

Project requirement 1: Engineering Evaluation

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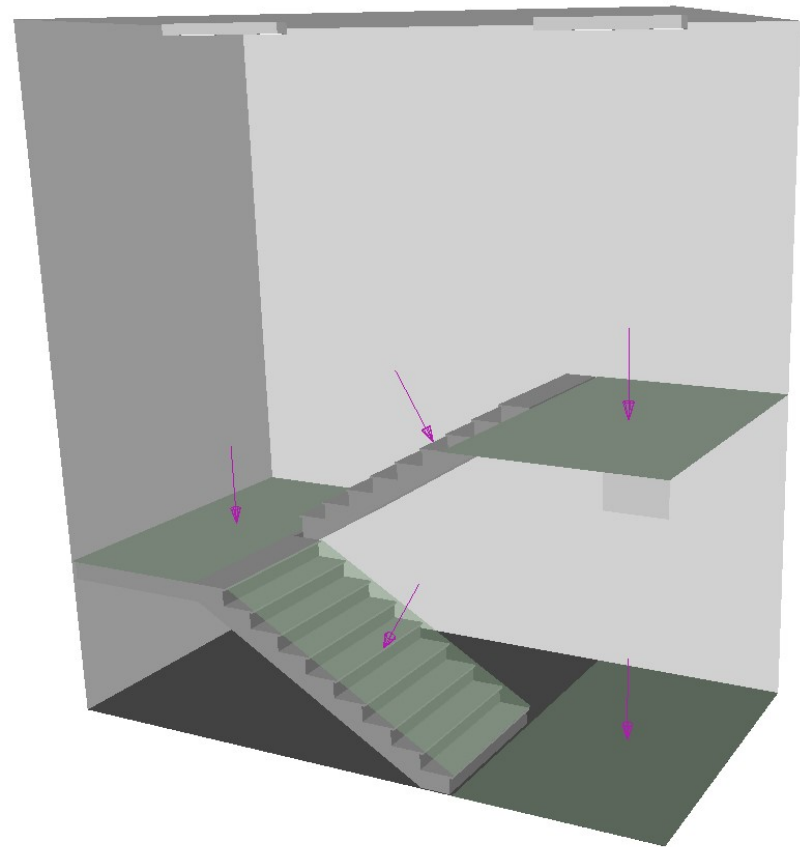
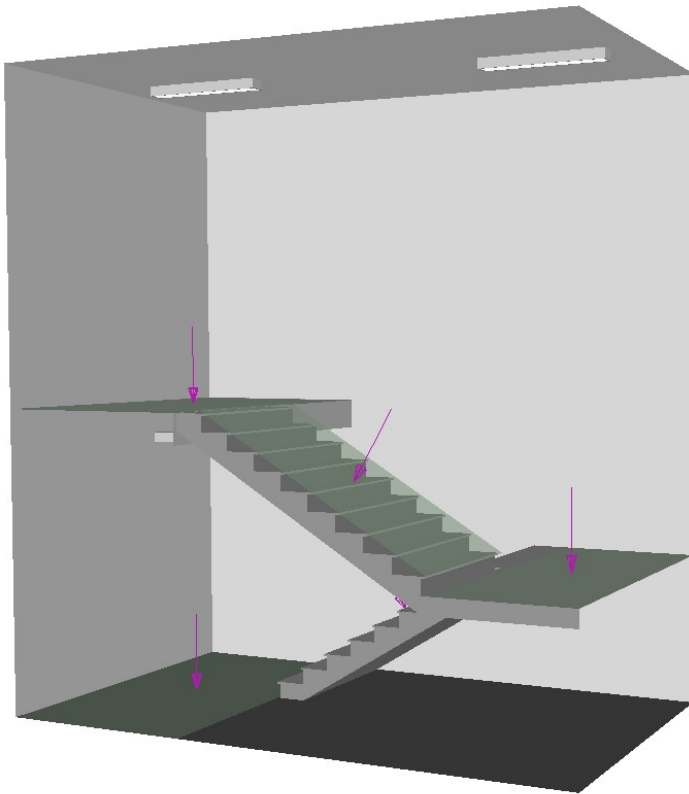
What to evaluate?

