

## NOTAT

OPPDRAG	<b>Nytt Vestre Viken Sykehus</b>	DOKUMENTKODE	126870-RIEN-NOT-003
EMNE	Dagslys, facader og bygningsform	TILGJENGELIGHET	Internt
OPPDRAGSGIVER	<b>Vestre Viken HF</b>	OPPDRAGSLEDER	Helle Basse Larsen
KONTAKTPERSON		SAKSBEH	Jakob Strømman-Andersen
KOPI		ANSVARLIG ENHET	Cura

## SAMMENDRAG

Dette notat inneholder en overordnet analyse af dagslysforhold i forbindelse med udformning af sengebygning

### 1 Indledning

Notatet inneholder en indledende analyse af Nytt Vestre Viken Sykehus (NVVS) overordnede bygningsudformning sammenholdt med adgang til dagslys. Fokus er på bygningsformens selvskygge i forhold til at tilvejebringe tilstrækkelig dagslys.

I notatet sammenlignes forskjellige placeringer og udformninger af sengebygningen. Til at validere og sammenligne de forskjellige typologier avendes VDF (Vertical Daylight Factor) som beregningsmetode og BS 8206-2: 2008 som vurderingsmatrice.

Underlaget for notatet er IFC modellen som foreligger på dette stadiet i projektet. Notatets resultater må derfor ses i lyset af underlaget og danne et utgangspunkt for den videre proces.

### 2 Bygningsform og dagslysforhold

Når man skal bestemme, hvordan dagslyset vil være i en bygning eller i rum, må man ta utgangspunkt i det dagslys, som rammes av bygningens eller rummets åpninger mot det fri.

Den teoretiske (maksimale) dagslysadgang til de enkelte facader vil i praksis ofte være redusert på grunn av selvskygge, nabobygninger eller skyggende trær i nærheten. Derfor er det avgjørende, at der allerede i den tidlige planlægningsfasen av NVVS tas hensyn til de faktiske omgivelser og deres betydning for dagslysadgangen.



Eksempel på bygningsstruktur med selvskyggende omgivelser, Swedish Issaquah Medical Center

00	25/03-2015	Dagslys, fasader og bygningsform	JSA	AJP	AJP
REV.	DATO	BESKRIVELSE	UTARBEIDET AV	KONTROLLERT AV	GODKJENT AV

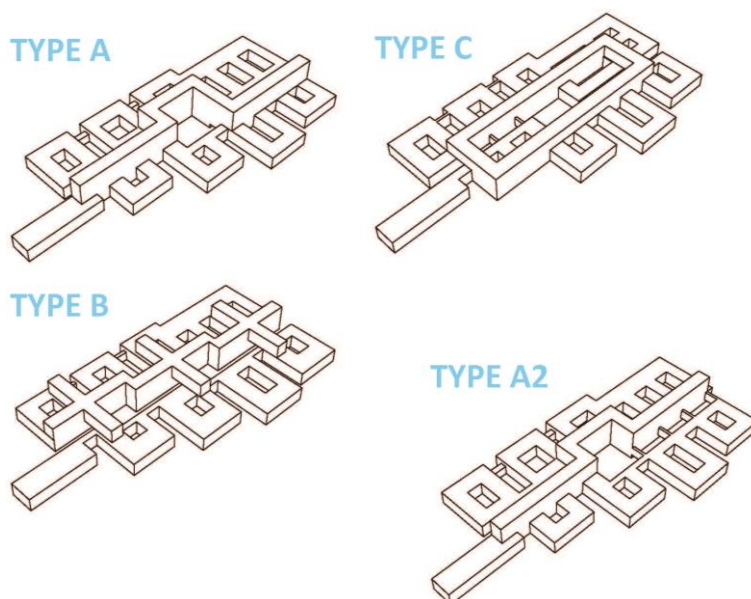
Mængden og kvaliteten af dagslys i rummet er påvirket af omgivelserne. Obstruktioner og skyggende omgivelser kan kvantificeres på mange måder. Den gennemsnitlige dagslysfaktor (DF) er en kendt fra TEK10 og BREEAM-NOR. I den Britiske Standard (BSI. "Code of practice for daylighting" (BS 8206-2: 2008. London, BSI, 2008) beskrives relationen mellem dagslys i rummet i dagslys tilgangen på facaden. Dagslys på facade kan analyseres/simuleres på baggrund af VDF (Vertical Daylight Factor).

#### Definition VDF (Vertical Daylight Factor)





VDF er et produkt af den diffuse himmelstråling samt den reflekterede stråling ved en standard overskyet himmel (CIE). VDF måles på en vertikal flade (facade) og sammenholdes med en horisontal uobstrueret flade.

### 3 Scenarier

I analysen er anvendt 4 typologier. Typerne repræsenterer fire forskellige udformninger af sengebygningen. Gældende for type A, B og C er at de har identiske kvadratmeter (bruksareal) og volumen. Det vil sige at den eneste variable i analysen er den geometriske udformning. Type A2 adskiller sig ved at have et reduceret kvadratmeter for sengebygningen.



Analyserne (VDF) kategoriseres i 4 intervaller. For hvert interval kan en anbefaling for det resulterede facadedesign (Window-to-wall ratio) bestemmes.

