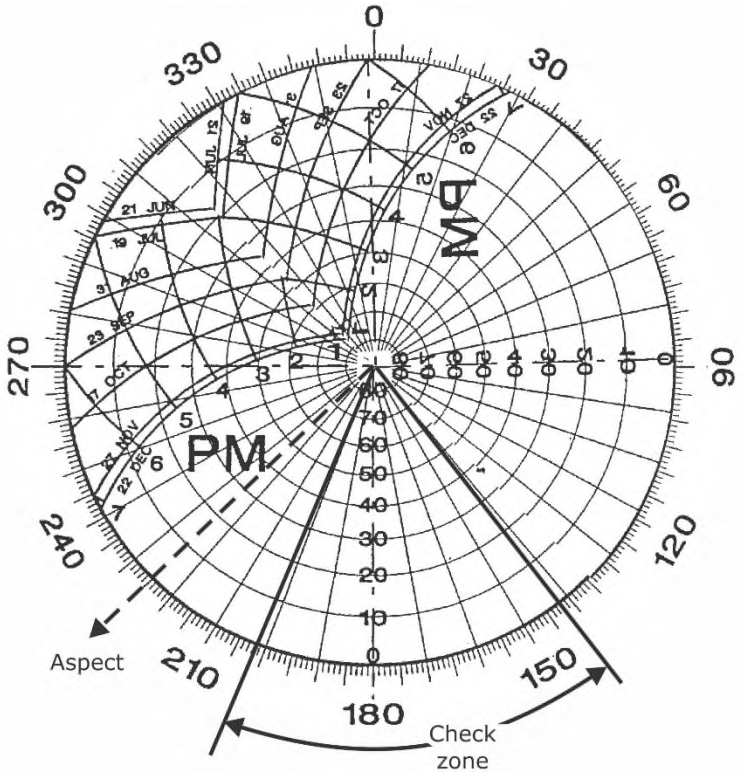

Figure B.28: Sun Chart for the 225° Aspect

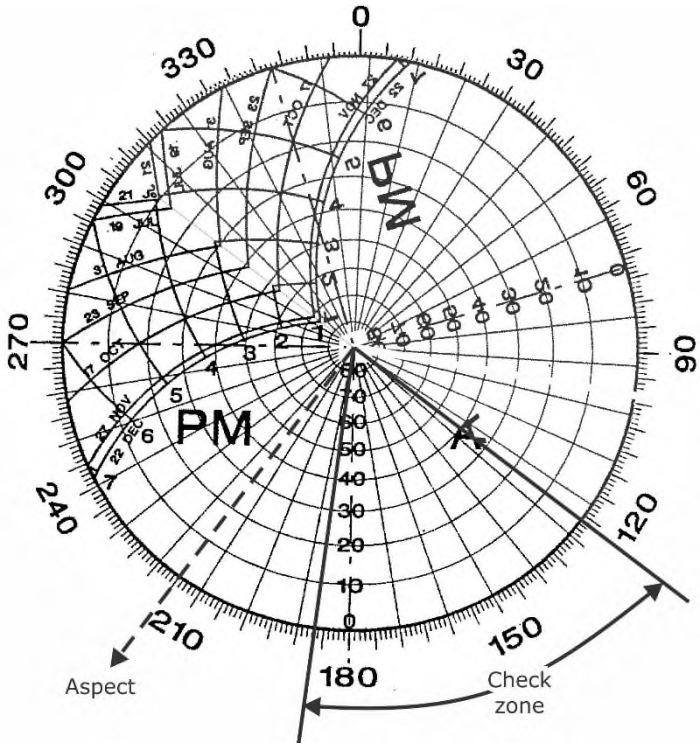

Figure B.29: Sun Chart for the 215° Aspect

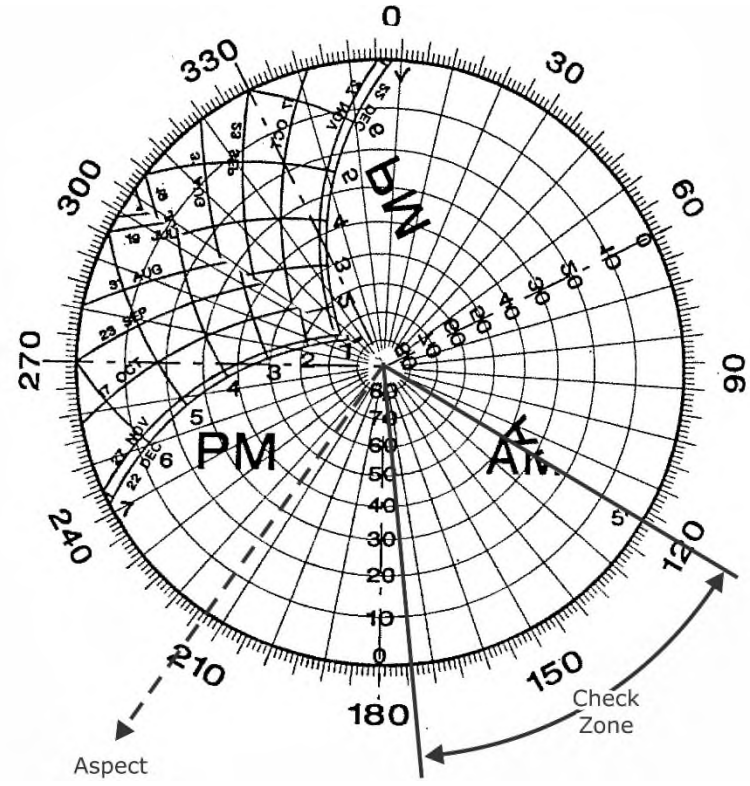

Figure B.30: Sun Chart for the 213° Aspect

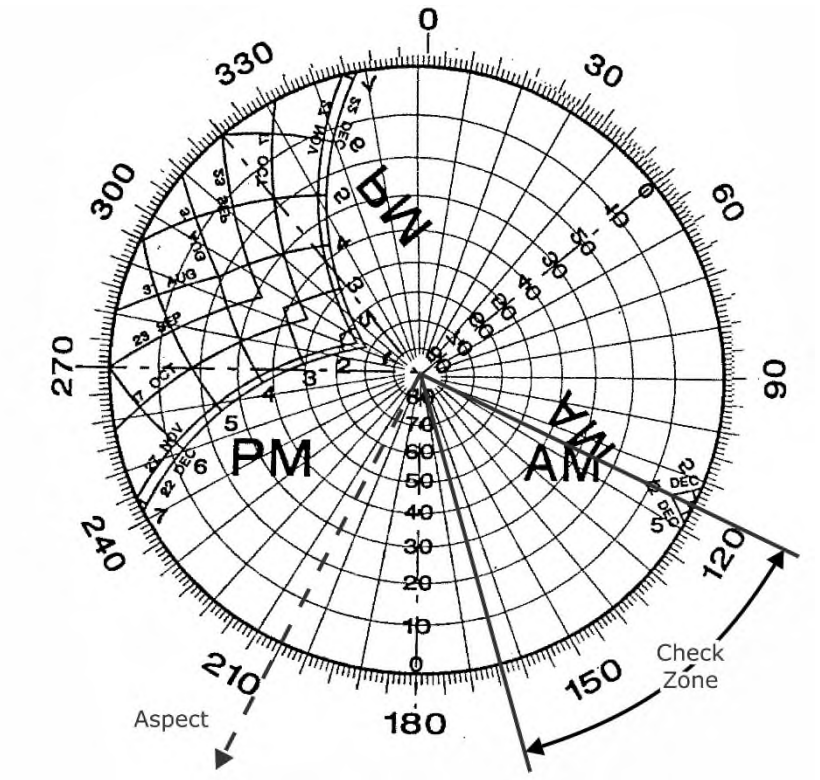

Figure B.31: Sun Chart for the 205° Aspect

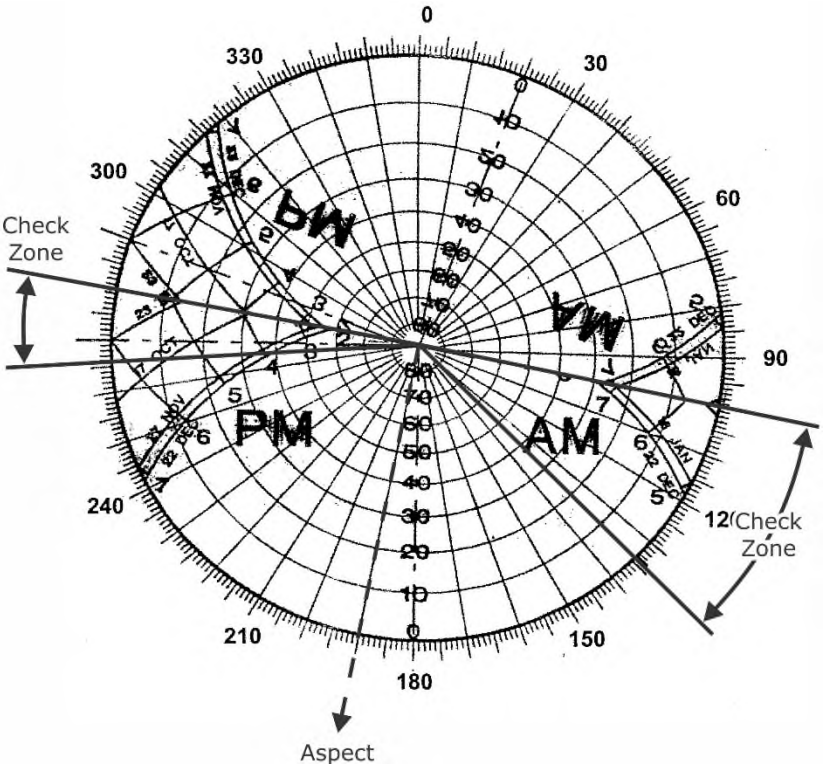

