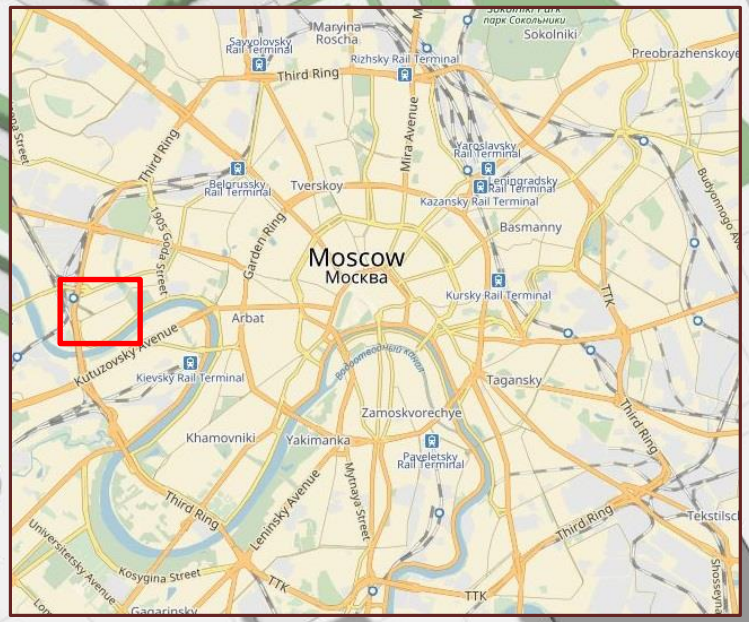
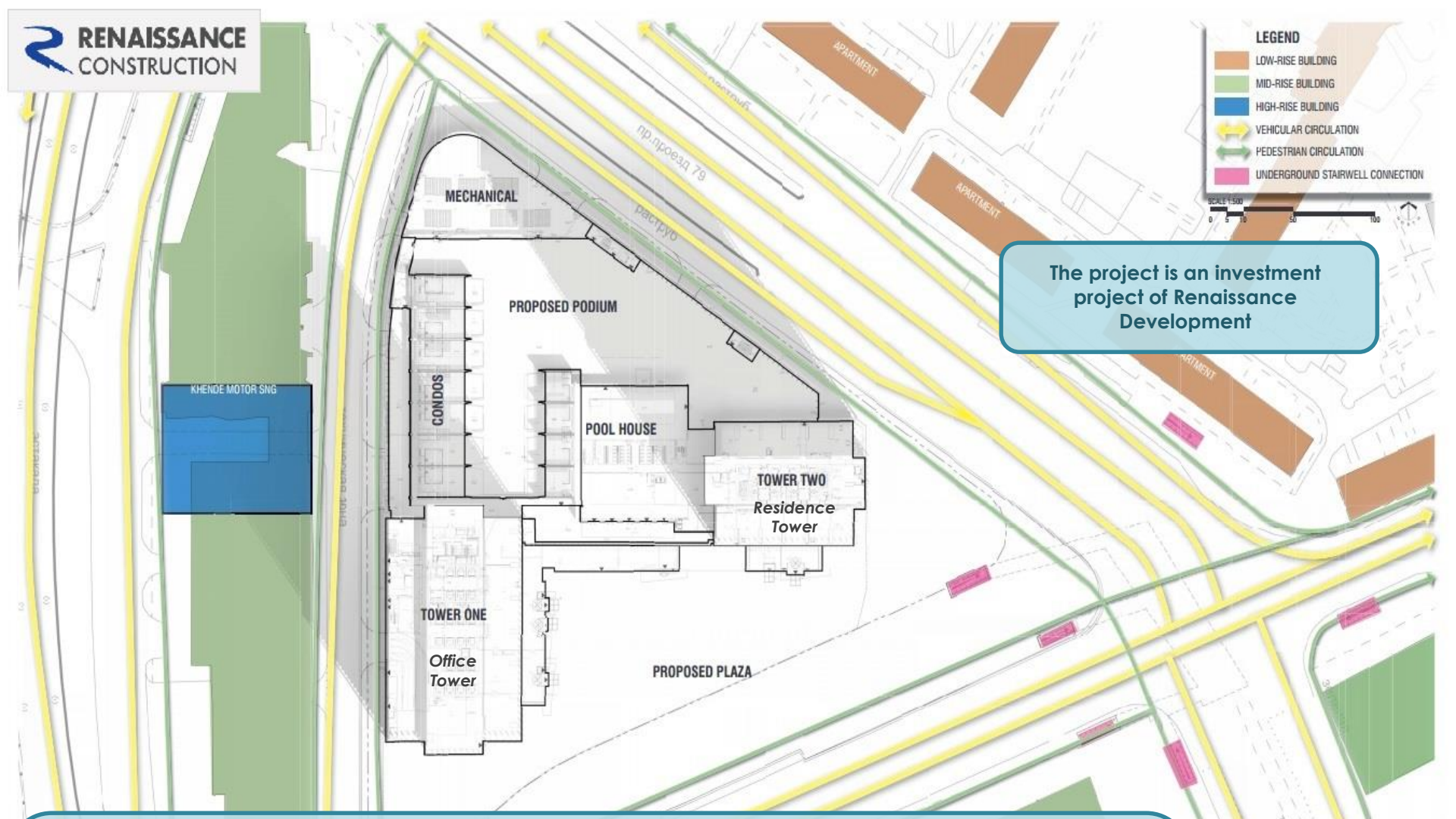
NEVATOWERS