VDF	WWR (window-to-wall ratio)
	< 40 Really good facade - Criteria can be met for WWR 0.3
	30-40 Good facade - Criteria can be met for WWR; $0.3 < WWR < 0.5$
	20-30 It is possible to achieve a good daylight performance, but special attention to facade reflectance and WWR is needed - Criteria can be met for WWR; $0.5 < WWR < 0.7$
	< 20 Poor facade - It is not possible to fulfill the requirements

Der søges typologier med minimum at facade med VDF < 20 %. Ved VDF < 20 % er det som udgangspunkt ikke muligt at overholder vejledningen krav i TEK10 i forhold til dagslys (gennemsnittlig dagslysfaktor i rummet er minimum 2 %). Derudover bør der generelt tilstræbes en høj adgang af dagslys, således at vinduesarealet kan holdes moderat. Det er især vigtigt i forhold til den samlede energiramme og ambition om Passivhus Standard, jf. 126870-RIEn-NOT-001

## 4 Resultater

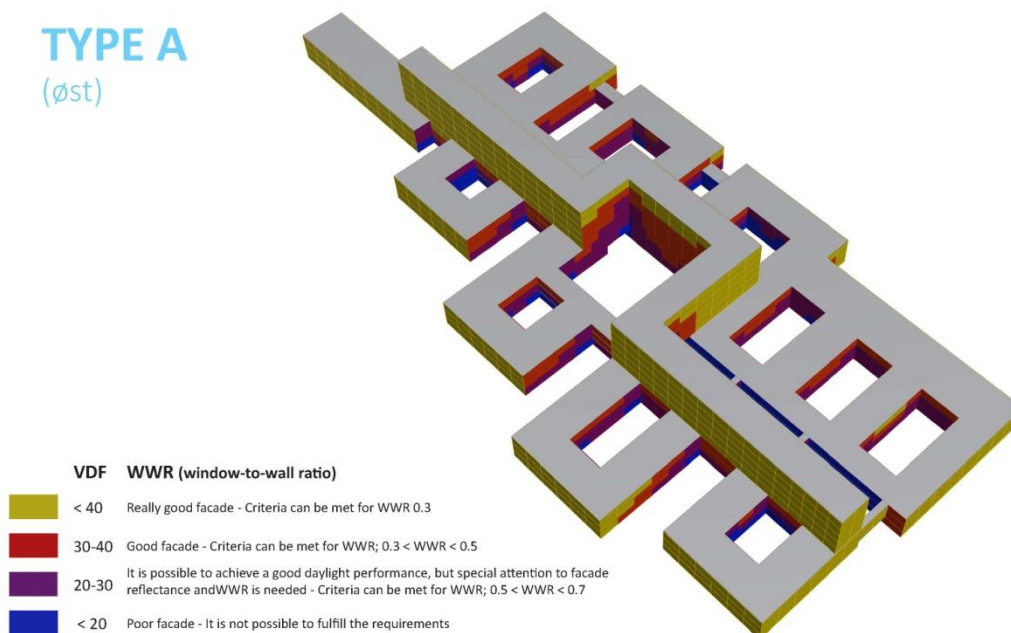
Resultaterne viser, at der er forskelle på dagslysadgangen for de fire typologier. Type A performer bedst sammenlignet med Type B & C. Type A2 performer signifikant bedst i forhold til at reducere mængde af facade/flader med utilstrækkelige dagslysforhold (VDF < 20 %). Dette er skyldes dog primært et reduceret etageareal.

VDF	Type A	Type B	Type C	Type A2	WWR (window-to-wall ratio)
< 40	45,5 %	42,3%	44,9 %	50,4 %	Really good facade - Criteria can be met for WWR 0.3
30-40	17,4 %	18,4 %	19,3 %	20,9 %	Good facade - Criteria can be met for WWR; 0.3 < WWR < 0.5
20-30	22,1 %	23,1 %	20,7 %	21,4 %	It is possible to achieve a good daylight performance - Criteria can be met for WWR; 0.5 < WWR < 0.7
< 20	15,0 %	16,2 %	15,1 %	7,3 %	Poor facade - It is not possible to fulfill the requirements

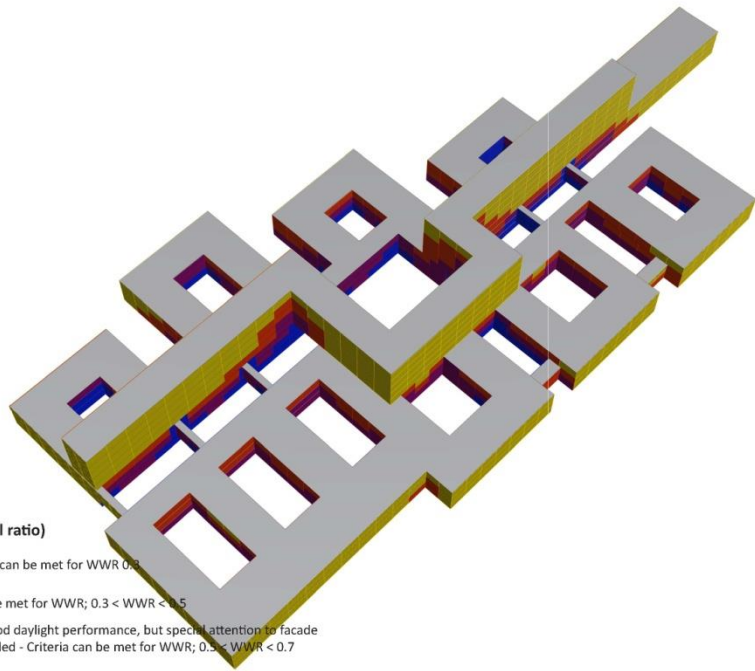
**BEST!**

Tabellen viser den samlede performance for de fire typologier.