Figure B.32: Sun Chart for the 190° Aspect

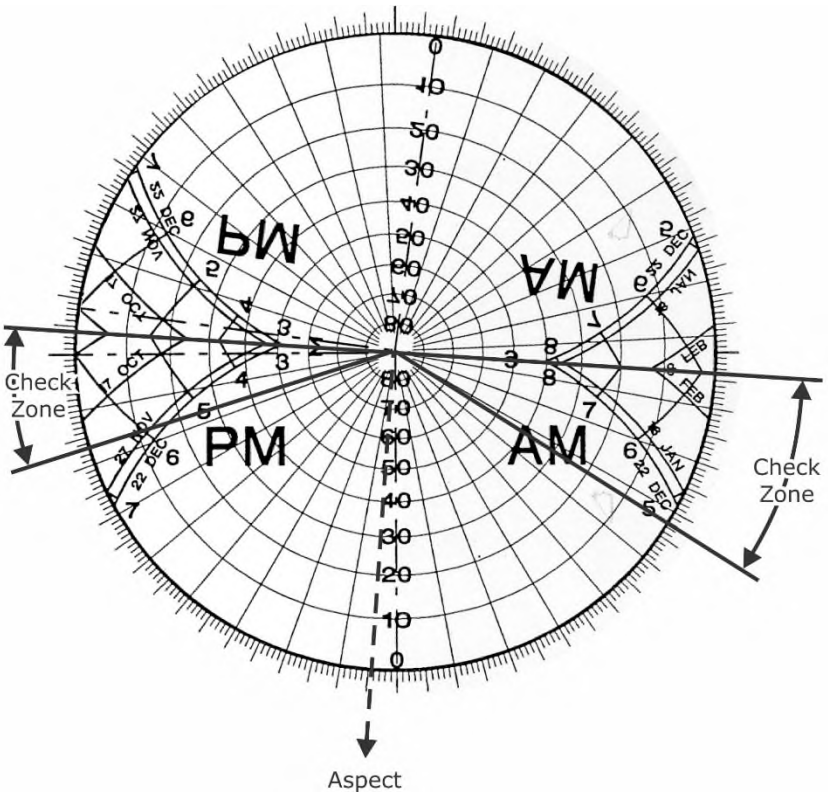

Figure B.33: Sun Chart for the 184° Aspect

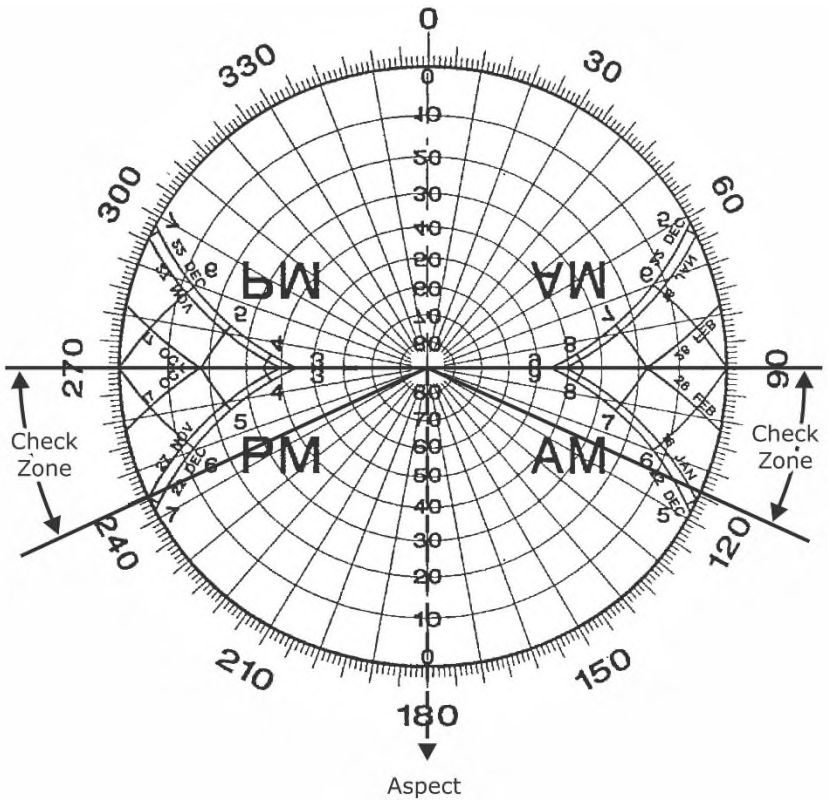

Figure B.34: Sun Chart for the 180° Aspect

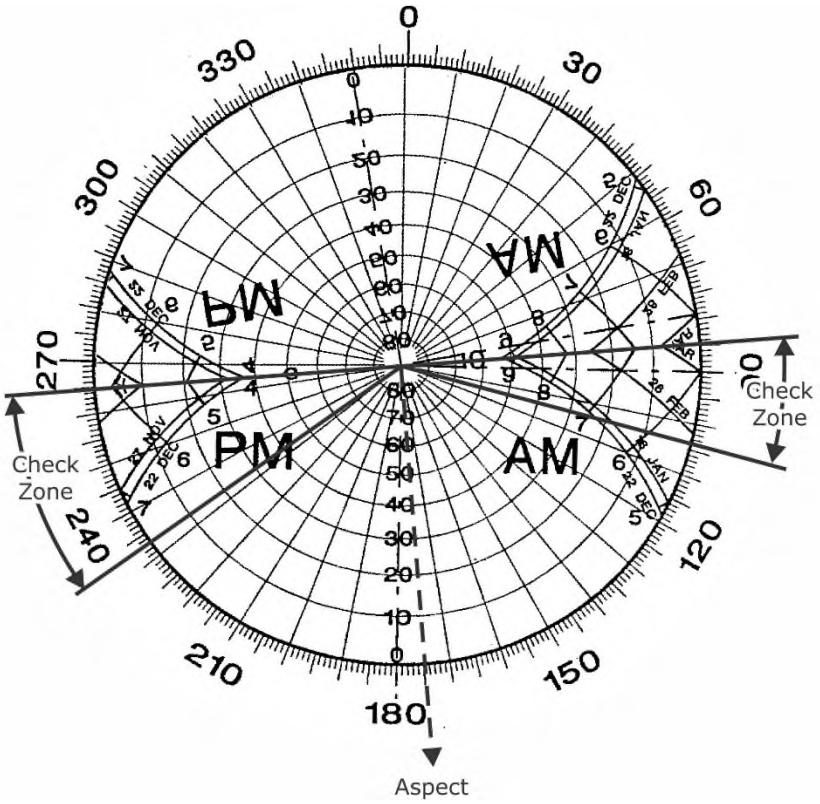

Figure B.35: Sun Chart for the 175° Aspect

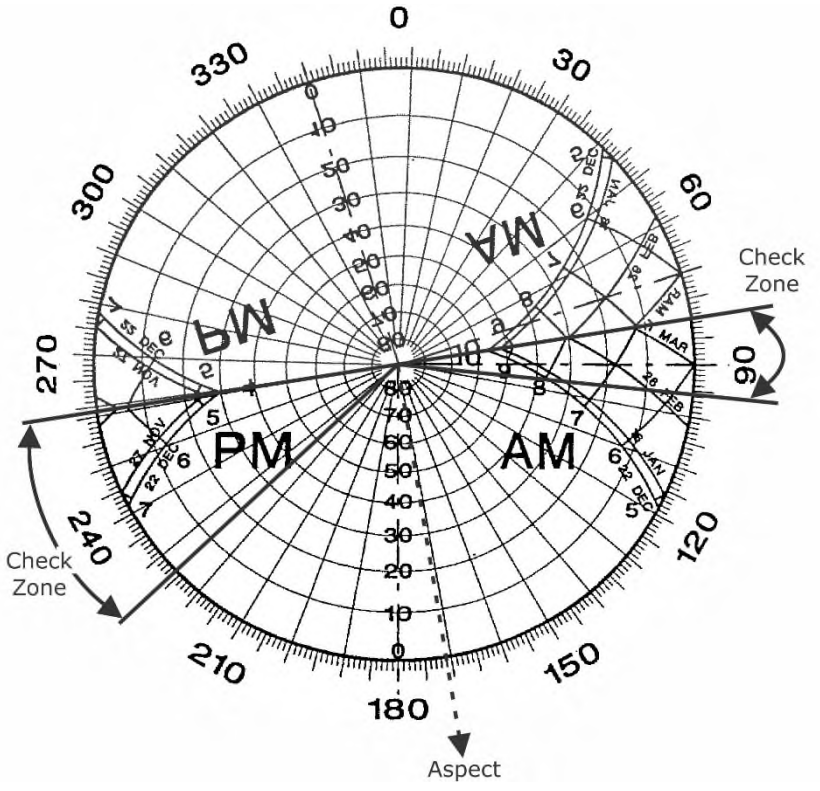