RENAISSANCE CONSTRUCTION

"NEVA TOWERS" is a multifunctional complex consisting apartments, offices and retail areas currently under construction at the plots № 17-18 of the International Business Center "Moscow City" located in the Krasnopresnenskaya Embankment



RENAISSANCE CONSTRUCTION



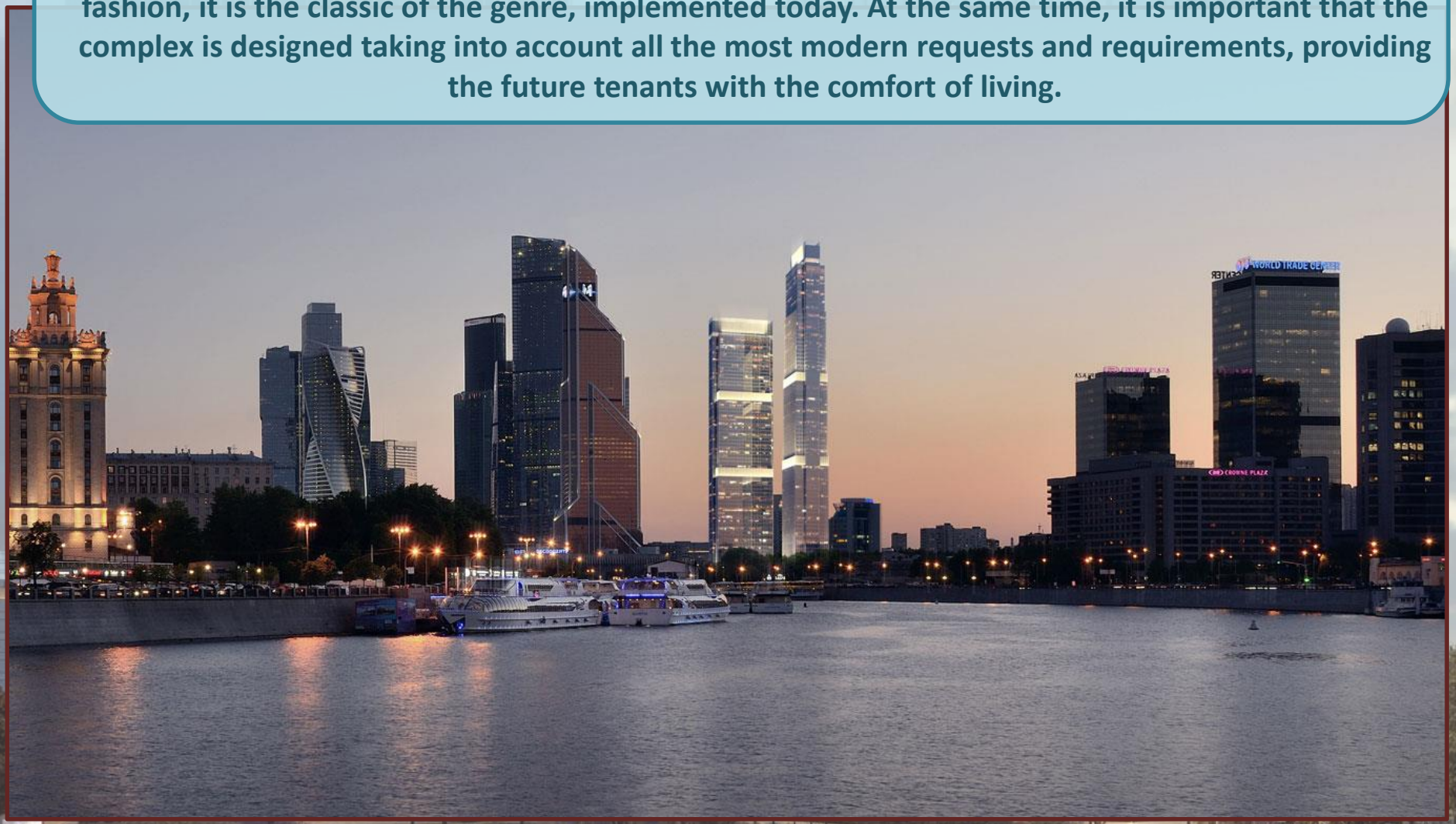
The project is an investment project of Renaissance Development

