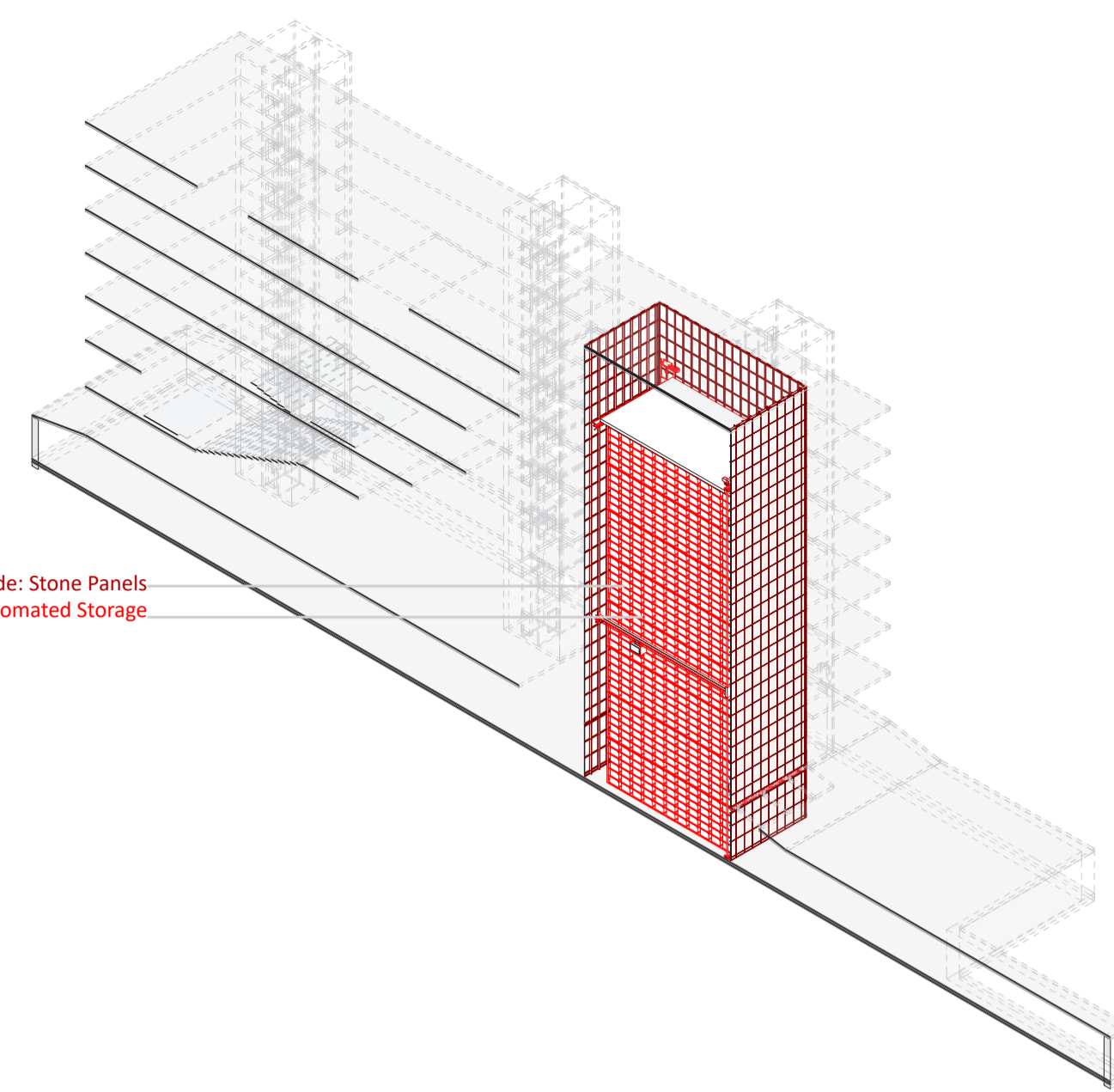