Figure B.36: Sun Chart for the 171° Aspect

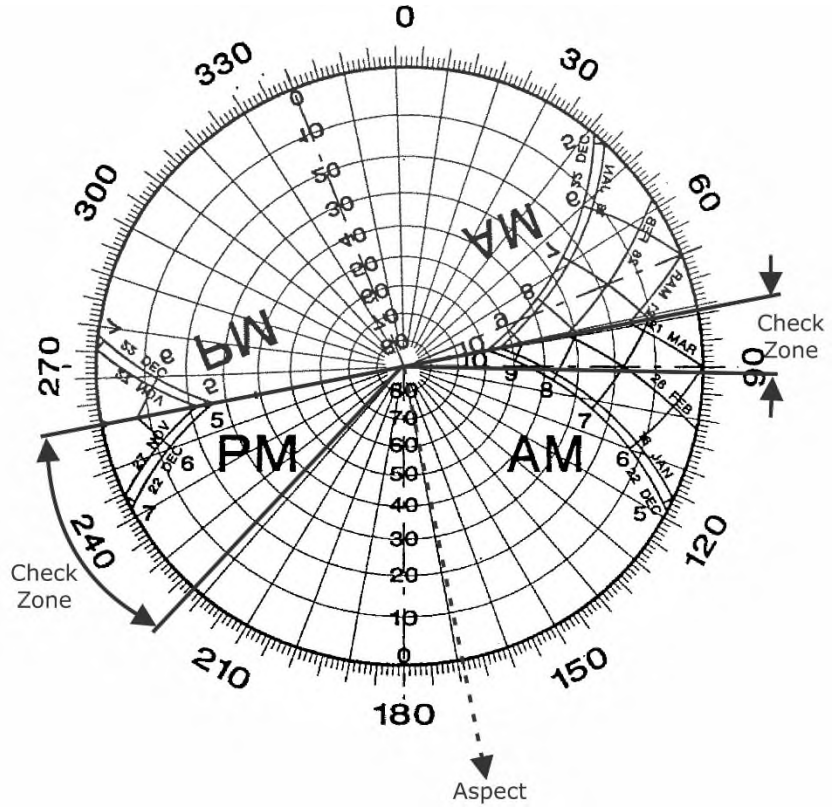

Figure B.37: Sun Chart for the 169° Aspect

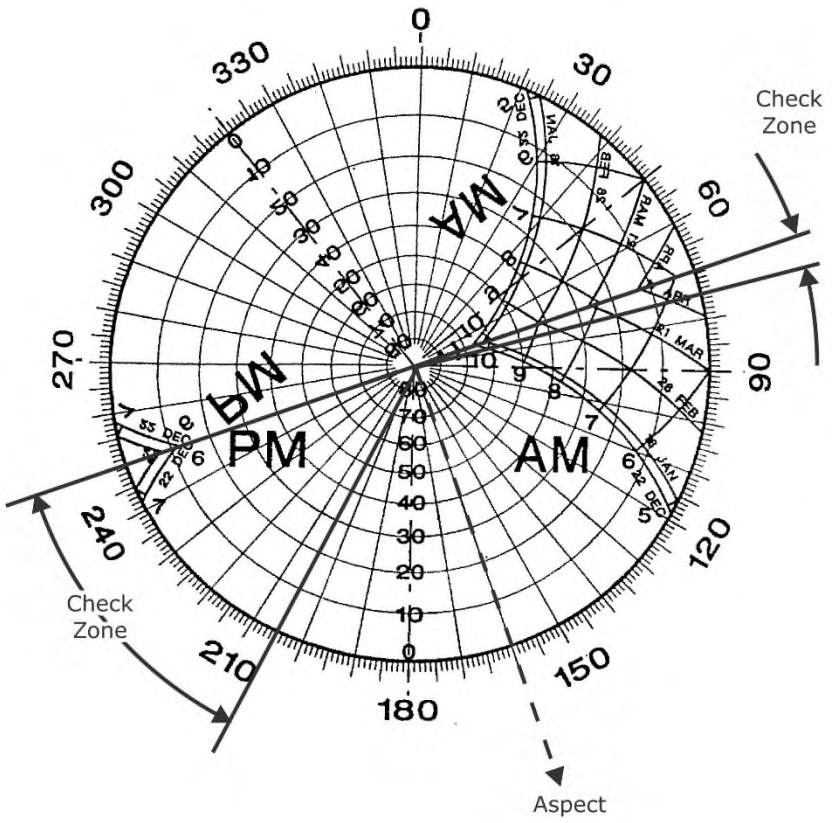

Figure B.38: Sun Chart for the 160° Aspect

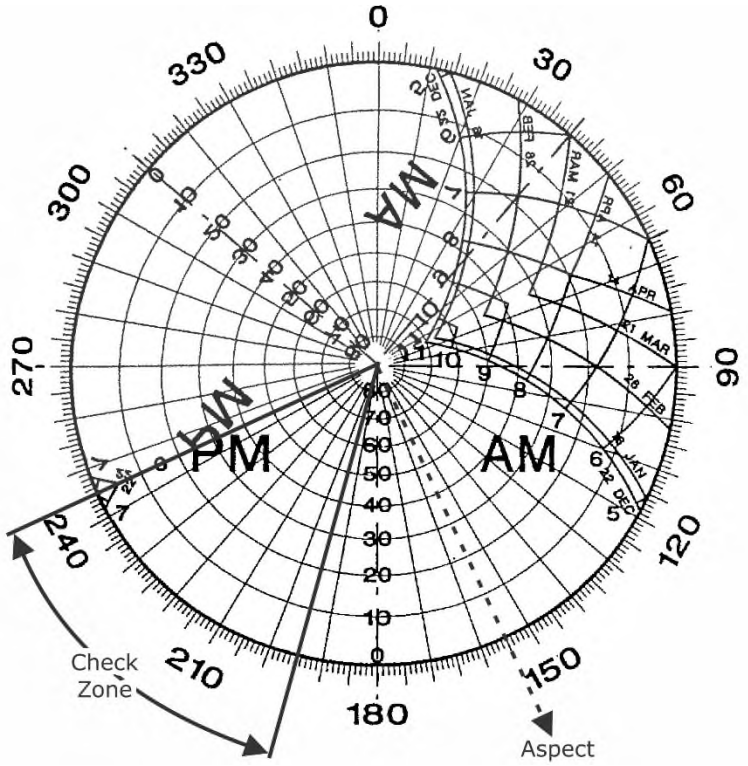

Figure B.39: Sun Chart for the 155° Aspect

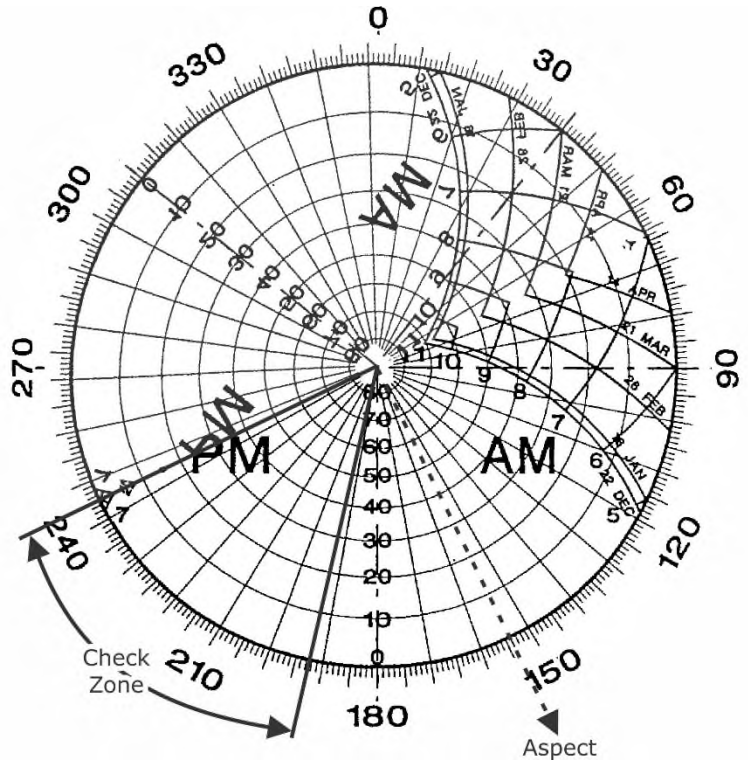

Figure B.40: Sun Chart for the 154° Aspect