The land plot has a triangular form of the area 2,41 hectare which consist of;
_ One 66-storey mixed use tower (302 m) and,
_Other one 79-storey apartment tower (345 m) and,
_ Common podium that contains 4 floors underground mostly function with carpark designed for 2 041 cars and technical rooms and 3 floors aboveground partially retail areas, technical rooms and car parks. Total car park area is 59 000 m2.

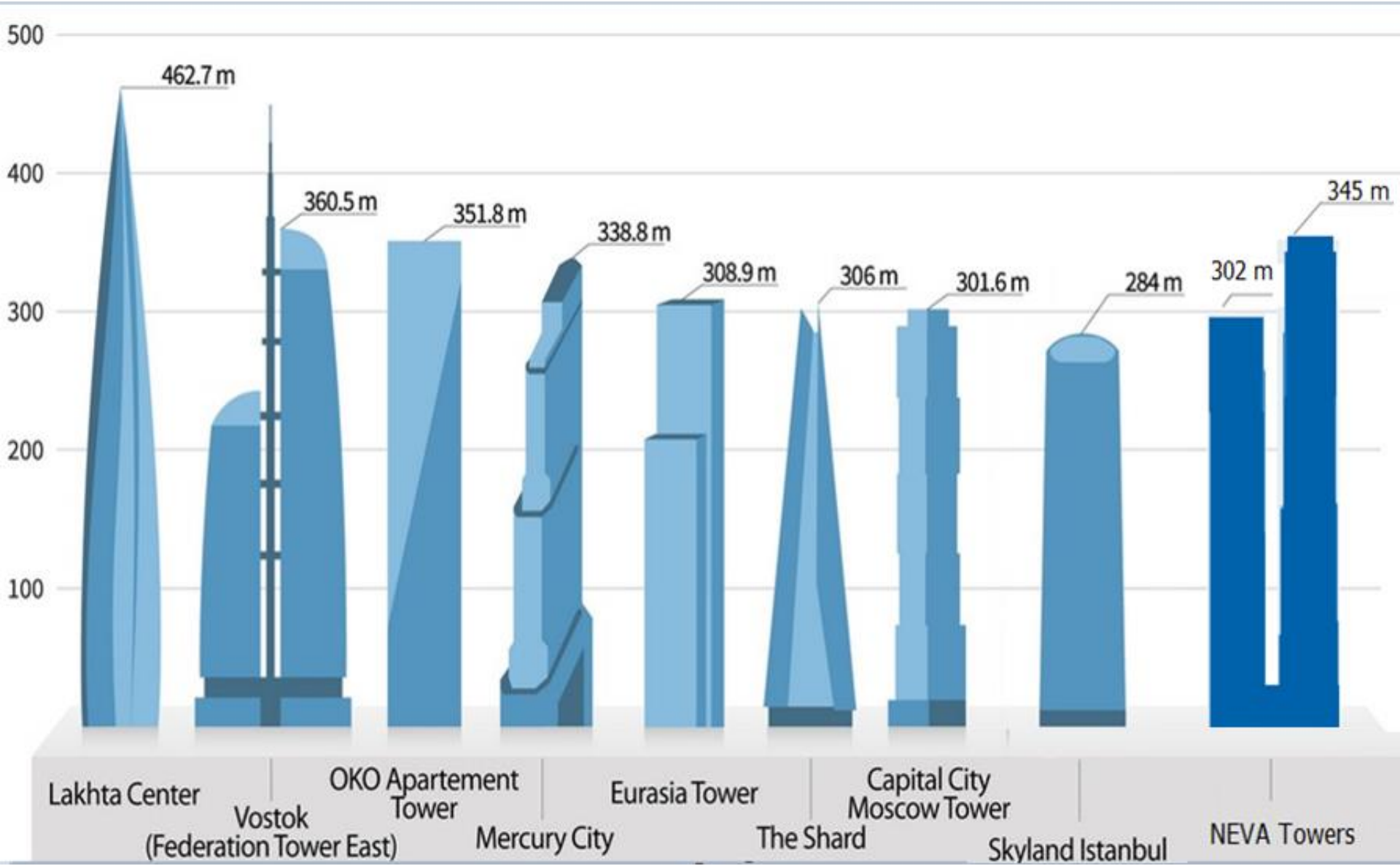
CONTEXT ANALYSIS

NEVATOWERS

In Moscow-City, there are plenty of modern skyscrapers with extravagant shapes and silhouettes, but these two towers are designed in the style of historical skyscrapers, which the lightness of glass and the massiveness of natural stone complement each other. This image is not subject to momentary fashion, it is the classic of the genre, implemented today. At the same time, it is important that the complex is designed taking into account all the most modern requests and requirements, providing the future tenants with the comfort of living.



Comparison of the Tallest Skyscrapers in Europe



RESIDENCE TOWER

Floors : 79
C.Areas : 108.775 m²
Residences : 838
Lifts : 11
Landscaping:15.032 m²

OFFICE TOWER

Floors : 66
C.Areas : 153.628 m²
Offices : 51 120 m²
Residences : 570
Lifts : 24
Landscaping: 8.545 m²

PODIUM

Floors : 6
C. Areas : 102.832 m²
Lifts : 16
Car Park : 2041 vch
63 675 m²
Landscaping Roof Garden : 7.274 m²

NEVA TOWERS

Field Information

Closed Area : 361 064 m²
Building Area : 15 111 m² footprint
Land Area : 24 705 m²
Landscaping : approx. 20 000 m²

Man-Hour at Completion

Direct : 15 316 643 mH
Indirect : 6 934 676 mH
Total : 22 251 319 mH

Actual Manpower (28.05.2018)

Direct : 2169 (% 68,79)