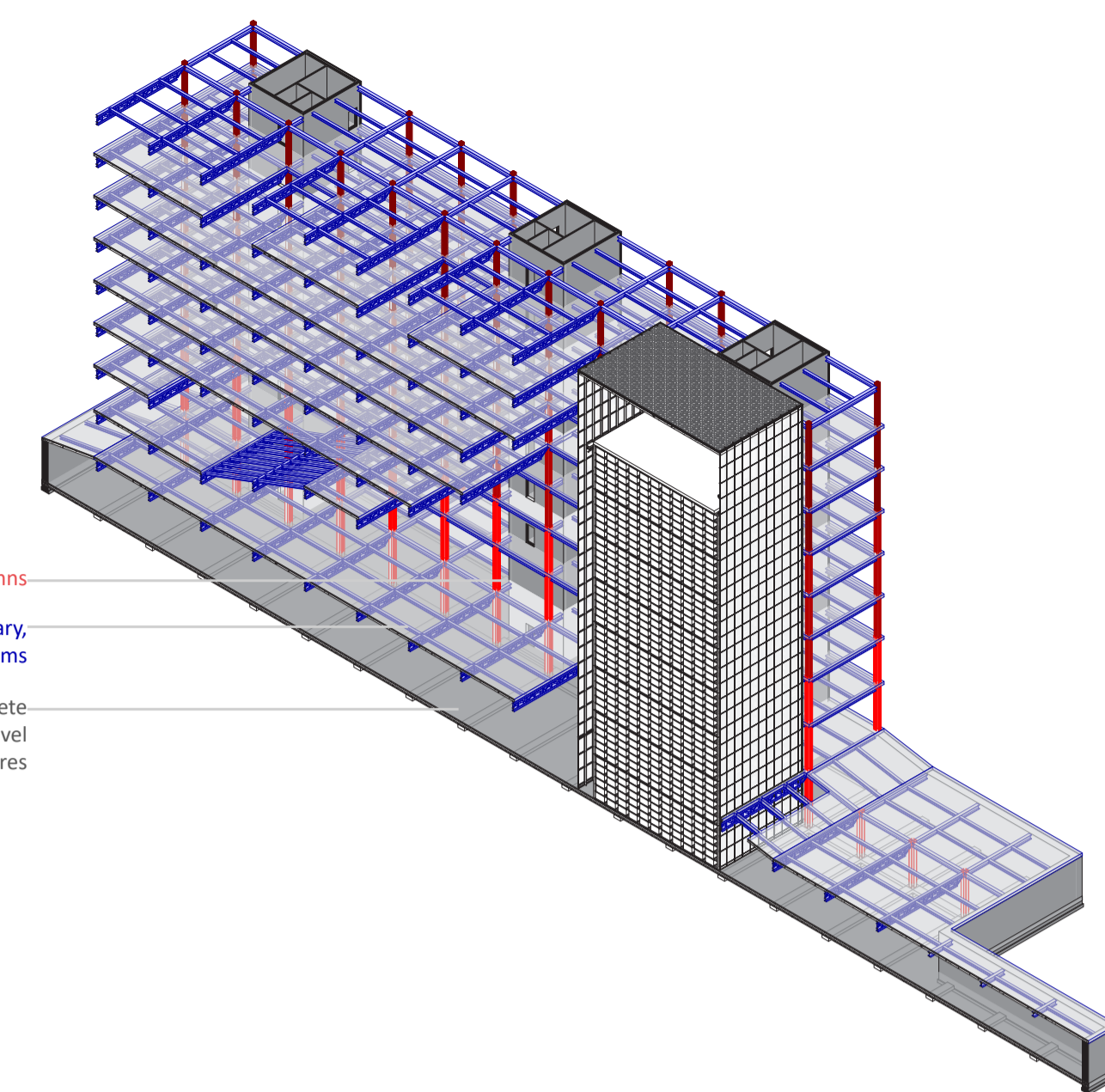