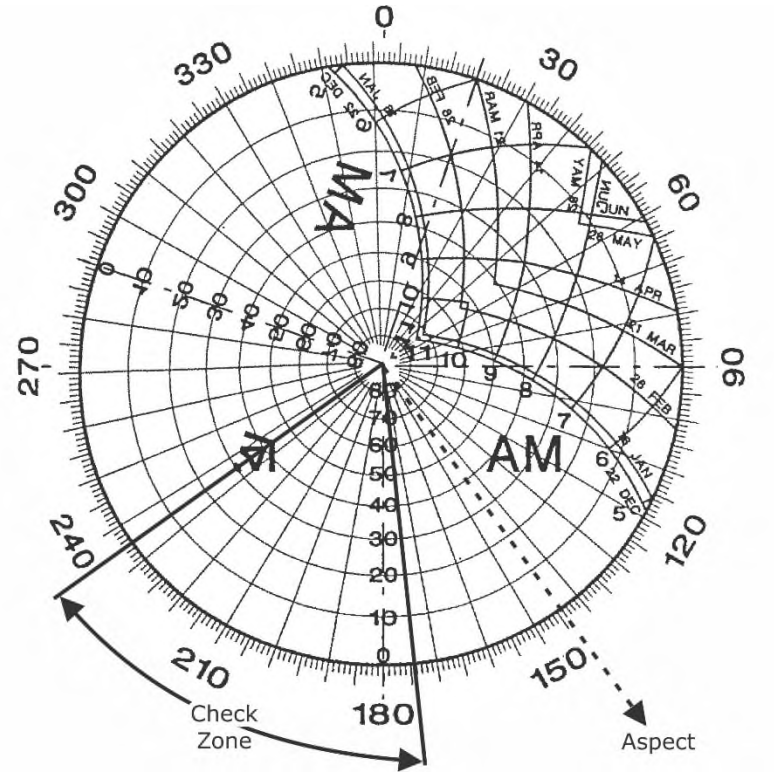

Figure B.41: Sun Chart for the 144° Aspect

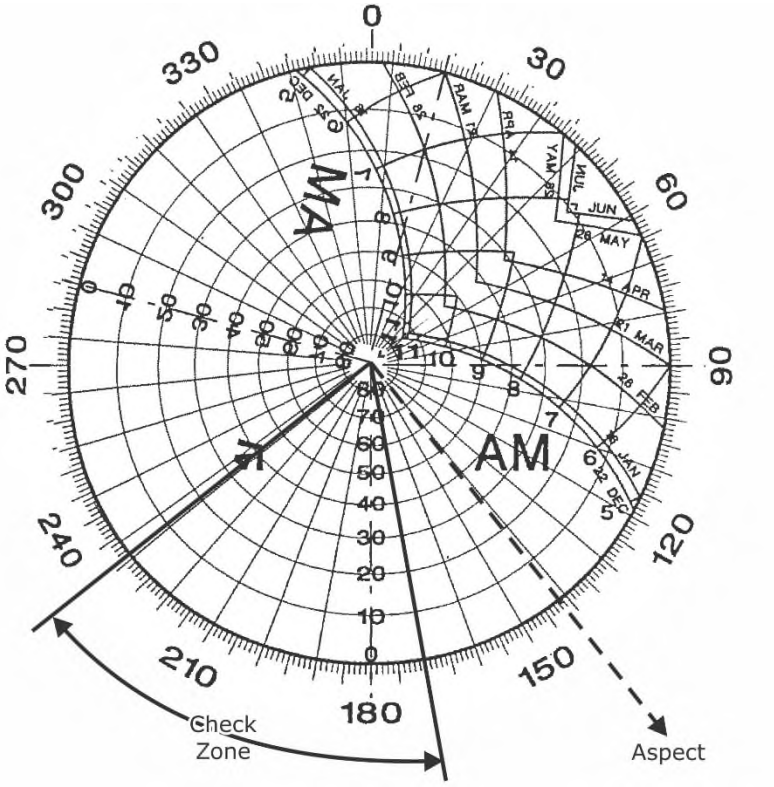

Figure B.42: Sun Chart for the 142° Aspect

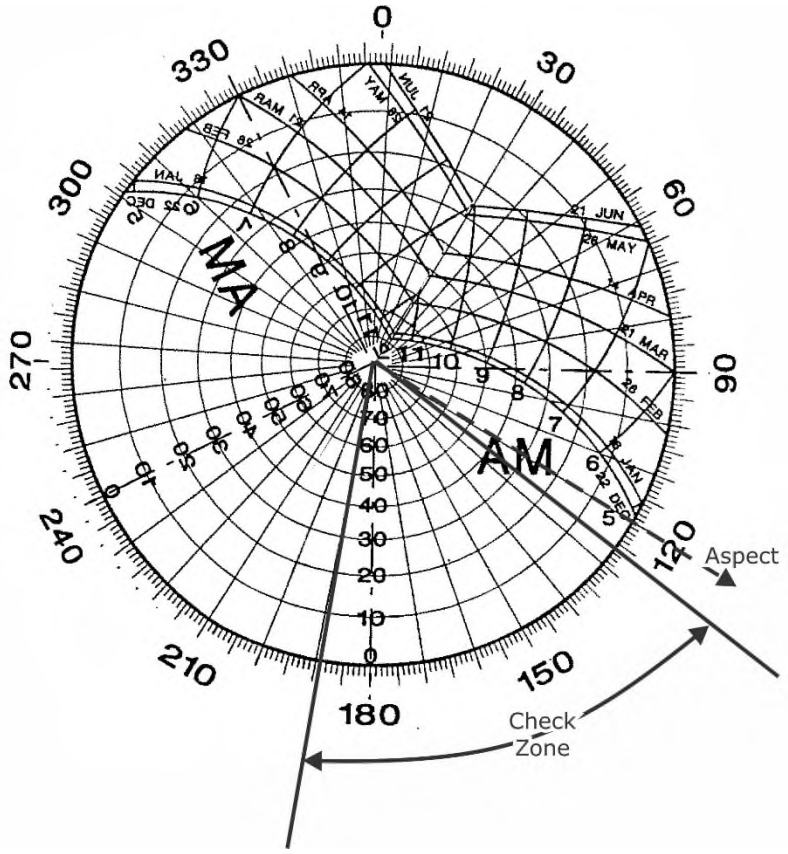

Figure B.43: Sun Chart for the 120° Aspect

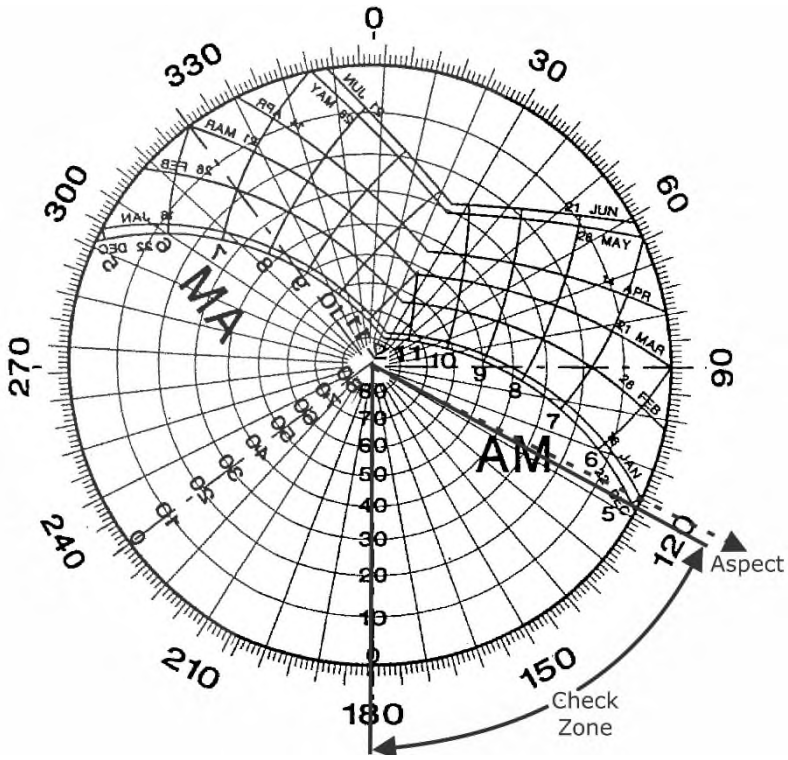

Figure B.44: Sun Chart for the 116° Aspect