- Average illuminance E_{av} in all spaces
- Uniformity of the illuminance u_0
- Glare UGR in CAD and Conference Rooms (determine the worst case)

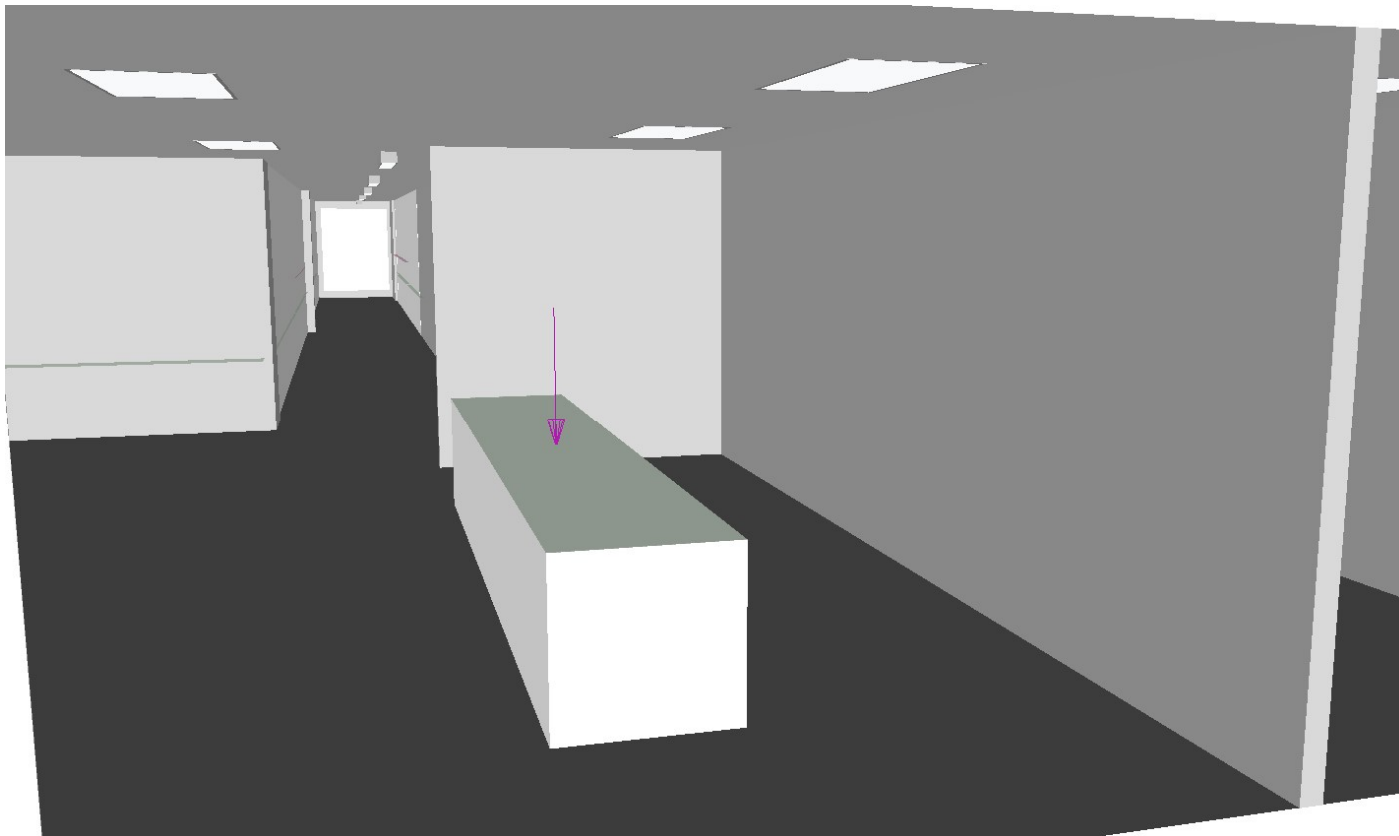
Procedure

- Set horizontal calculation surfaces ($H_1=0\text{m}$, $H_2=0.7\text{m}$, $H_3=0.8\text{m}$).
- Set UGR calculation surfaces at $H=1.2\text{m}$ (CAD and Conference)
- Calculate the maintained average illuminance E_{av} and the uniformity u_0 . Set the output grid to 0.5m.
- Compare your results to the values recommended by AS/NZS1680 standards.