STRUCTURAL ELEMENTS:
CONCRETE CORES
six concrete vertical stabilisers of the building

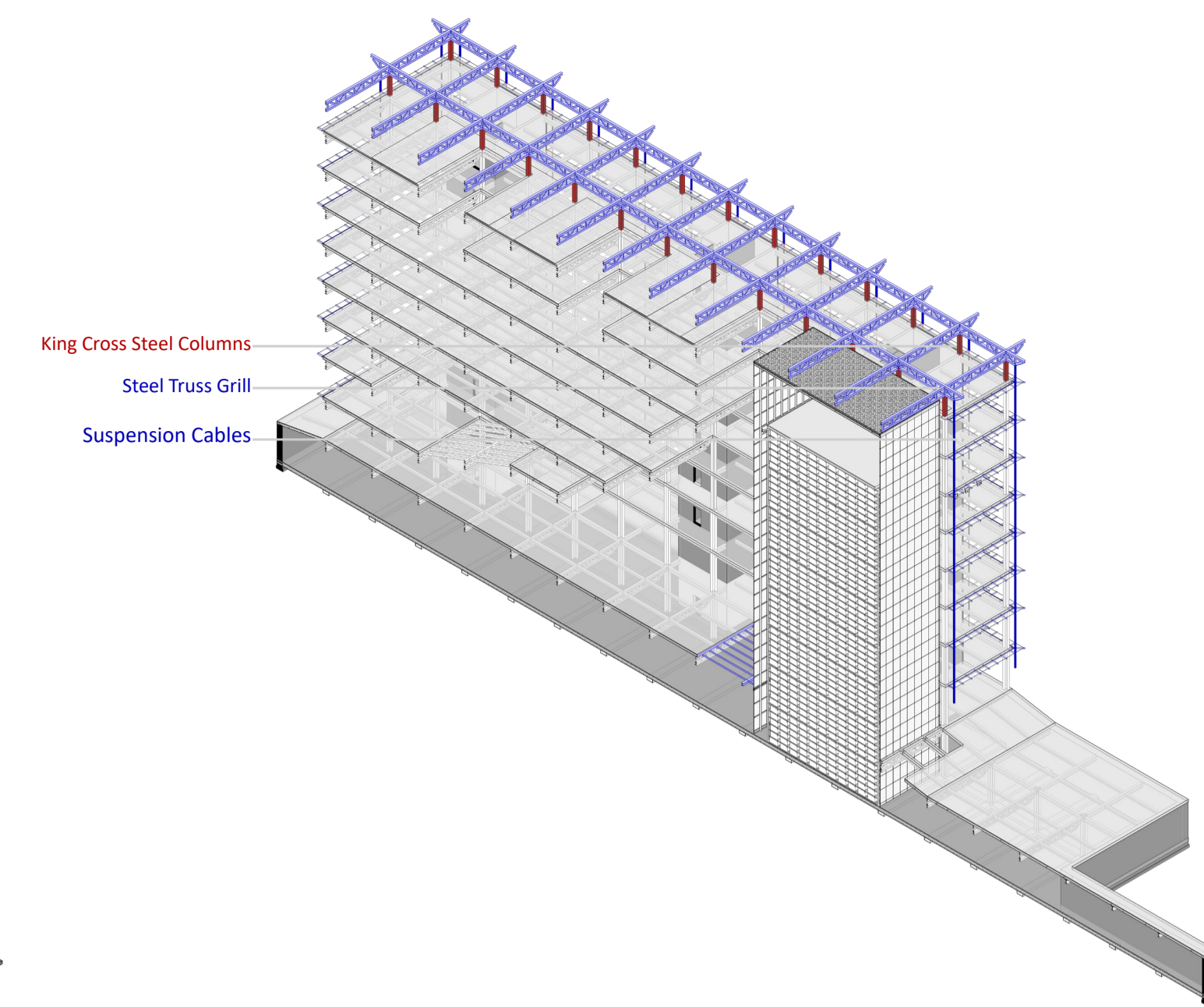


STRUCTURAL ELEMENT:
SELF-BEARING TOWER OF BOOKS
autonomous element



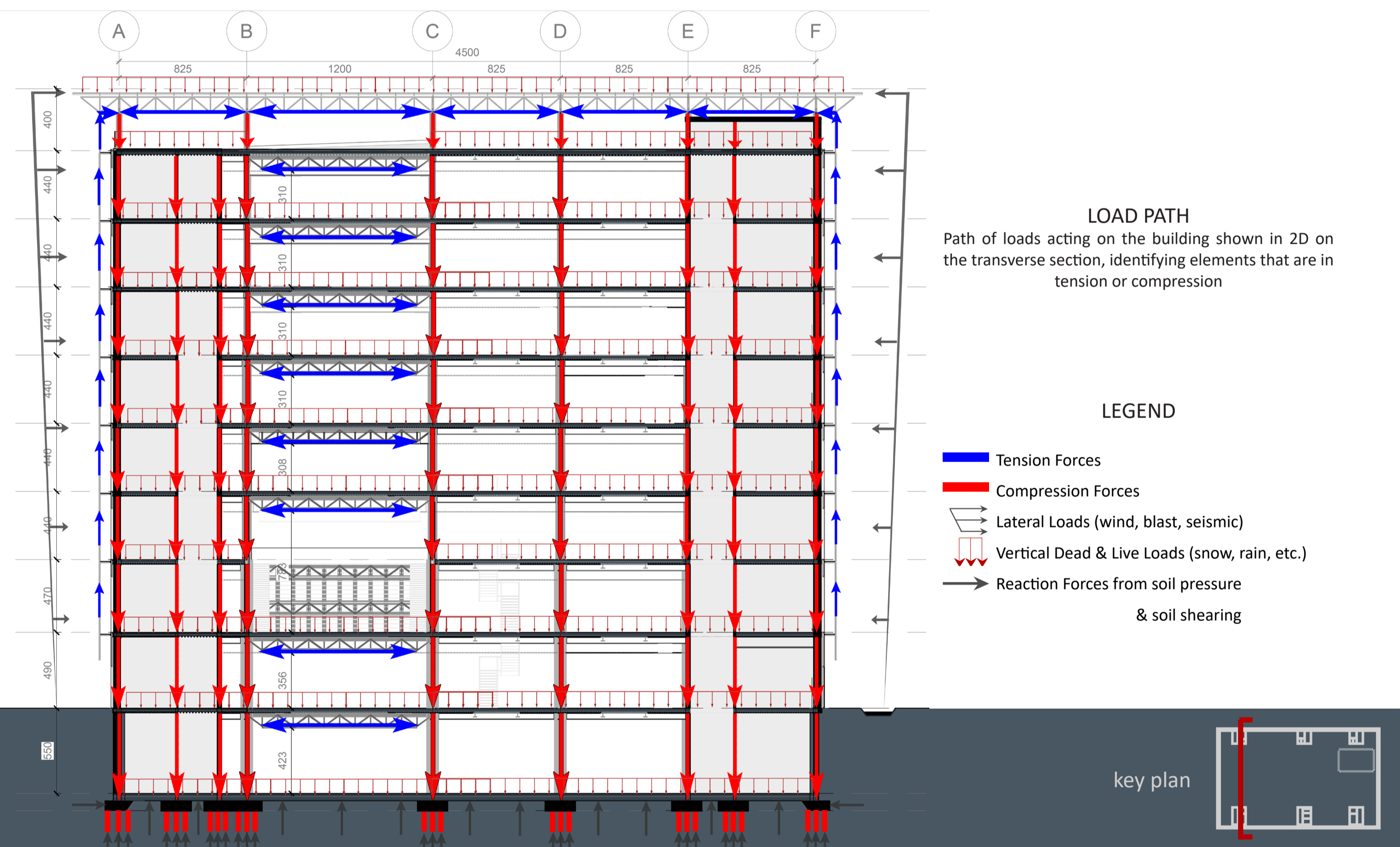
King Cross Steel Columns
Steel Primary, Secondary,
and Truss Beams
Reinforced Concrete
Subterranean Level
and Cores

STRUCTURAL ELEMENTS:
STEEL 3D FRAME & REINFORCED CONCRETE CORES
wide span opening views to the Tower of Books