## 5 Bilag

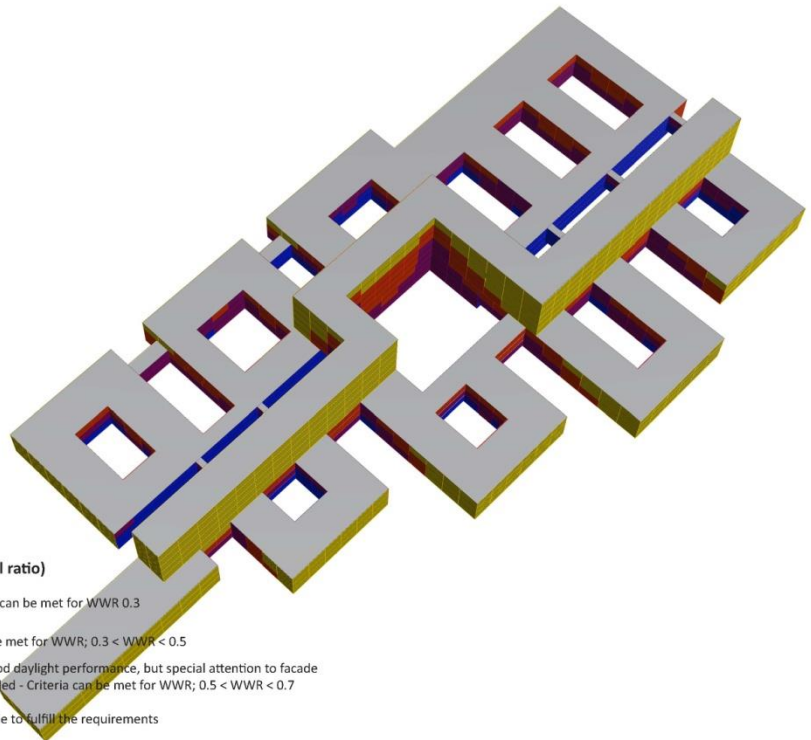


**TYPE A**  
(nord)



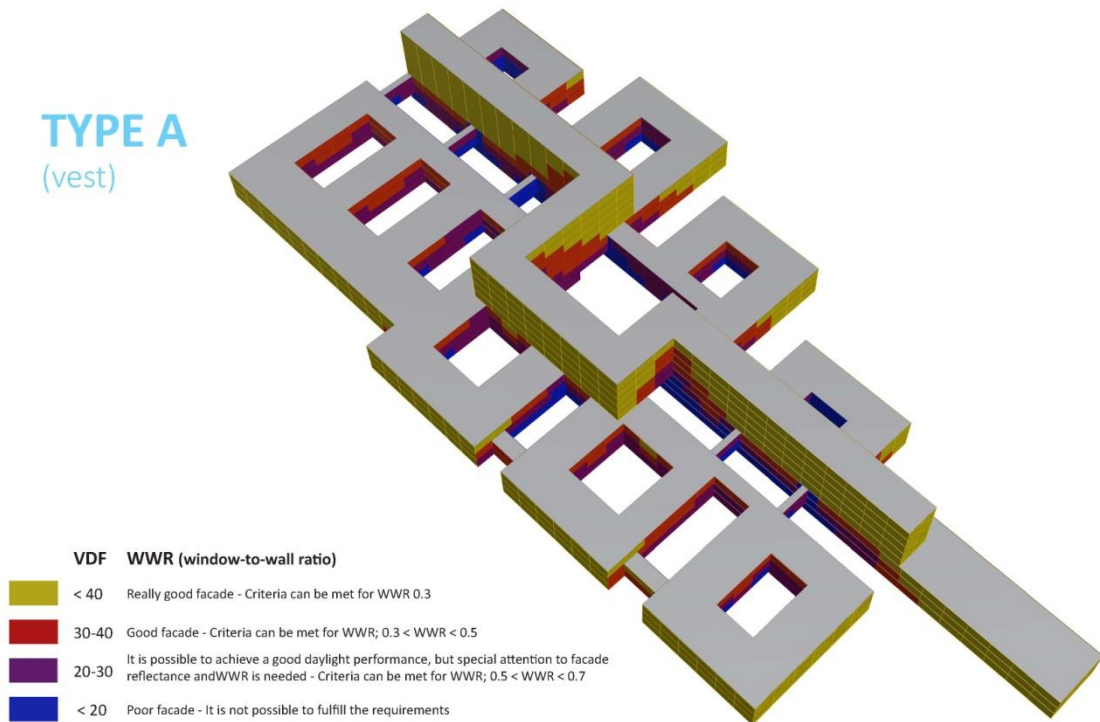
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20-30	It is possible to achieve a good daylight performance, but special attention to facade reflectance and WWR is needed - Criteria can be met for WWR; $0.5 < WWR < 0.7$
< 20	Poor facade - It is not possible to fulfill the requirements