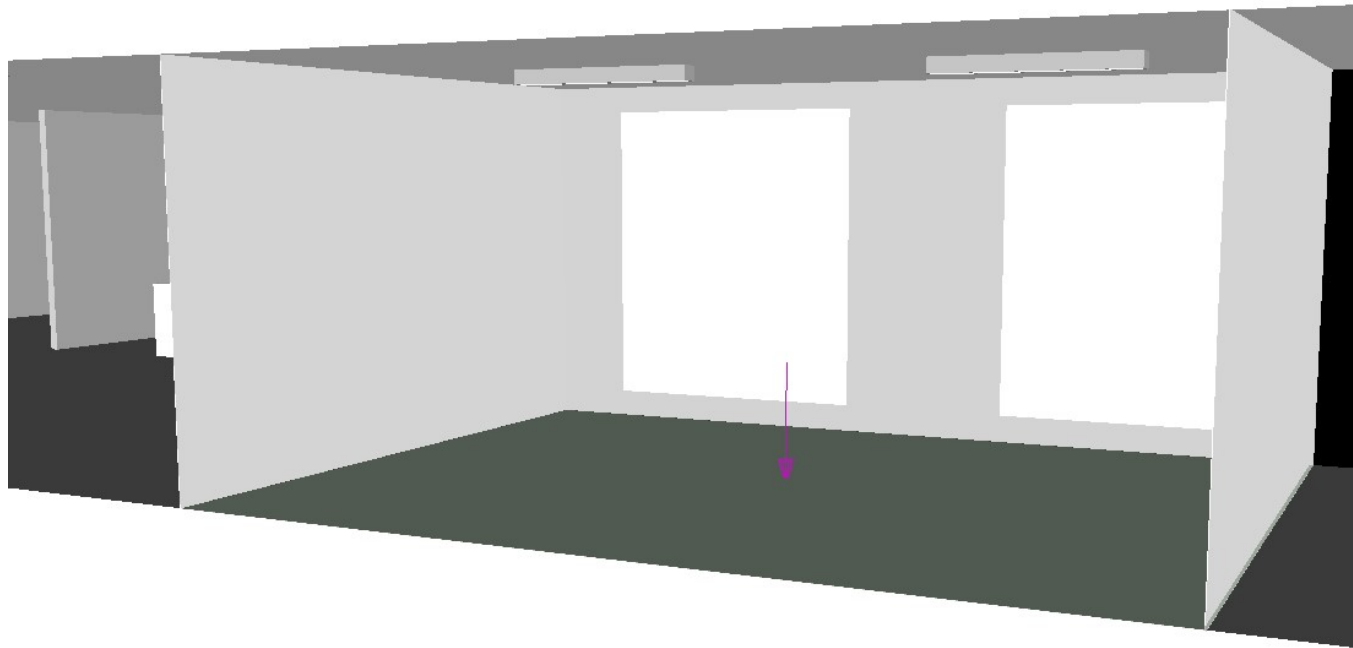
Calculation surfaces - stairs



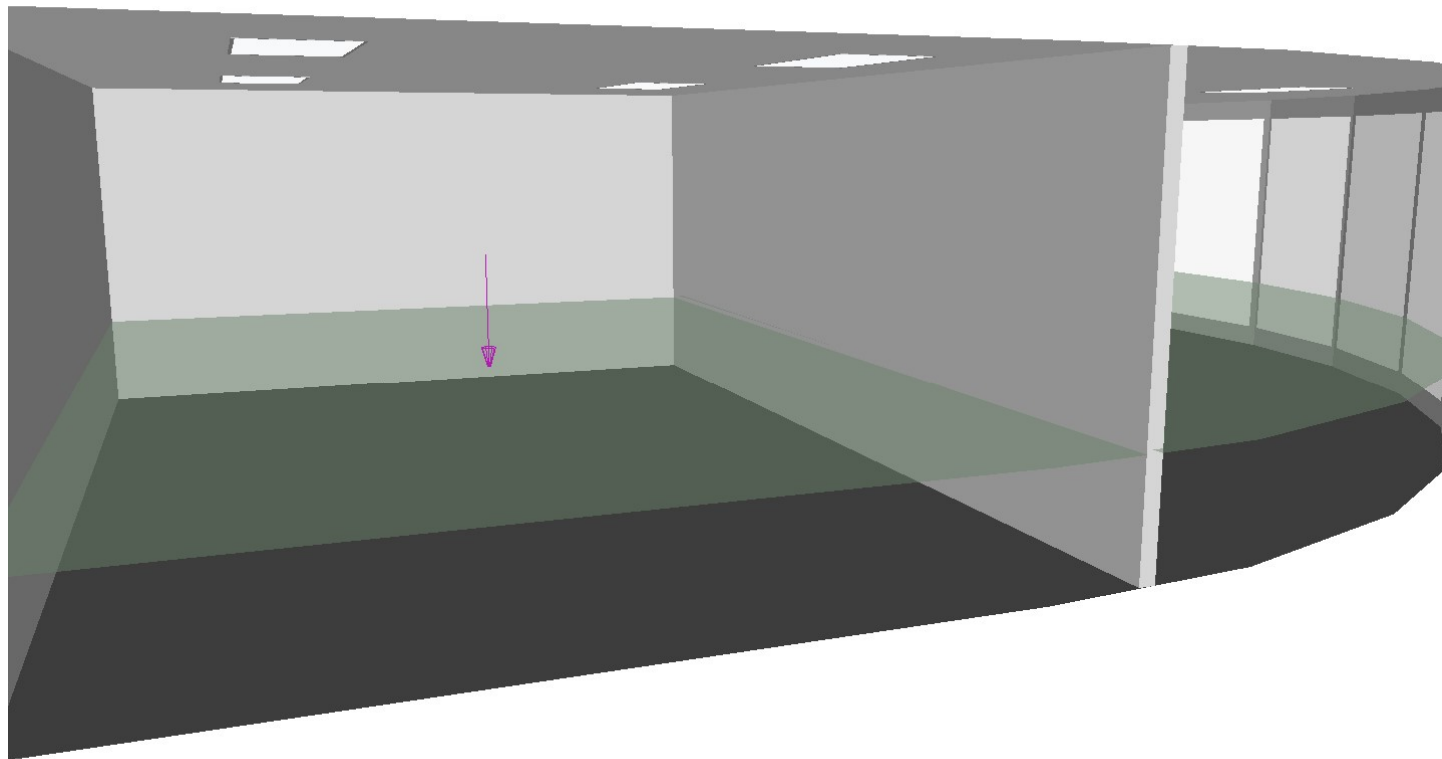
Calculation surface – reception desk ($H > 0.8\text{m}$)