Direct (Passive): 720 (% 22,84)
Indirect : 264 (% 8,37)
Total : 3153

Completion Dates

Residence Tower : Apr'19
Podium : Apr'19
Office Tower : Sep'20

Physical Progress as of 15.05.18

Planned Mh: 6 241 779 mh
Earned Mh: 6 073 895 mh
Spent Mh: 6 039 887 mh
Planned Progress: 40.75 %
Cumulative Progress: 39.65 %


RENAISSANCE CONSTRUCTION
RENAISSANCE DEVELOPMENT
NEVATOWERS
DESIGN and CONSULTING PARTNERS
Arch. Concept Designers
hok
speech
Facade Review Concept Designer
FXFOWLE
Structural Engineering
HALVORSON AND PARTNERS
A WSP | PARSONS BRINCKERHOFF COMPANY
Interior Concept Designer
DA
Wind & Stack Effect Consultant
RWDI
Interior Concept Designer
HBA
Facade Consultant
AFC
ALUMINIUM FASSADEN CONSULTING
Landscape Concept Designer
LandDesign
Transportation Consultant
LERCH BATES
Building Insight
Concreting Consultant
наука и технологии
Foundation, Settlement and Environment Effect Consultant
RESEARCH CENTER OF CONSTRUCTION
Joint Stock Company
Concrete Deflection Consultant
НИИЖБ
NIIZHB
NAMED AFTER A.A. GVOZDEV

The designers of the project are Sergei Choban (company SPEECH (RU)) and HOK (USA). Design company FXFOWLE (USA) also took part in the project for reviewing of facade. The interiors of the public spaces are developed by HBA / Hirsch Bedner Associate, which is responsible for the design of the world's leading hotel brands: Hilton, Marriott, Fairmont, Hyatt, Sheraton, Four Seasons, Mandarin Oriental, Ritz Carlton, Waldorf Astoria and others

The consulting companies are; Halverson and Partners (USA) is for structural decisions, Mezzo(TR) for sound insulation, AFC (Austria) for facade technologies, OPB (Russia) for fire norms, NIIJB and NIISF for reinforced concrete and reinforcing, etc.