**TYPE A**  
(syd)

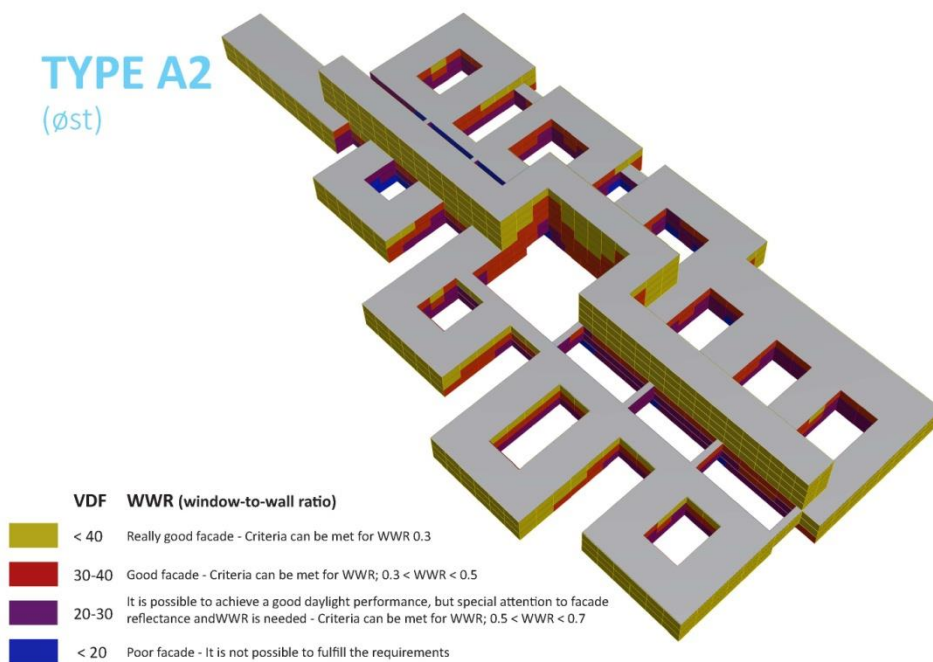


VDF	WWR (window-to-wall ratio)
< 40	Really good facade - Criteria can be met for WWR 0.3
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< 20	Poor facade - It is not possible to fulfill the requirements

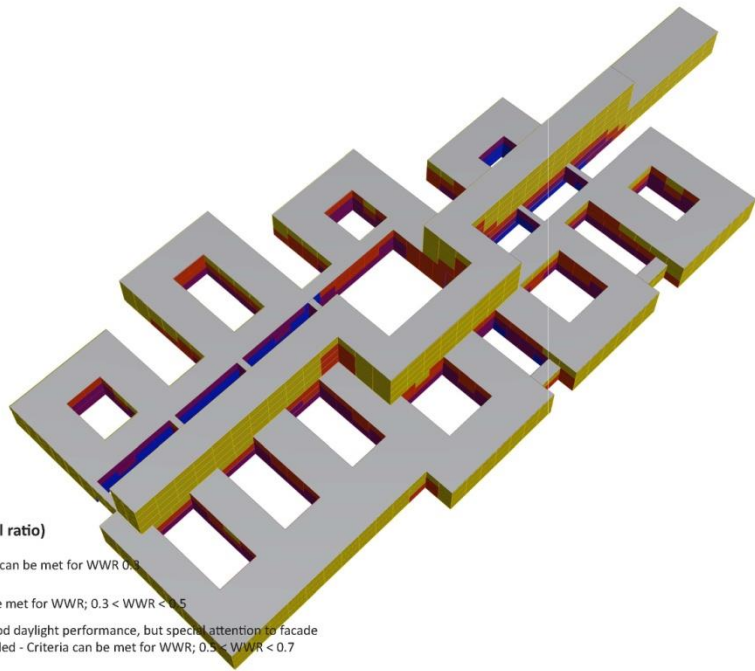
## TYPE A (vest)