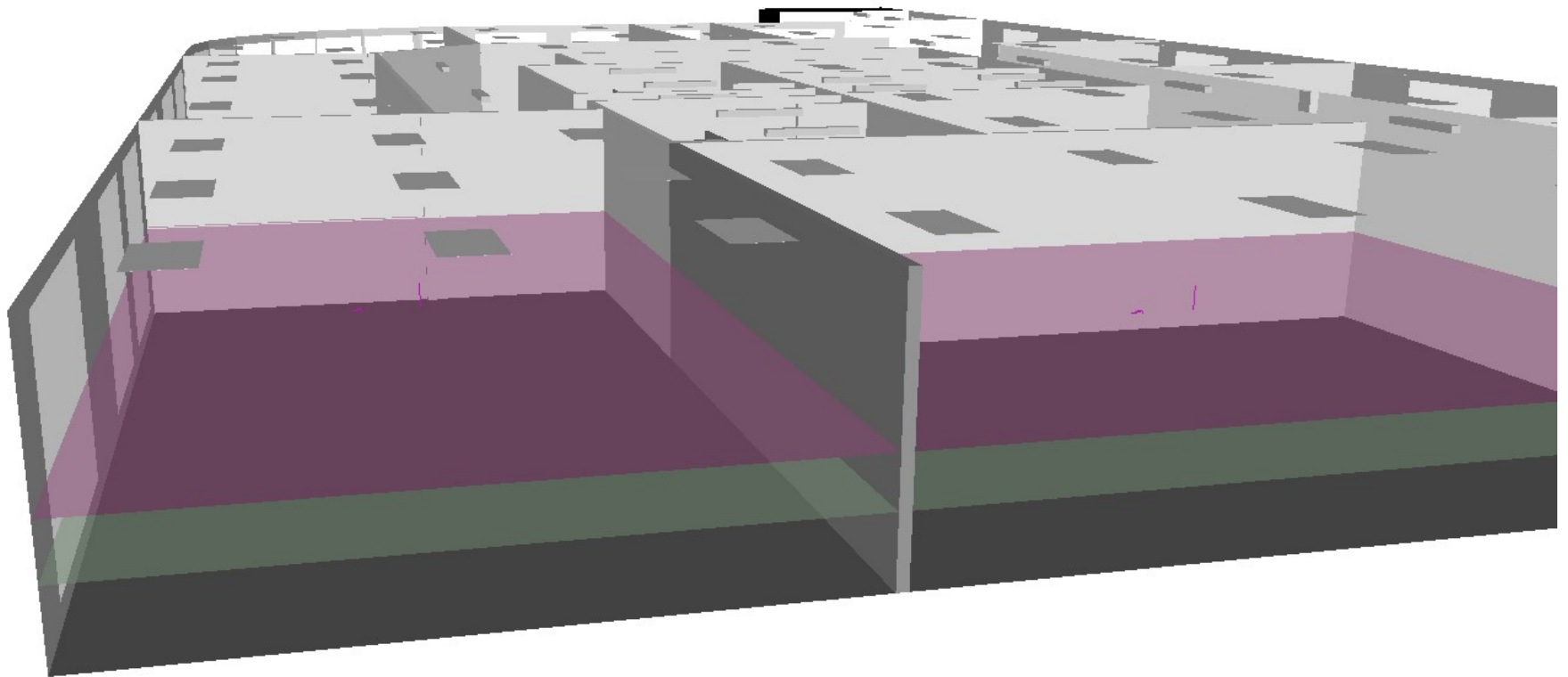
Calculation Surface – 101 Entrance (H=0m)



Calculation surface – Office (H=0.7m)



UGR calculation surface – CAD, Conference Rooms (H=1.2m)



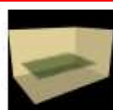


Setting calculation surface

Calculation surfaces



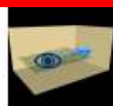
Use a drag-and-drop action to pull an object into a CAD window.