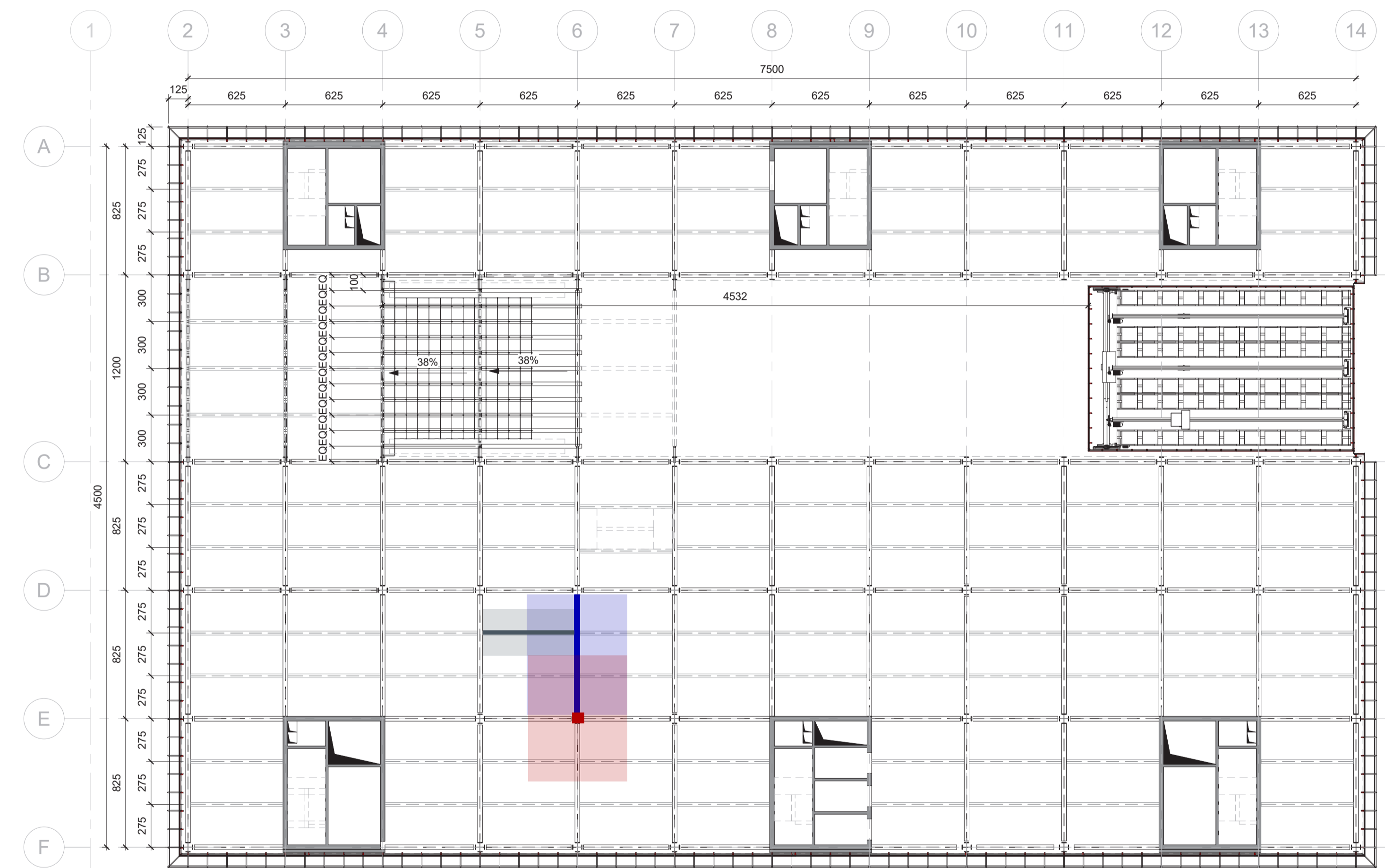


King Cross Steel Columns
Steel Truss Grill
Suspension Cables

STRUCTURAL ELEMENTS:
TRUSSES & TENSION CABLES
Facade suspended from trusses for the perception of 'lightness'