## TYPE A2 (øst)

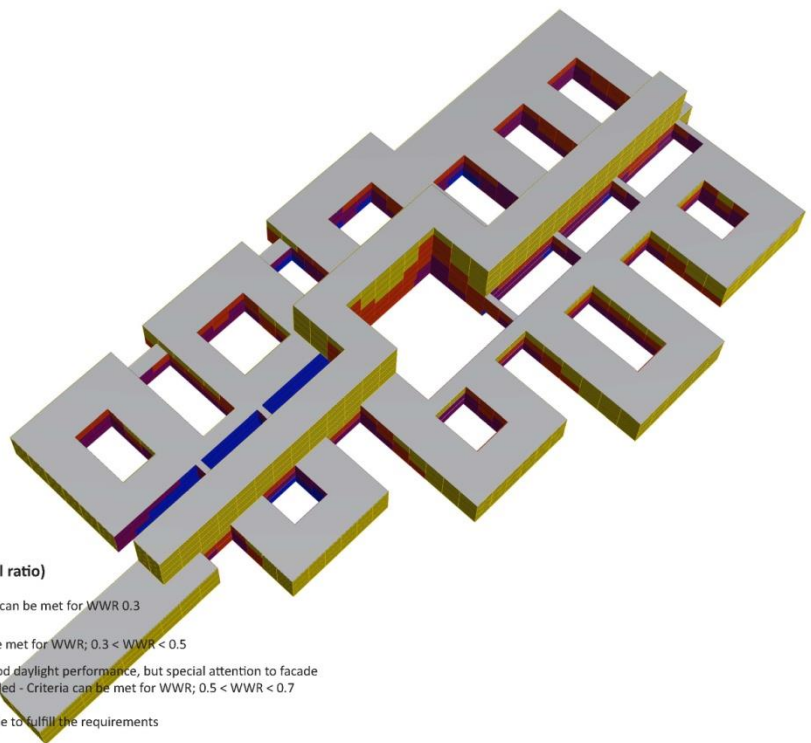


## TYPE A2 (nord)



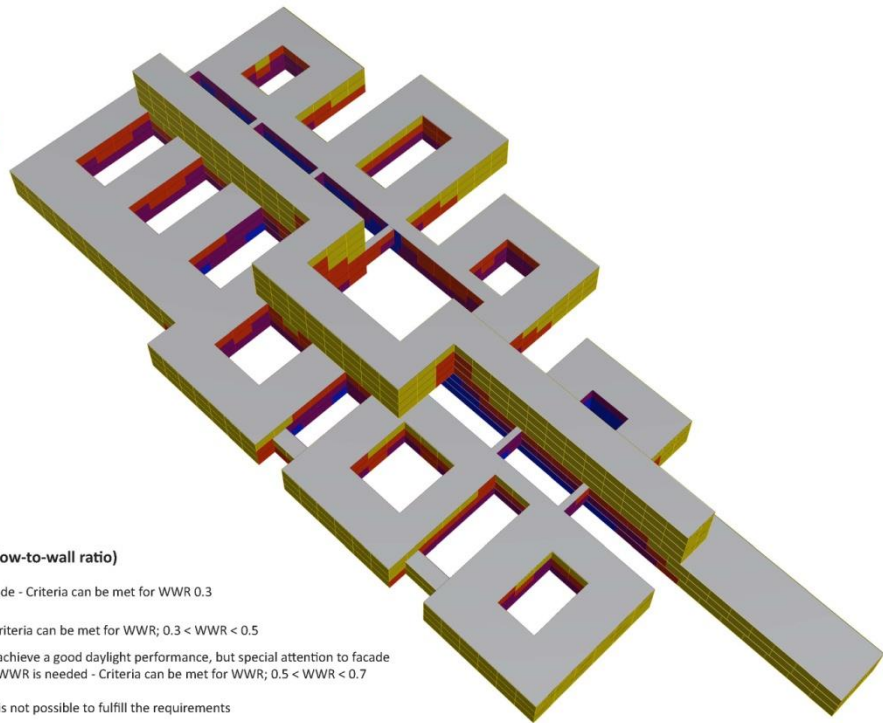
VDF	WWR (window-to-wall ratio)
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30-40	Good facade - Criteria can be met for WWR; $0.3 < WWR < 0.5$
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VDF	WWR (window-to-wall ratio)
< 40	Really good facade - Criteria can be met for WWR 0.3
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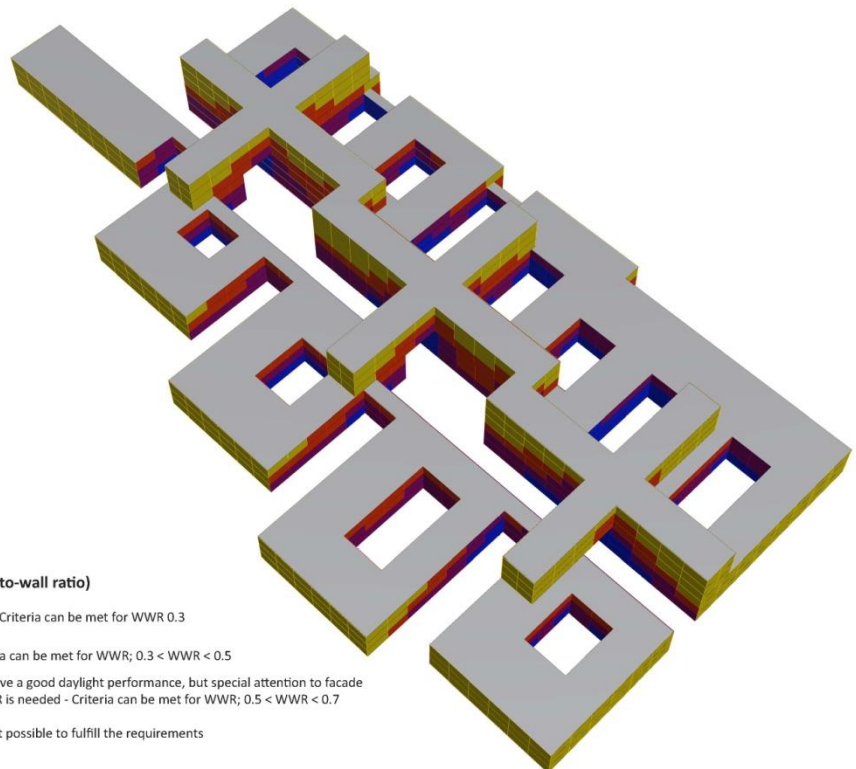
## TYPE A2 (vest)







### VDF WWR (window-to-wall ratio)

	< 0.3	Really good facade - Criteria can be met for WWR 0.3
	0.3-0.5	Good facade - Criteria can be met for WWR; $0.3 < WWR < 0.5$
	0.5-0.7	It is possible to achieve a good daylight performance, but special attention to facade reflectance and WWR is needed - Criteria can be met for WWR; $0.5 < WWR < 0.7$
	< 0.2	Poor facade - It is not possible to fulfill the requirements