Calculation Surface



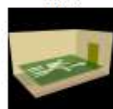
Task Area



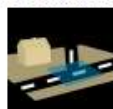
UGR Calculation Area



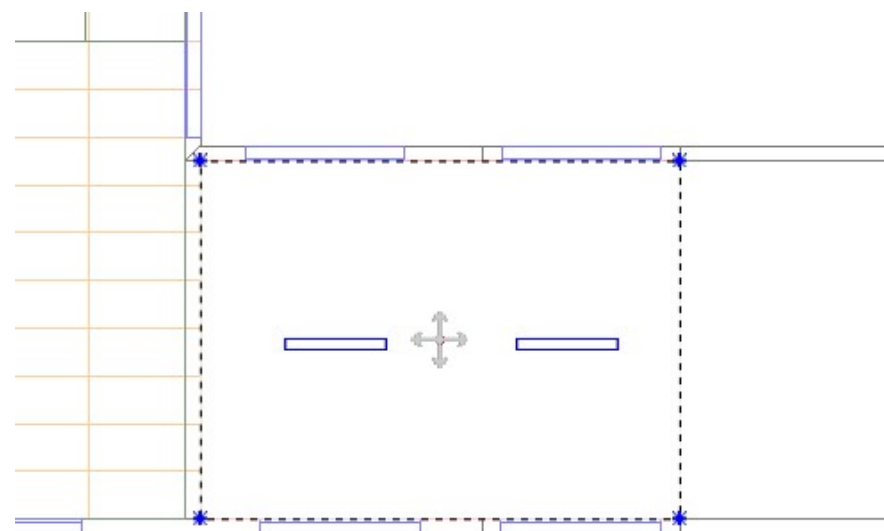
Daylight factor calculation s...