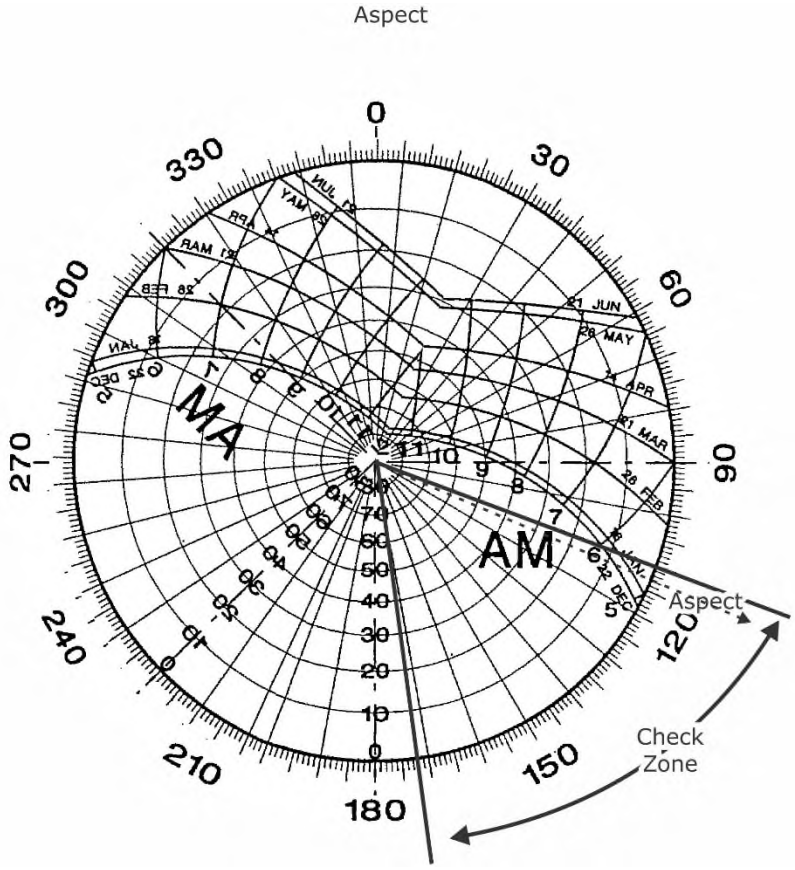

Figure B.45: Sun Chart for the 113° Aspect

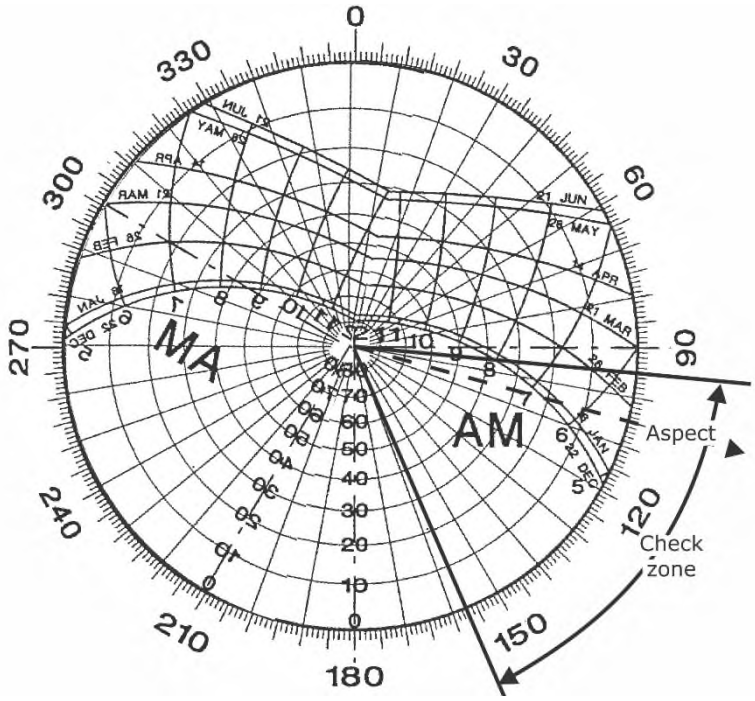

Figure B.46: Sun Chart for the 105° Aspect

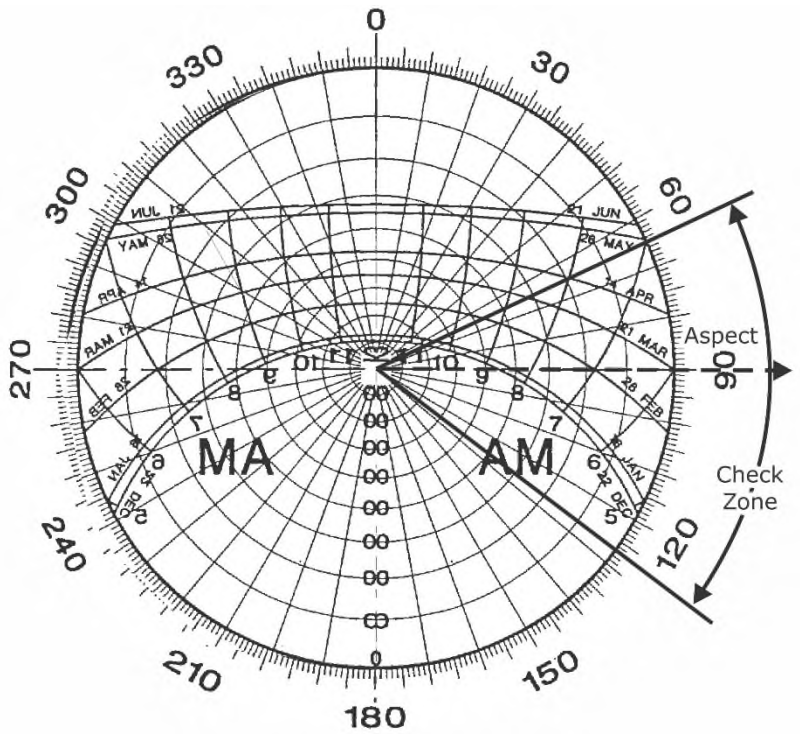

Figure B.47: Sun Chart for the 90° Aspect

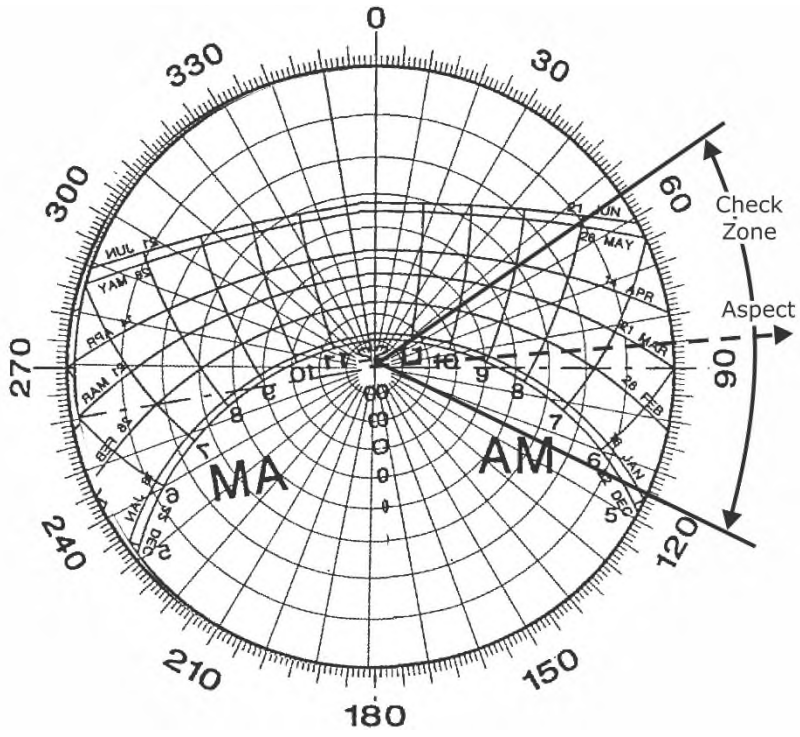

Figure B.48: Sun Chart for the 85° Aspect

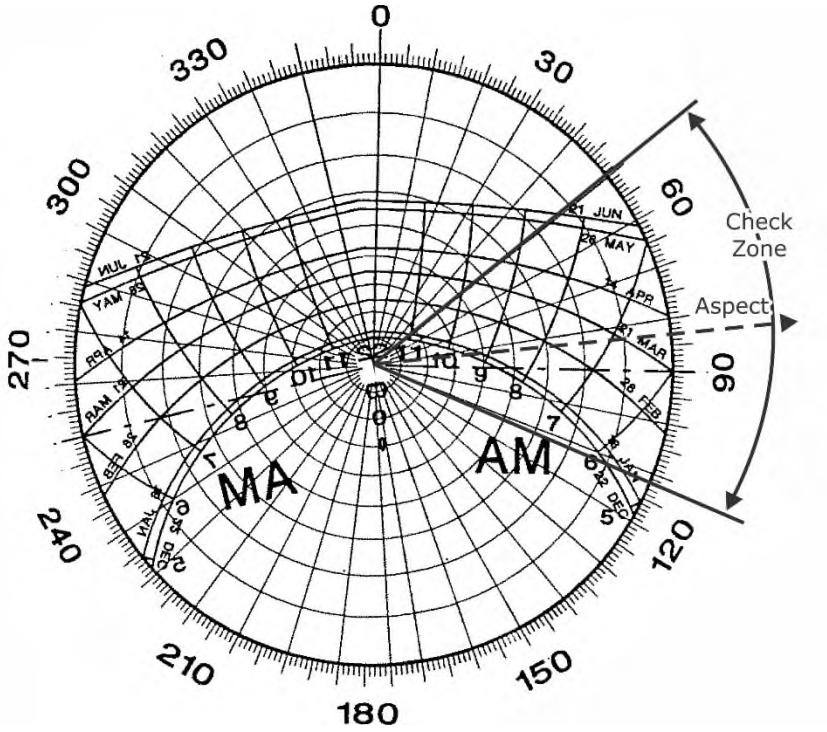