The project complies with all modern environmental standards, and the buildings will be certified according to the world standard in **green building - LEED**.

A wide range of services and a roof garden is realized within the framework of the "house without borders" concept, which allows residents to find more time for themselves, which is not easy in modern rhythm.

For the residents of Neva Towers, a unique club infrastructure has been developed: a panoramic swimming pool in a roof garden of a four-story podium building, a fitness club with SPA and Turkish bath , squash courts, virtual golf, cinema hall, music and karaoke studio, a hall for individual lessons

STANDING SEAM METAL ROOF

GREEN ROOF

SKYLIGHT

STONE WALL

CURTAIN WALL

FOLDING GLASS WALL

RENAISSANCE CONSTRUCTION

POOL ROOF MATERIALS - OPTION 1

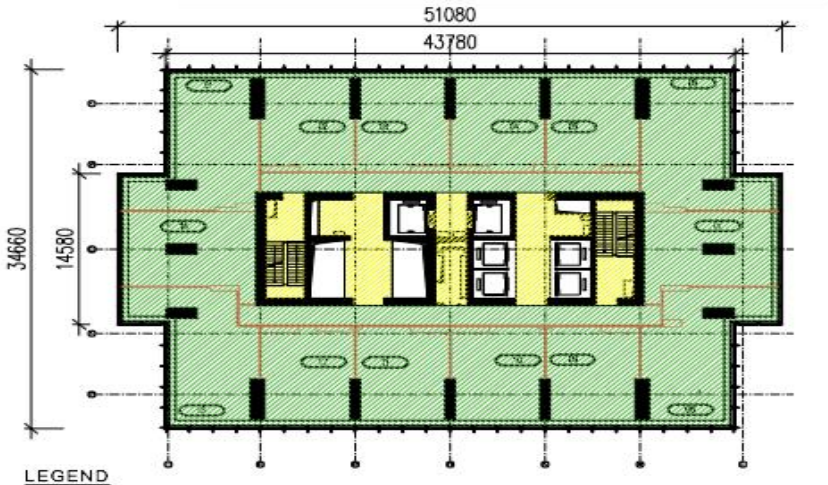
Actual Progress of Construction

North-West View

South-West View

The main loadbearing structure of the building is monolith reinforced concrete columns, walls and beams.

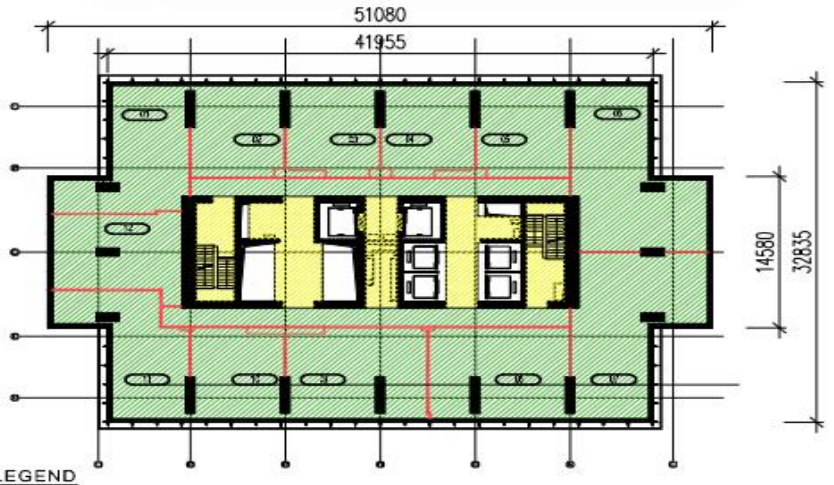
T2- Apartment Lowrise Typical Floor Plan



LEGEND

- APARTMENTS 1239,1 m²
- CORE 326,9 m² (wall thickness 750mm)