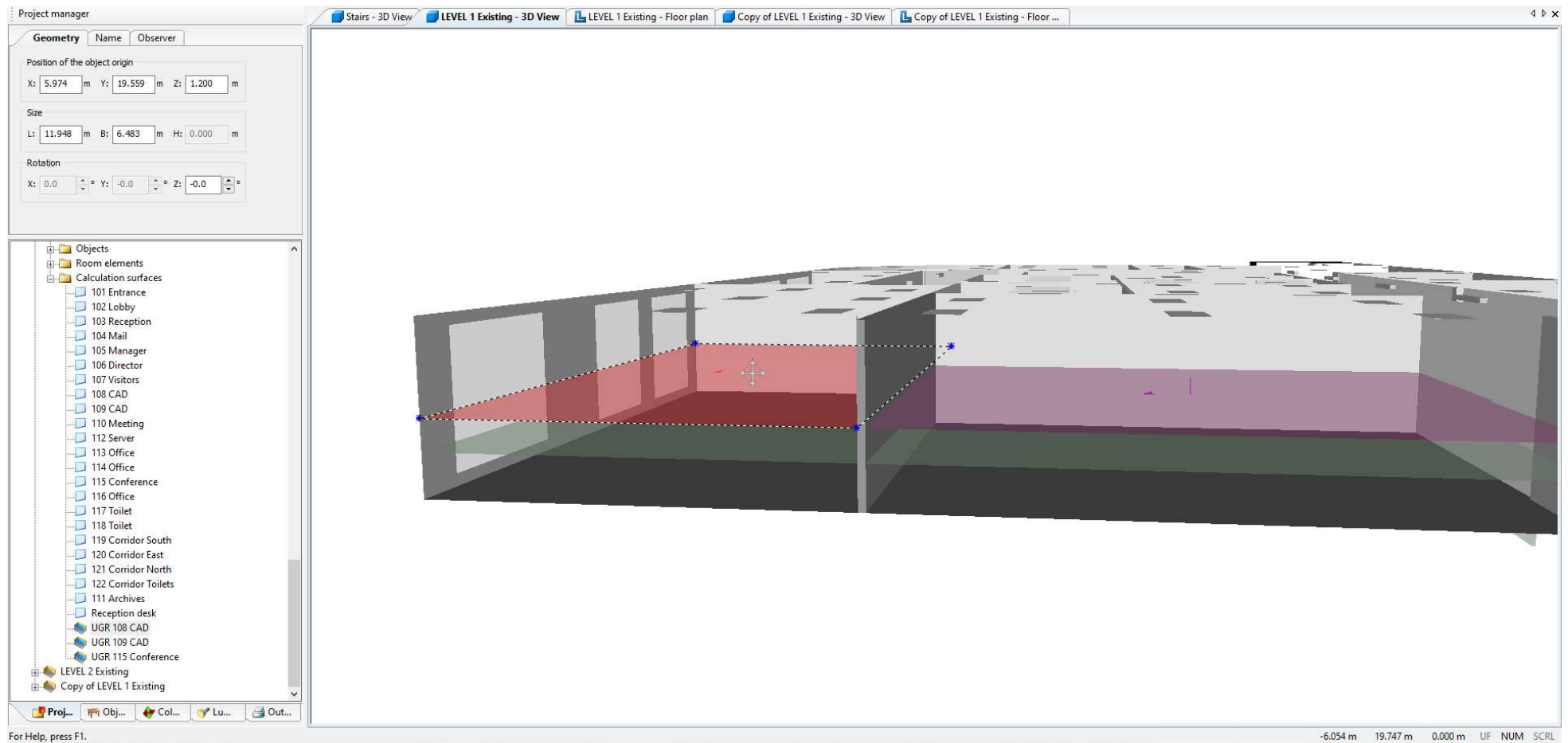
Escape Route



Street-valuation field

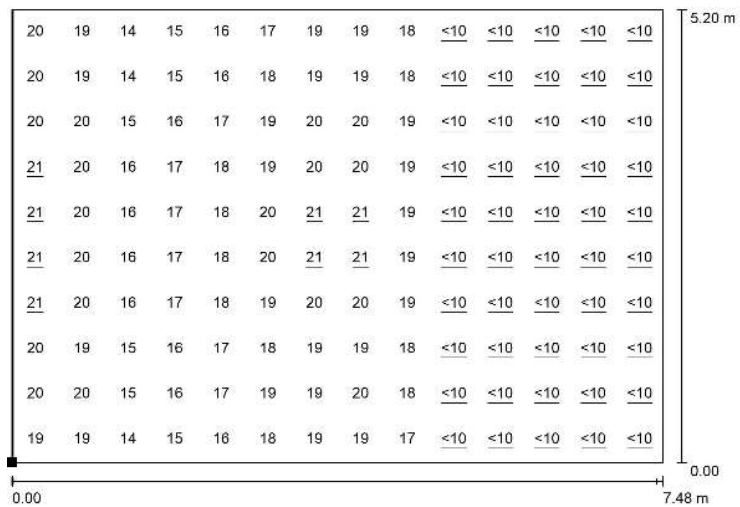


Floor plan with calculation surfaces



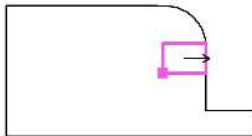
Observer: options 0deg, 90deg

LEVEL 1 Existing / UGR Calculation Area 7 / Value Chart (UGR)



Scale 1 : 54

Position of surface in room:
Marked point: (27.319 m,
11.002 m, 1.200 m)

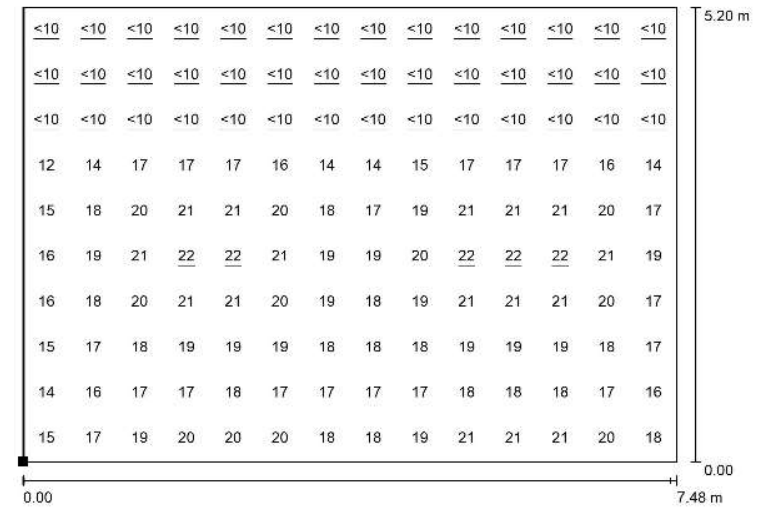


Grid: 14 x 10 Points

Min
/

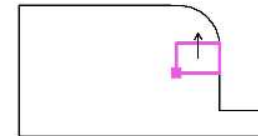
Max
21

LEVEL 1 Existing / UGR Calculation Area 7 / Value Chart (UGR)



Scale 1 : 54

Position of surface in room:
Marked point: (27.319 m,
11.002 m, 1.200 m)