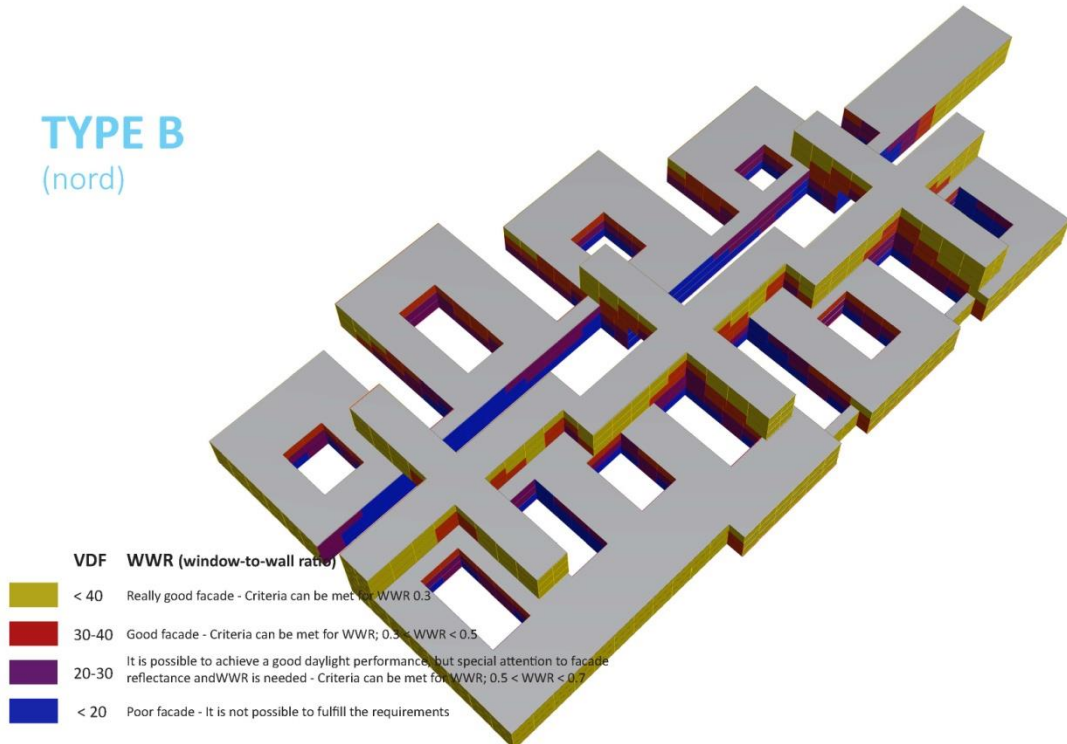
## TYPE B (øst)



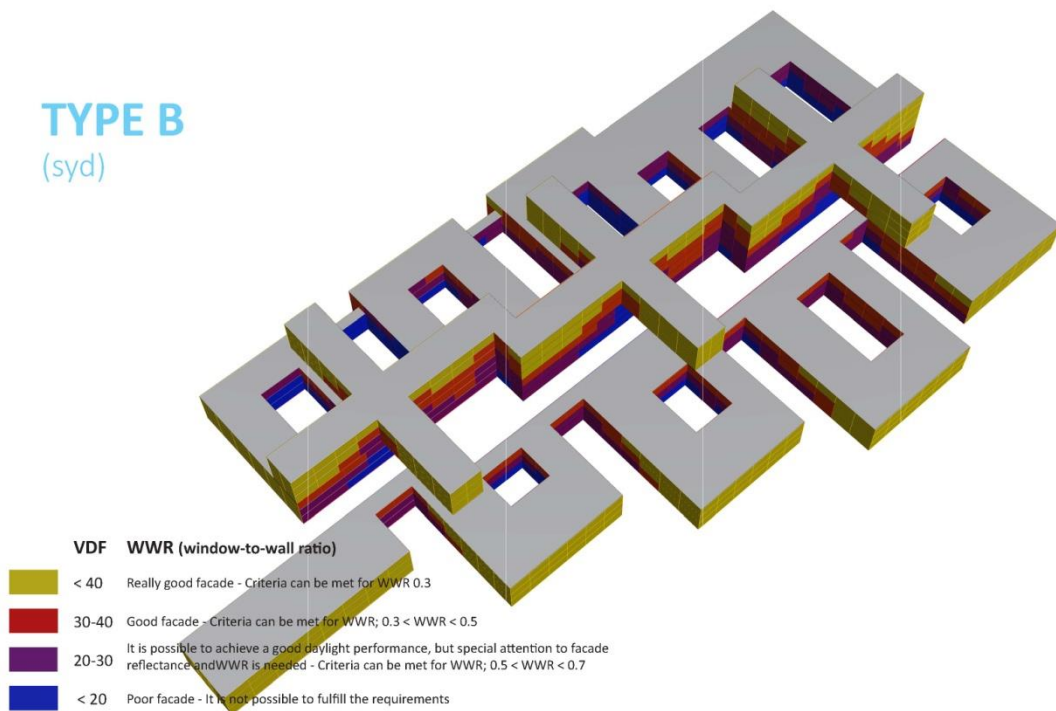
### VDF WWR (window-to-wall ratio)

	< 0.3	Really good facade - Criteria can be met for WWR 0.3
	0.3-0.5	Good facade - Criteria can be met for WWR; $0.3 < WWR < 0.5$
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	< 0.2	Poor facade - It is not possible to fulfill the requirements