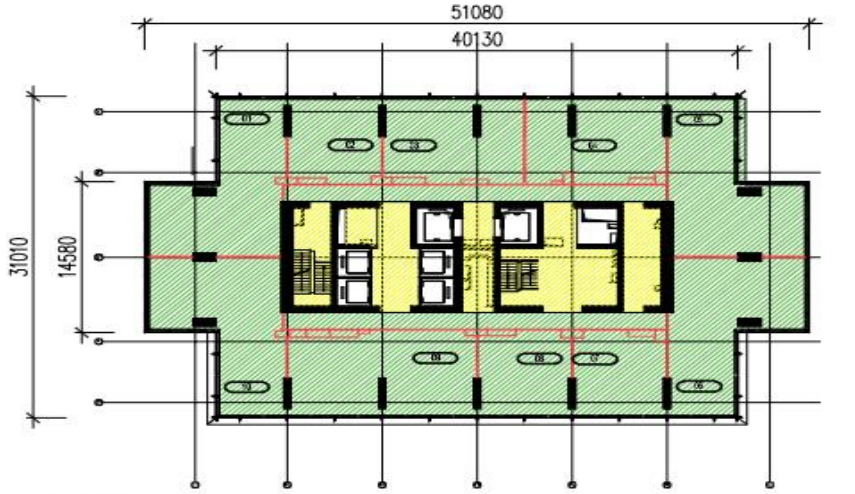
T2- Apartment Midrise Typical Floor Plan



LEGEND

- APARTMENTS 1125,5 m²
- CORE 328,5 m² (wall thickness 650mm)

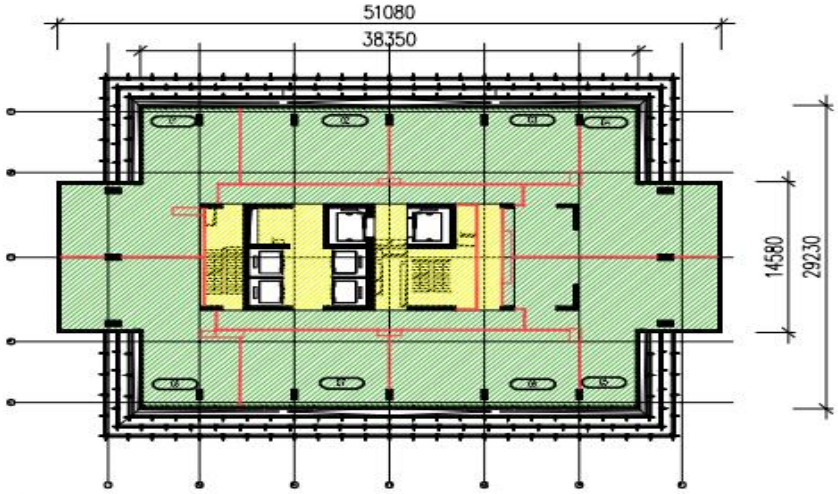
T2-Apartment Highrise Typical Floor Plan



LEGEND

- APARTMENTS 1045,6 m²
- CORE 321,7 m² (wall thickness 600mm)