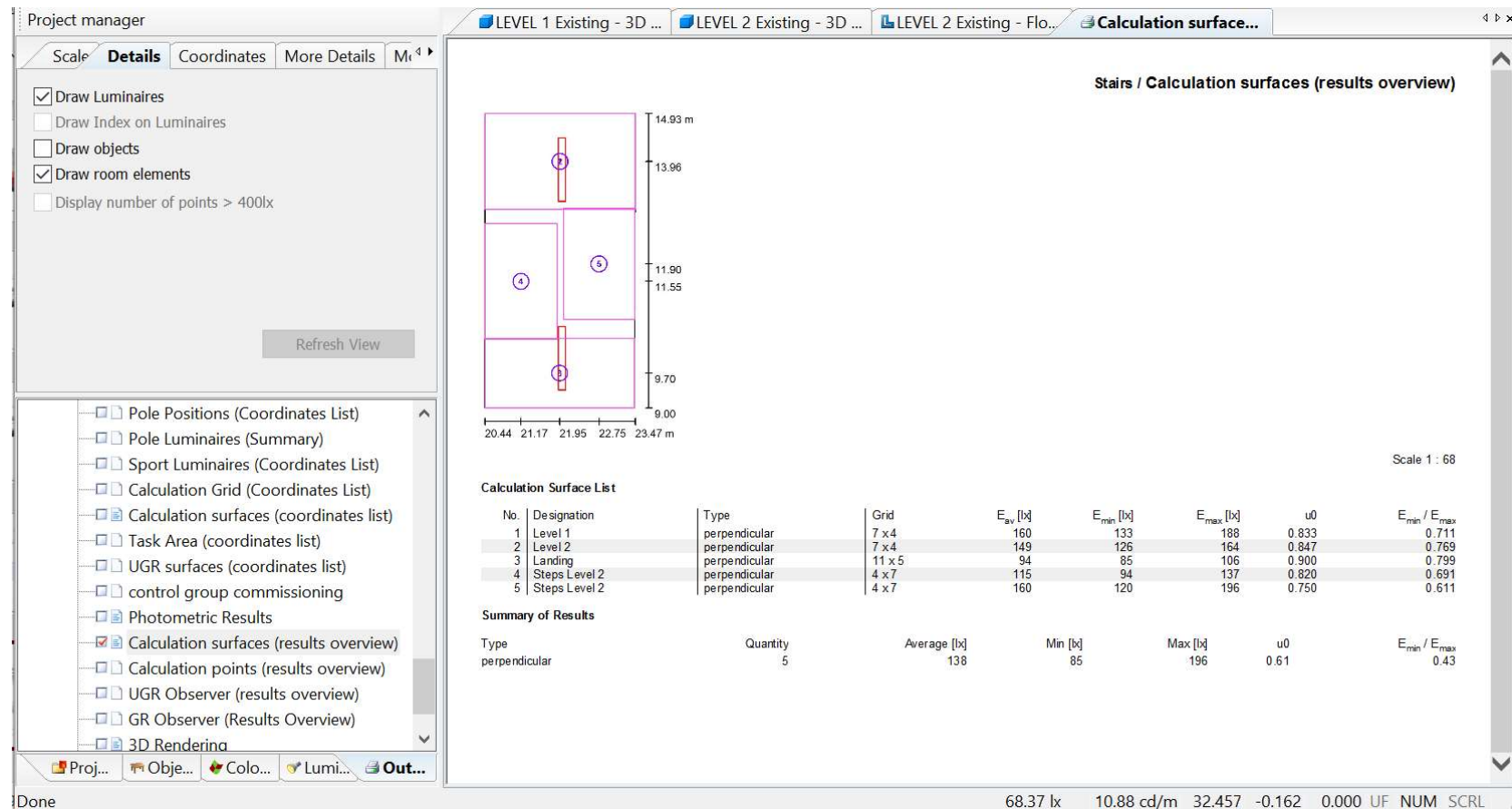


Grid: 14 x 10 Points

Min
/

Max
22

Displaying results - Stairs





Setting display grid on 0.5m

Output grid

Format

Scale

Details

Coordinates

☐ Original
 (32 x 32 Points)

☒ Distance
 m

☐ Points
 x

Determine min, max, and average values from

☒ Output Grid
 ☐ Original Grid

Room Surfaces

Workplane

101 Entrance

102 Lobby

103 Reception

104 Mail

105 Manager

Isolines (E)

Greyscale (E)

Value Chart (E)

Table (E)

106 Director

107 Visitors

108 CAD

109 CAD

110 Meeting

112 Server

113 Office

114 Office

115 Conference

116 Office

117 Toilet

118 Toilet

LEVEL 1 Existing / 105 Manager / Value Chart

268	355	468	586	611	573	509	414	456	515	591	622	539	402	299
265	374	524	669	740	686	572	450	506	615	717	718	609	448	316
270	378	525	664	731	685	576	470	518	623	715	707	603	452	322
271	374	510	636	697	660	569	472	518	607	685	674	581	443	321
269	365	487	599	654	625	550	467	507	583	647	634	551	427	316
282	381	493	611	667	635	554	466	508	589	659	651	563	449	333
267	377	527	667	733	685	575	463	516	622	717	713	610	458	327
261	372	530	671	742	689	571	450	506	620	721	720	609	455	320
252	350	475	602	656	610	510	404	452	545	627	637	542	402	285
222	289	387	469	475	451	418	350	378	409	458	490	431	331	253