Figure B.49: Sun Chart for the 83° Aspect

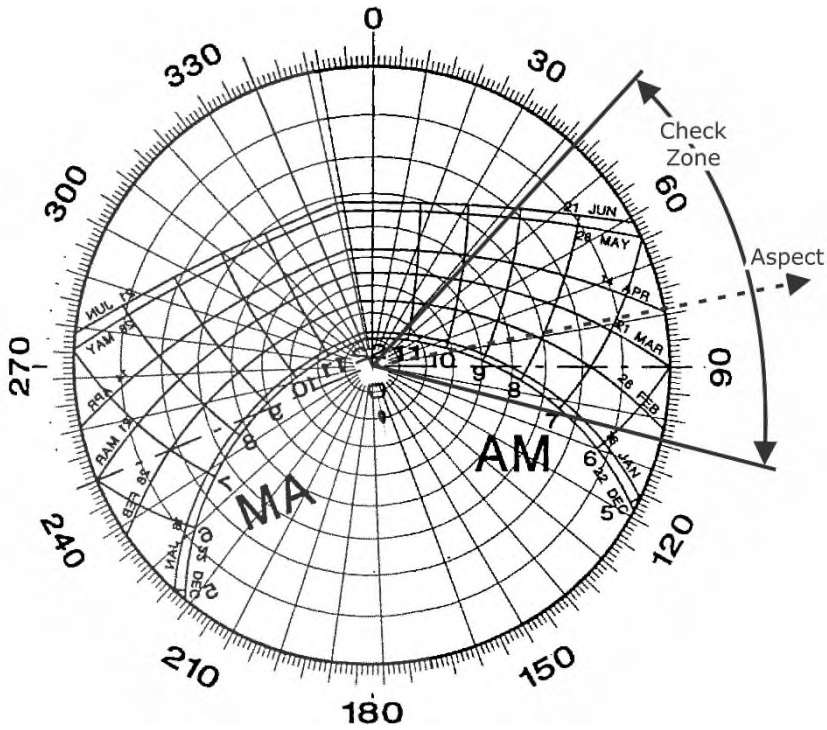

Figure B.50: Sun Chart for the 79° Aspect

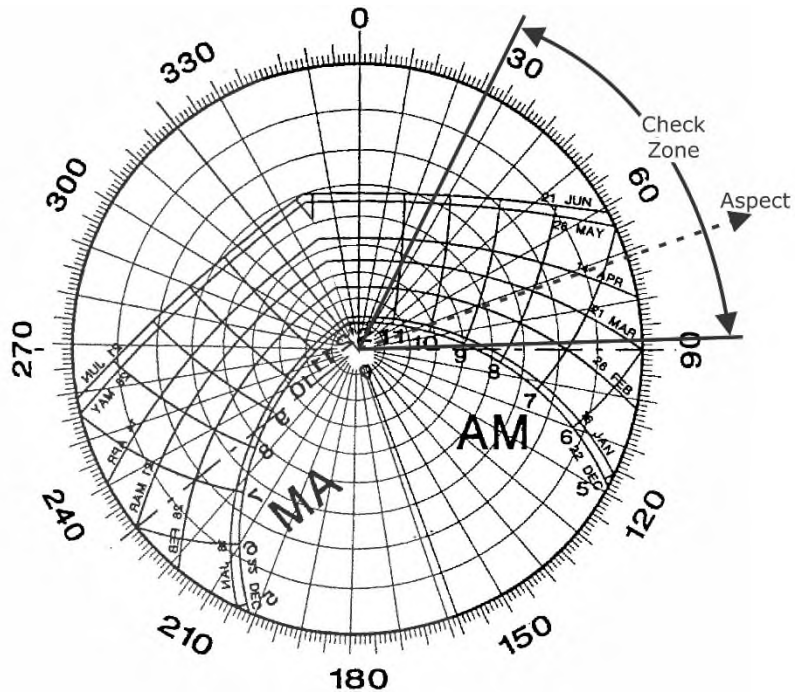

Figure B.51: Sun Chart for the 71° Aspect

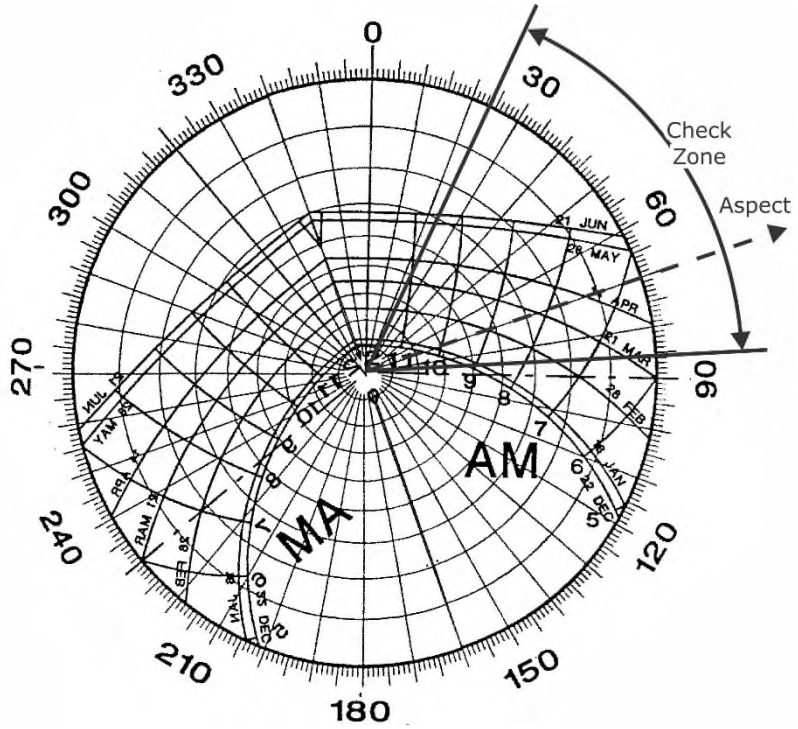

Figure B.52: Sun Chart for the 70 Aspect

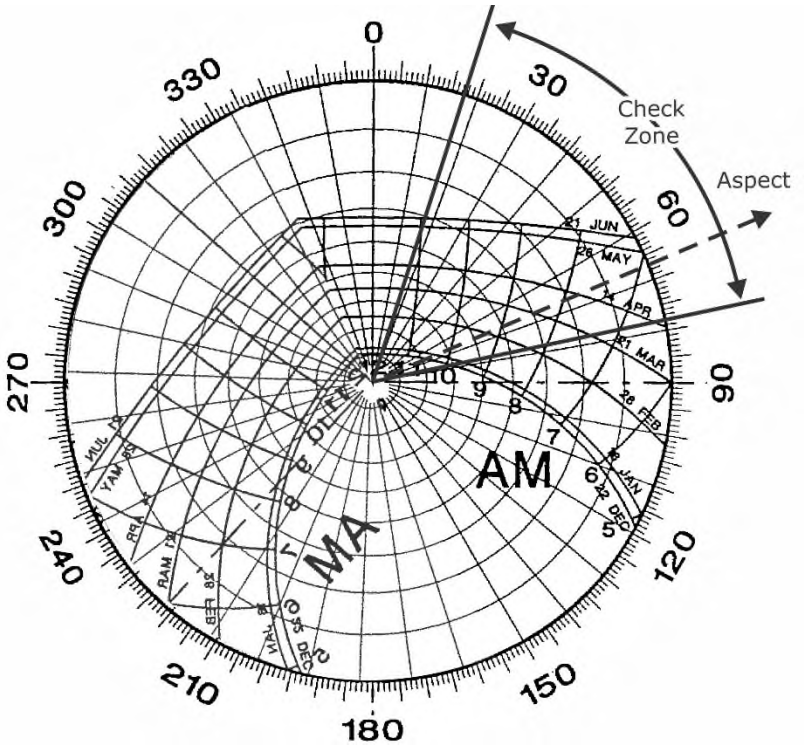

Figure B.53: Sun Chart for the 67° Aspect