**TYPE B**  
(nord)

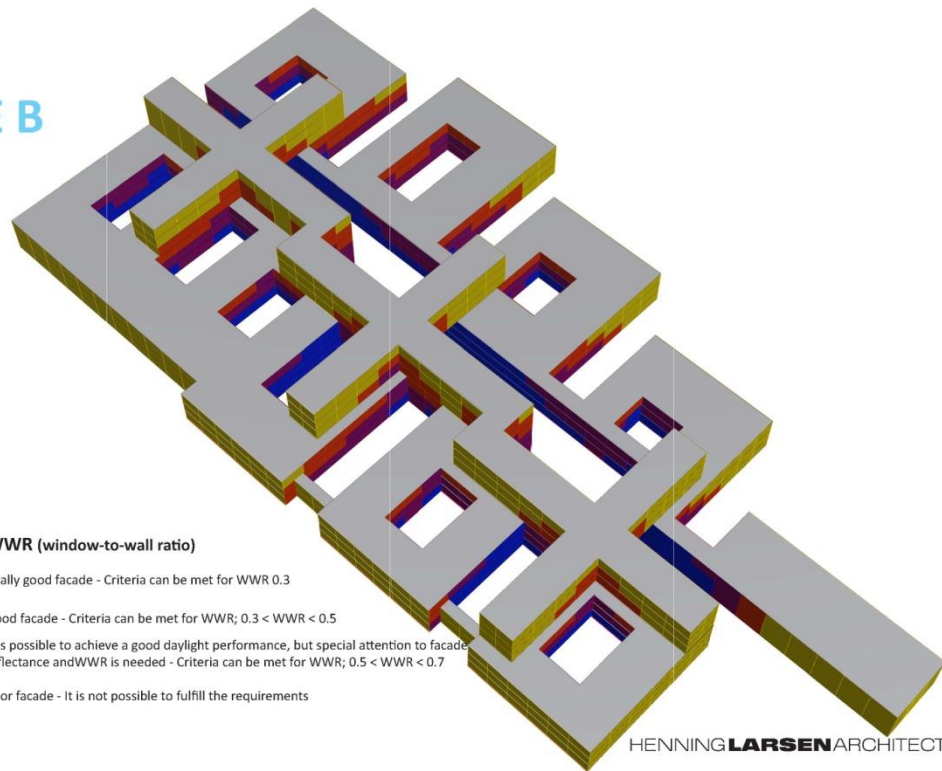


**TYPE B**  
(syd)





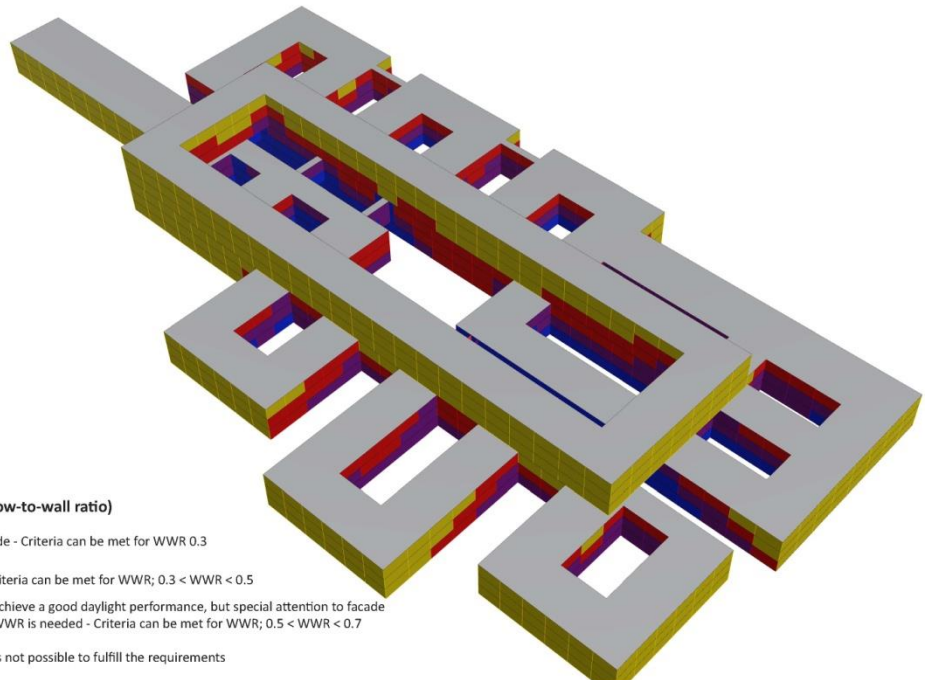
**TYPE B**  
(vest)



VDF	WWR (window-to-wall ratio)	Description
Yellow	< 40	Really good facade - Criteria can be met for WWR 0.3
Red	30-40	Good facade - Criteria can be met for WWR; $0.3 < WWR < 0.5$
Purple	20-30	It is possible to achieve a good daylight performance, but special attention to facade reflectance and WWR is needed - Criteria can be met for WWR; $0.5 < WWR < 0.7$
Blue	< 20	Poor facade - It is not possible to fulfill the requirements