5.20 m

4.61

0.00

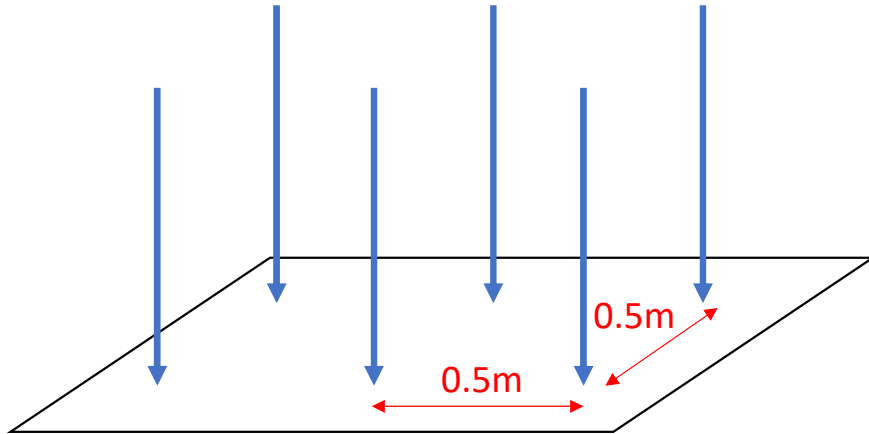
7.47 m

Position of surface in room:

Marked point: (27.330 m, 10.999 m, 0.700 m)

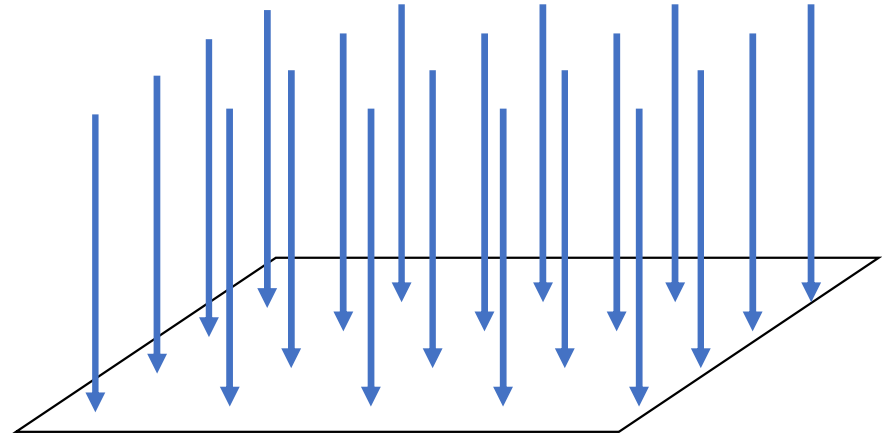
Understanding display grid on 0.5m

Luminous flux



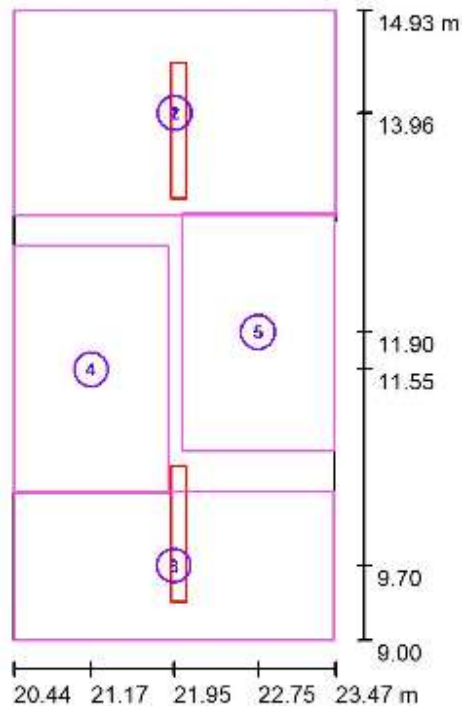
6 calculation points

Luminous flux



30 calculation points

Displaying results - Stairs



Calculation Surface List

No.	Designation	Type	Grid	E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	$u0$	E_{min} / E_{max}
1	Level 1	perpendicular	7 x 4	160	133	188	0.833	0.711
2	Level 2	perpendicular	7 x 4	149	126	164	0.847	0.769
3	Landing	perpendicular	11 x 5	94	85	106	0.900	0.799
4	Steps Level 2	perpendicular	4 x 7	115	94	137	0.820	0.691
5	Steps Level 2	perpendicular	4 x 7	160	120	196	0.750	0.611

Summary of Results

Type	Quantity	Average [lx]	Min [lx]	Max [lx]	$u0$	E_{min} / E_{max}
perpendicular	5	138	85	196	0.61	0.43

Grid Average Illuminance Uniformity