T2-Apartment Toprise Typical Floor Plan

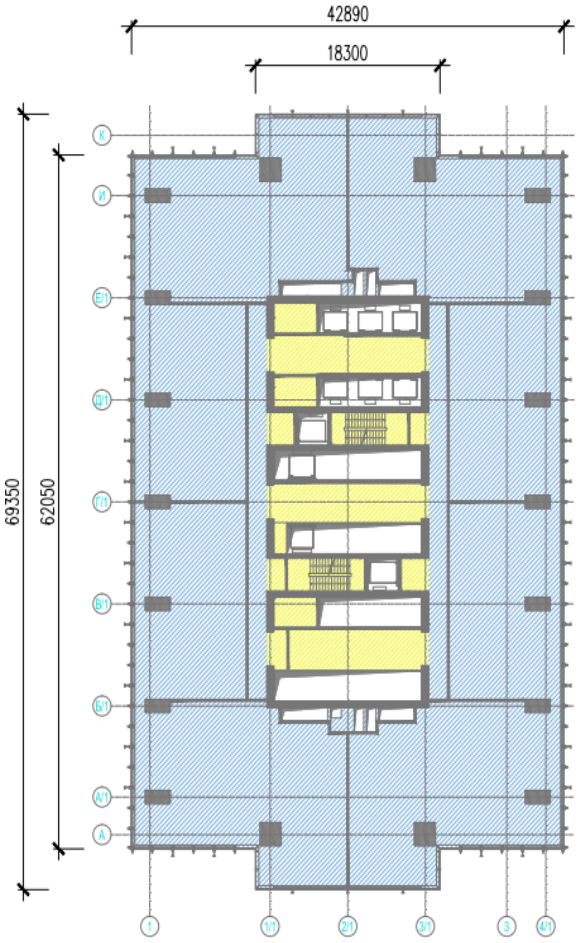


LEGEND

- APARTMENTS 1023,2 m²
- CORE 237,6 m² (wall thickness 400mm)

Tower 1 – Typical Floor Plans

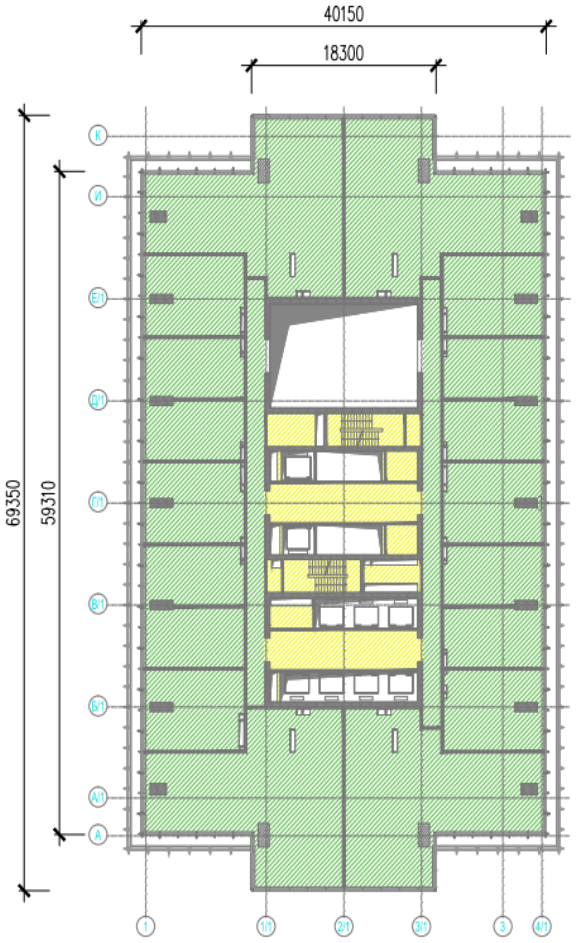
T1- Office Lowrise Typical Floor Plan



LEGEND

- OFFICE 2194,99 m²
- CORE 590,57 m² (thickness 700mm)

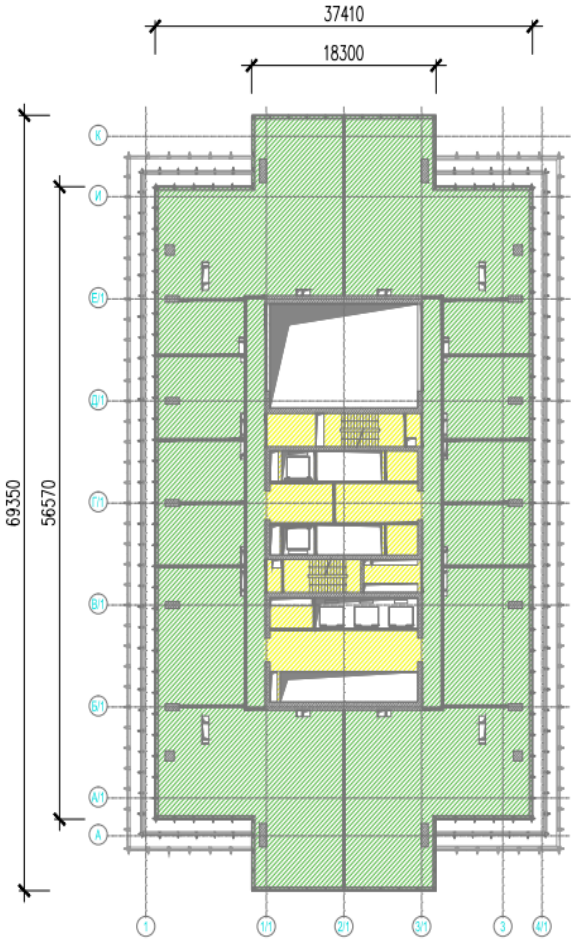
T1- Apartment Midrise Typical Floor Plan