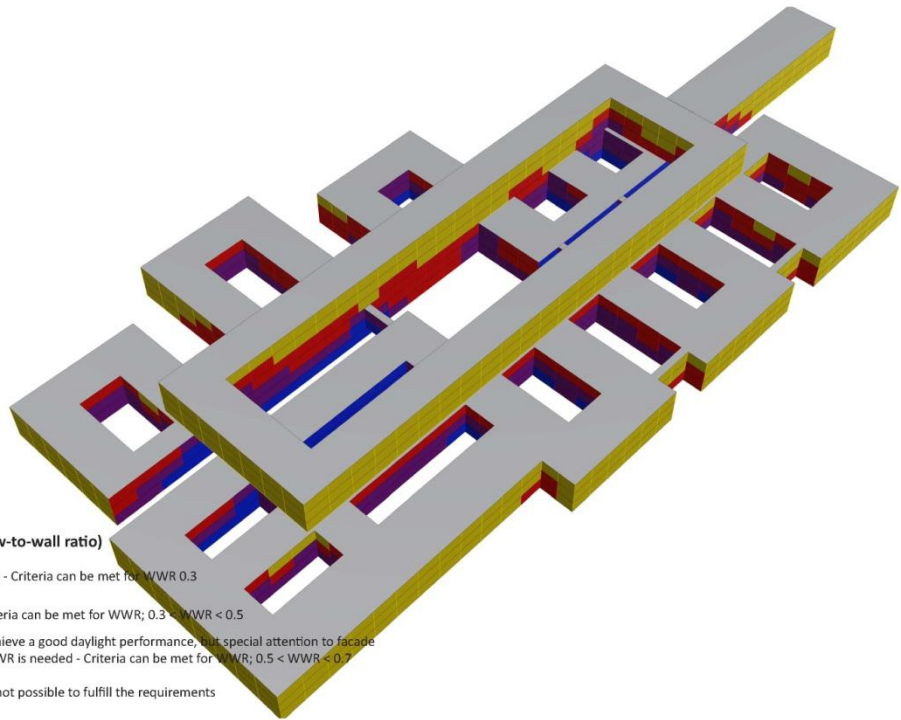
HENNING LARSEN ARCHITECTS

**TYPE C**  
(øst)



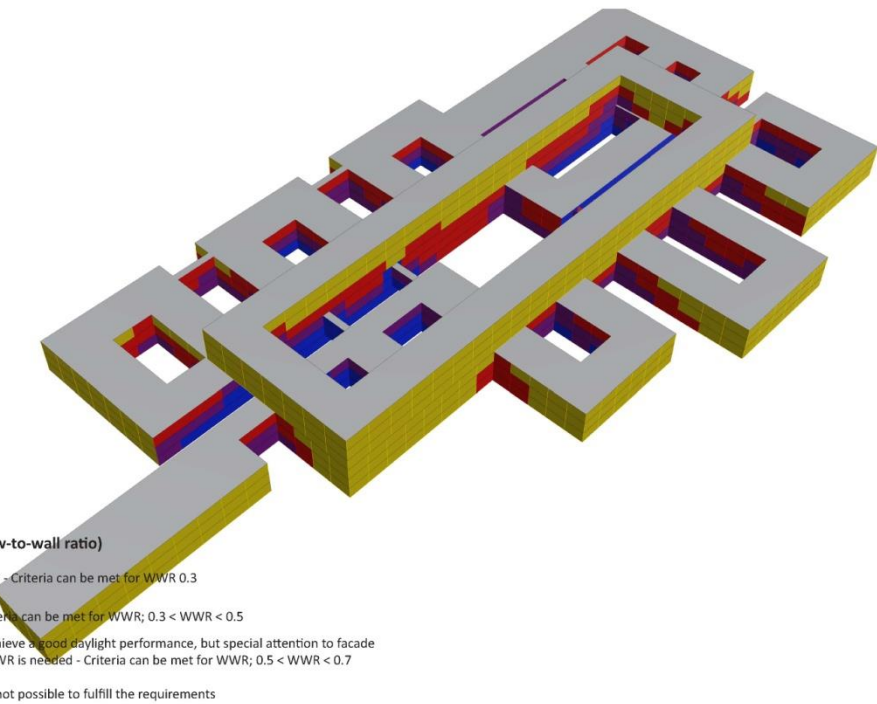
VDF	WWR (window-to-wall ratio)	Description
Yellow	< 40	Really good facade - Criteria can be met for WWR 0.3
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Purple	20-30	It is possible to achieve a good daylight performance, but special attention to facade reflectance and WWR is needed - Criteria can be met for WWR; $0.5 < WWR < 0.7$
Blue	< 20	Poor facade - It is not possible to fulfill the requirements

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(nord)



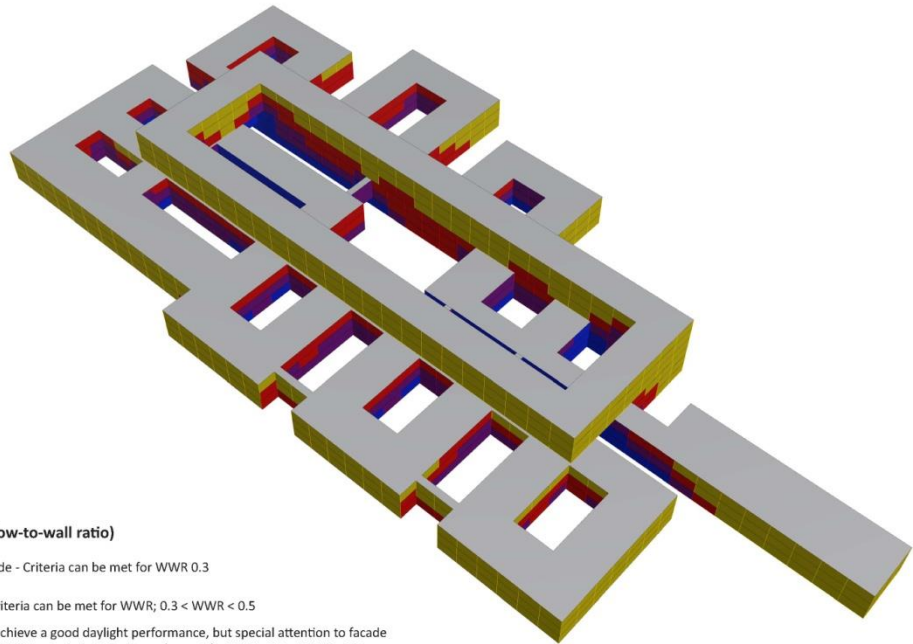
VDF	WWR (window-to-wall ratio)	Description
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(syd)







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Blue	< 20	Poor facade - It is not possible to fulfill the requirements

## TYPE C (vest)



**VDF WWR (window-to-wall ratio)**

	< 0.3	Really good facade - Criteria can be met for WWR 0.3
	0.3-0.5	Good facade - Criteria can be met for WWR; $0.3 < WWR < 0.5$
	0.5-0.7	It is possible to achieve a good daylight performance, but special attention to facade reflectance and WWR is needed - Criteria can be met for WWR; $0.5 < WWR < 0.7$
	< 0.2	Poor facade - It is not possible to fulfill the requirements