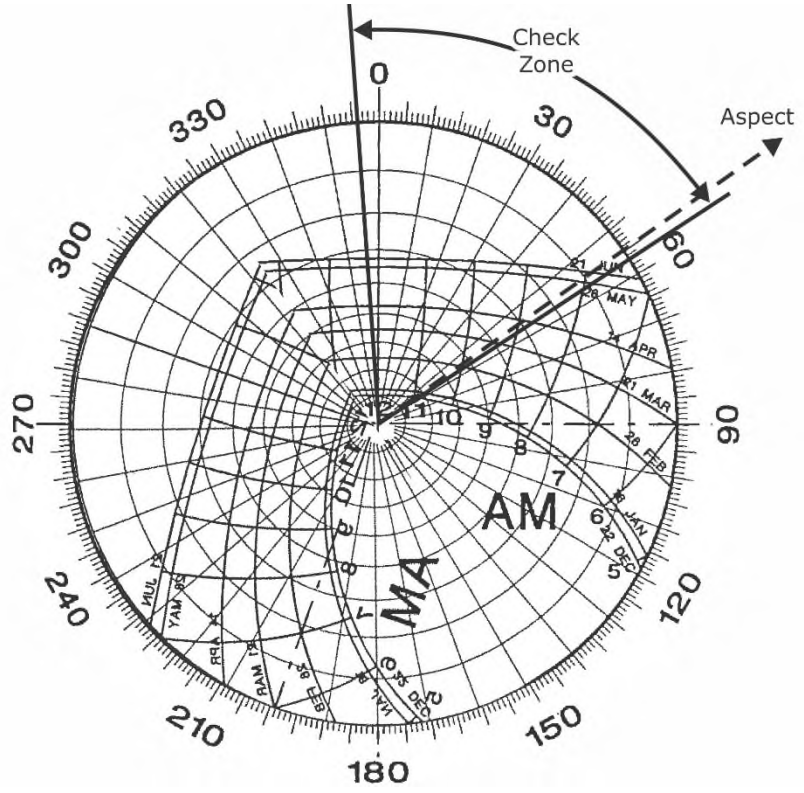

Figure B.54: Sun Chart for the 55° Aspect

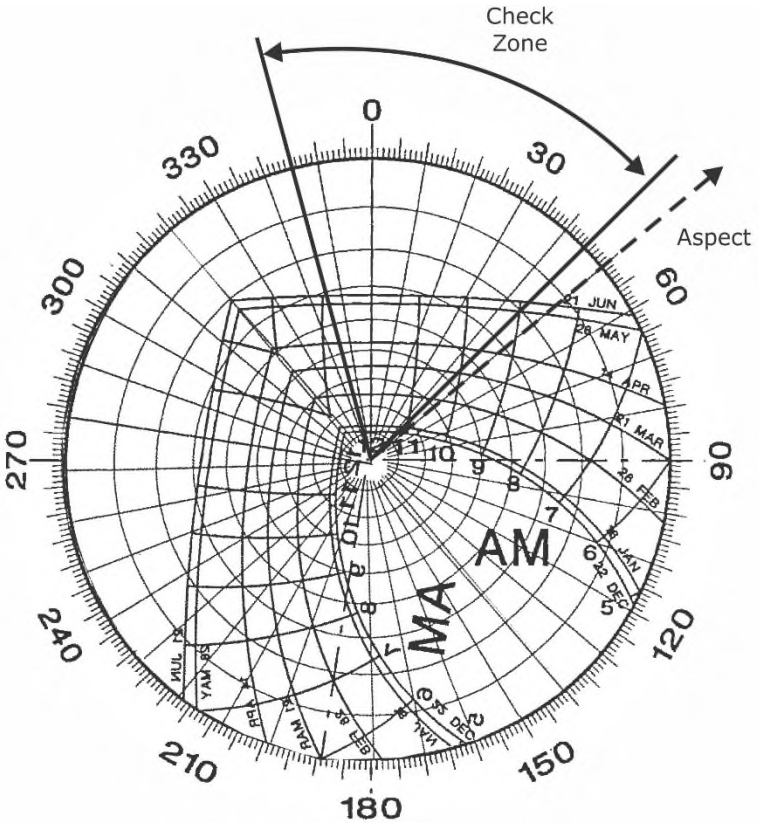

Figure B.55: Sun Chart for the 50° Aspect

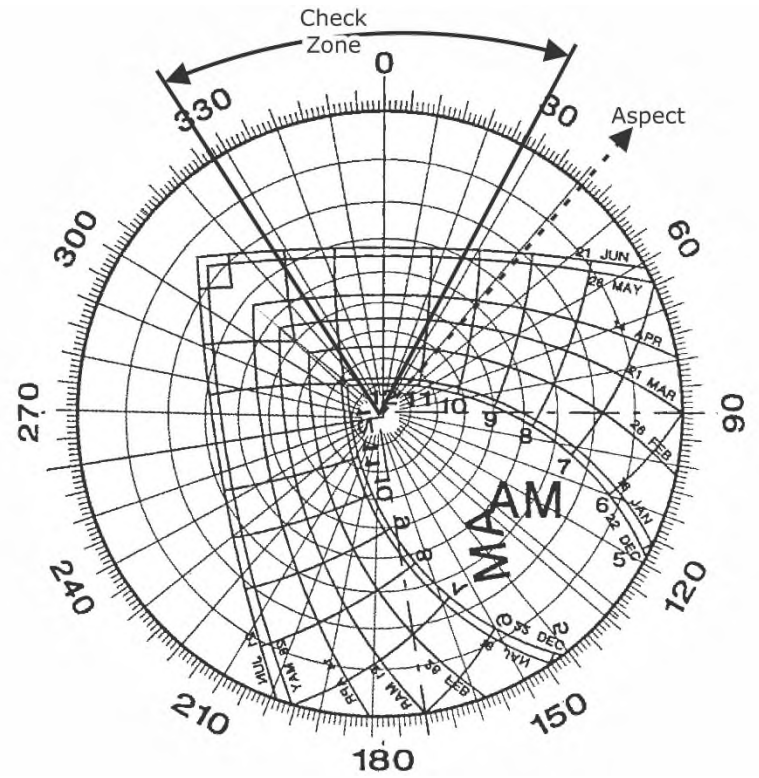

Figure B.56: Sun Chart for the 41° Aspect

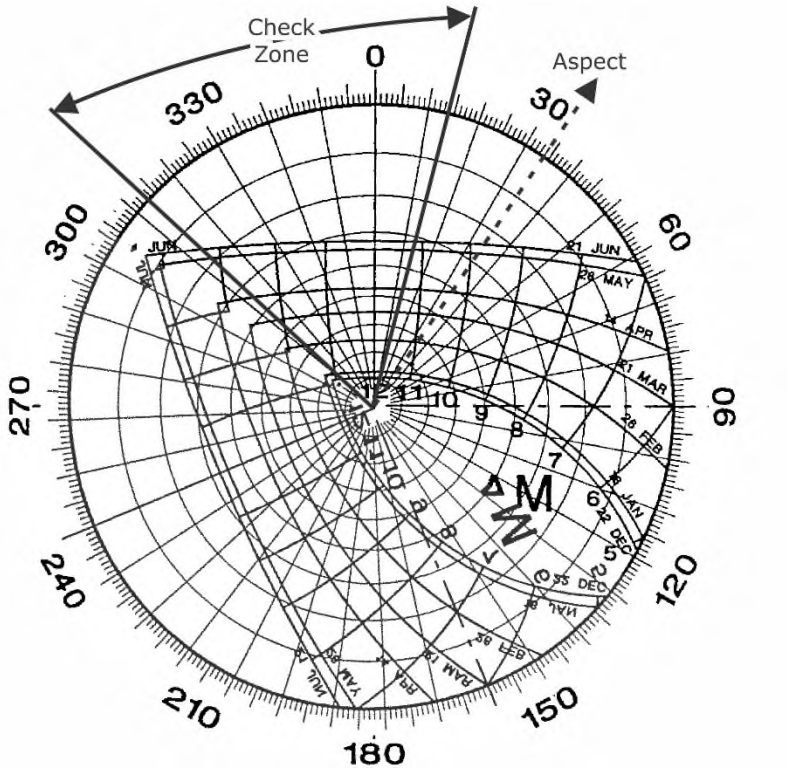

Figure B.57: Sun Chart for the 34° Aspect

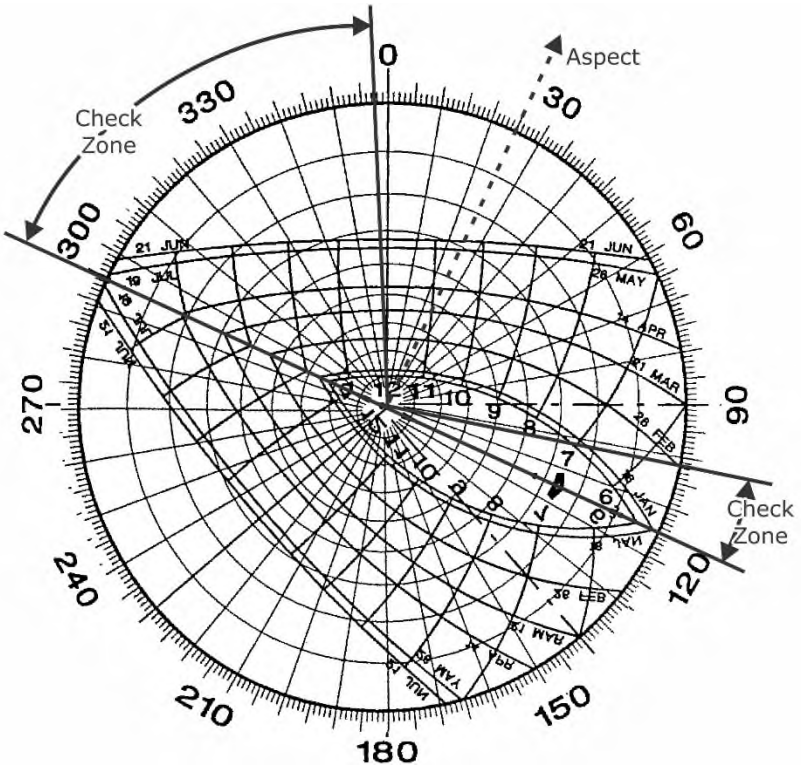