LOAD PATHS



Primary Beam
Secondary Beam

SUMMARY OF LOADS ON SLABS

LOADS ON ROOF CANOPY	Value
G1, self weight	0,294 kN/m ²
Q1, maintenance	0,400 kN/m ²
Q2, snow load	0,842 kN/m ²
LOADS ON ROOF SLAB	Value
G1, roof	4,931 kN/m ²
Q1, roof	5,000 kN/m ²
LOADS ON TYP. FLOOR SLAB	Value
G1, slab	6,043 kN/m ²
Q1, slab	5,000 kN/m ²

SUMMARY OF SLS-ULS CHECK FOR SECONDARY BEAM

SECONDARY BEAM - TYP. FLOOR	Value	Check
Length (m)	6,25	6250 mm
Tributary width (m)	3,00	
q _{sls,typical floor}	34,67 kN/m	1,00*(G1+G2)+1,00*(Q1)
N _{sls,typical floor}	49,05 kN/m	1,35*(G1+G2)+1,50*(Q1)
Section Profile	HEM240	
SLS		
Md	169,26 kNm	q _{sls} *L ² /8
Vd	108,33 kN	q _{sls} *L/2
Deflection δ _{max}	13,50 mm	(5* ³ q _{sls} *L ⁴)/(384*E*I _y)
Verification		
Bending moment Ma	725,83 kNm	W _{pl,y} /f _y d
Shear Va	1189,08 kN	A _v /sqrt(3)*f _y d
Deflection δ _{max/L}	25,00 mm	δ _{max} <δ _a
		L/250 for decks, in general

continued

ULS	Value	Check
Md	239,49 kNm	q _{sls} *L ² /8
Vd	153,28 kN	q _{sls} *L/2
Deflection δ _{max}	19,10 mm	(5* ³ q _{sls} *L ⁴)/(384*E*I _y)
Verification		
Bending moment Ma		Md<Ma
Shear Va		Vd<Va
Deflection δ _{max/L}		δ _{max} <δ _a

SUMMARY OF SLS-ULS CHECK FOR PRIMARY BEAM

PRIMARY BEAM - TYPICAL FLOOR	Value	Check
Length (m)	8,25	8250 mm
Tributary width (m)	6,25	6250 mm
Section Profile	HEM400	
SLS		
Md<Ma	634,67<1910,06	Verified
Vd<Va	307,79<2181	Verified
δ _{max} <δ _a	20,58<33	Verified
ULS		
Md<Ma	491,19<1910,06	Verified
Vd<Va	318,45<2181	Verified
δ _{max} <δ _a	25,08<33	Verified

SUMMARY OF BUCKLING CHECK FOR COLUMN

VERTICAL LOAD ON COLUMNS	Value
q _{sls zone 3 tot} (kN/m ²)	91,17
q _{sls zone 3 tot} (kN/m ²)	124,92
N _{sls column zone 3 (N)}	44142,12
N _{sls column zone 3 (N)}	59591,86
ZONE 3 COLUMN SECTION & BUCKLING CHECK	Value
Structural Element	King Cross HEB400
t (mm)	4400,00
I _y (mm ⁴)	2860,00
A: Tributary Area (m ²)	51,56
λ	21,75
λ < λ _{cr} 150	Verified
Allowable Stress	4745318,99
N	318,45<2181
σ (MPa)	121,03
σ < σ _{cr} 160	Verified
Limit State	Verified
N _{cr} (N)	173571151,78
λ	0,23
φ	0,33
χ	0,99

continued

Compression Check	Value
N _{Ed} /N _{Rd} (N)	8763590,789
N _{Ed} (N)	6500868,49
N _{Ed} /N _{Rd} ≤ 1,00	0,74
Verified	
SIMILARLY FOR ZONE 2&1	Value
ZONE 2 COLUMN SECTION & BUCKLING CHECK	Value
Structural Element	King Cross HEB500
N _{Ed} /N _{Rd} ≤ 1,00	0,79
Verified	
ZONE 1 COLUMN SECTION & BUCKLING CHECK	Value
Structural Element	King Cross HEB600
N _{Ed} /N _{Rd} ≤ 1,00	0,87
Verified	