Figure B.58: Sun Chart for the 25° Aspect

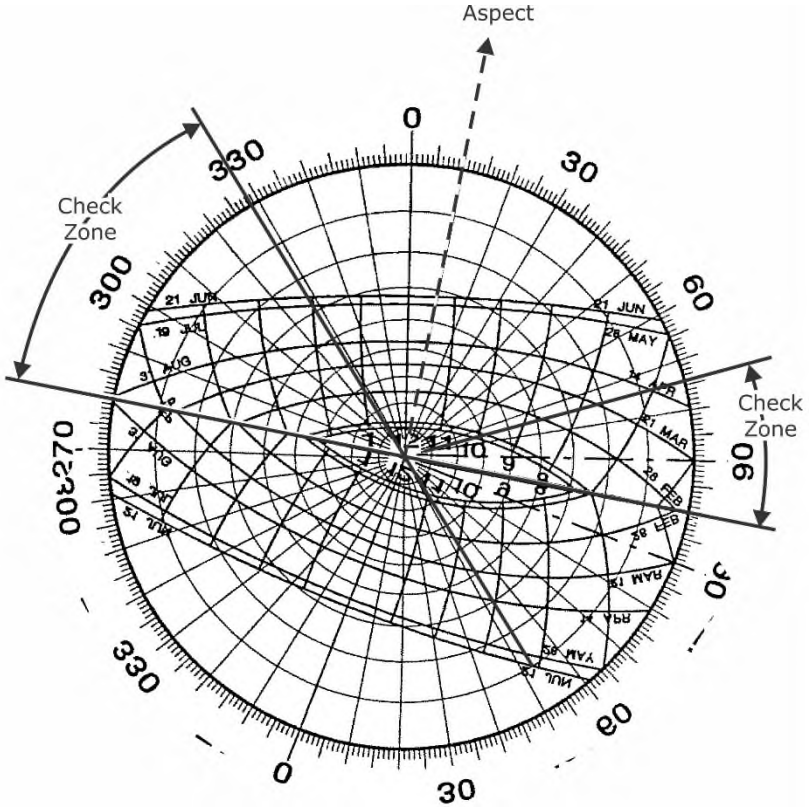

Figure B.59: Sun Chart for the 10° Aspect

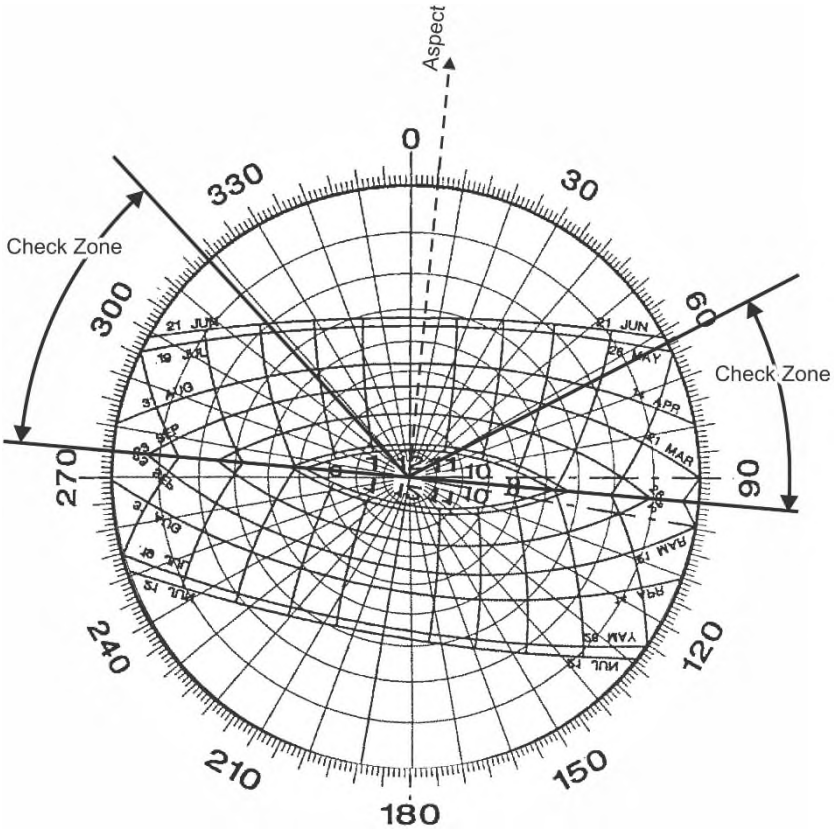

Figure B.60: Sun Chart for the 5° Aspect

APPENDIX C STANDARD SUN CHART FOR THE REGION

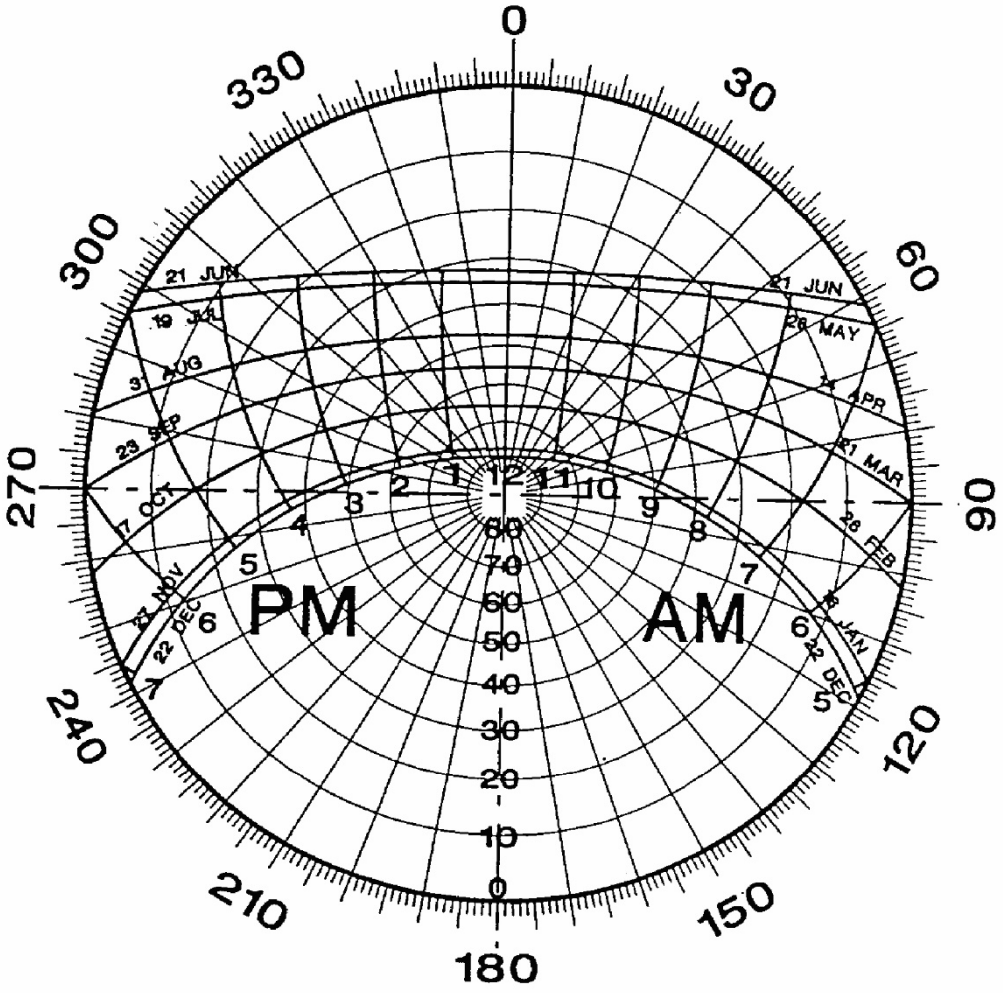

Figure C.1: Standard Sun Chart for the Sydney Region