LEGEND

- APARTMENT 1980,94 m²
- CORE 575,92 m² (thickness 500mm)

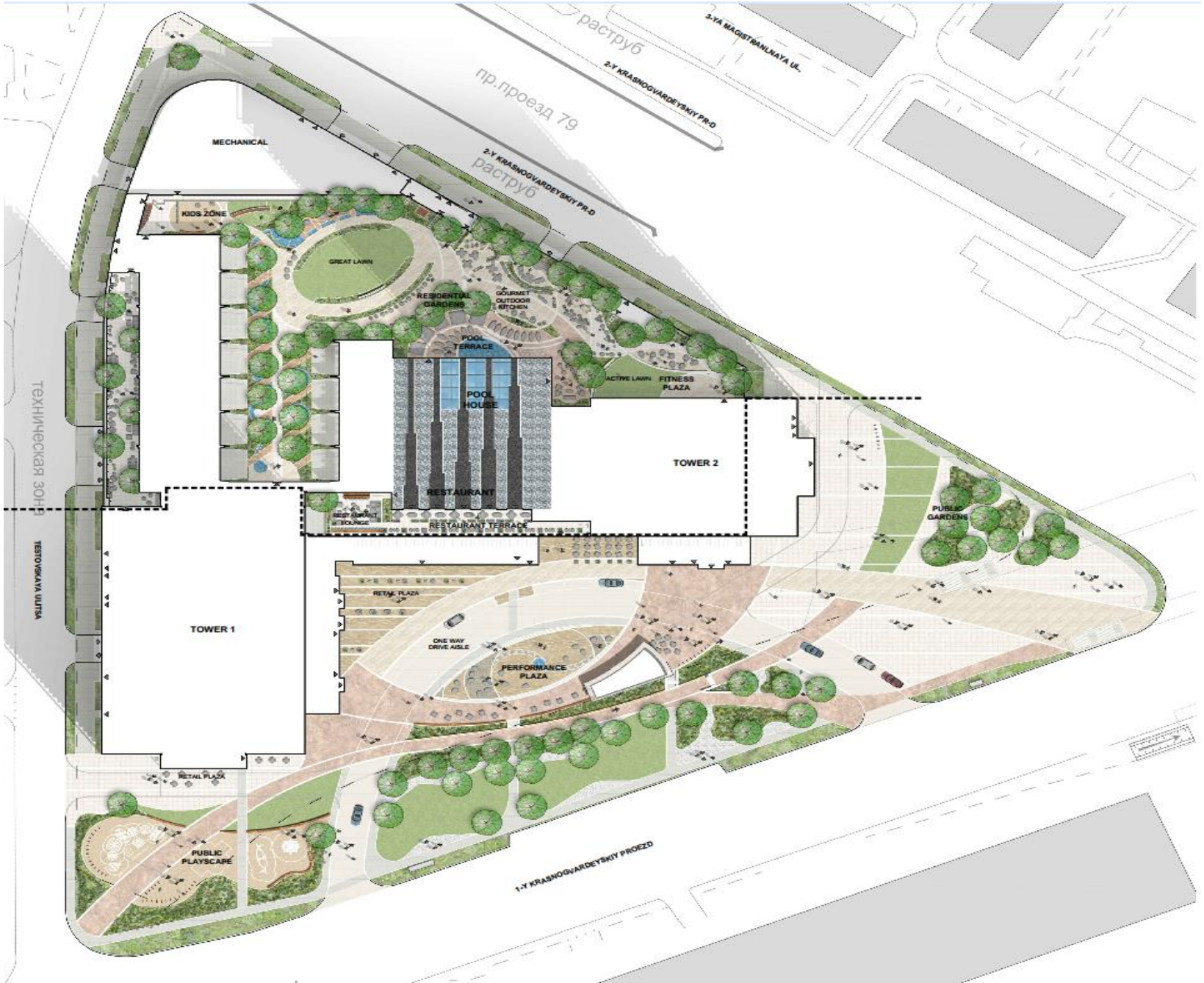
T1- Apartment Highrise Typical Floor Plan



LEGEND

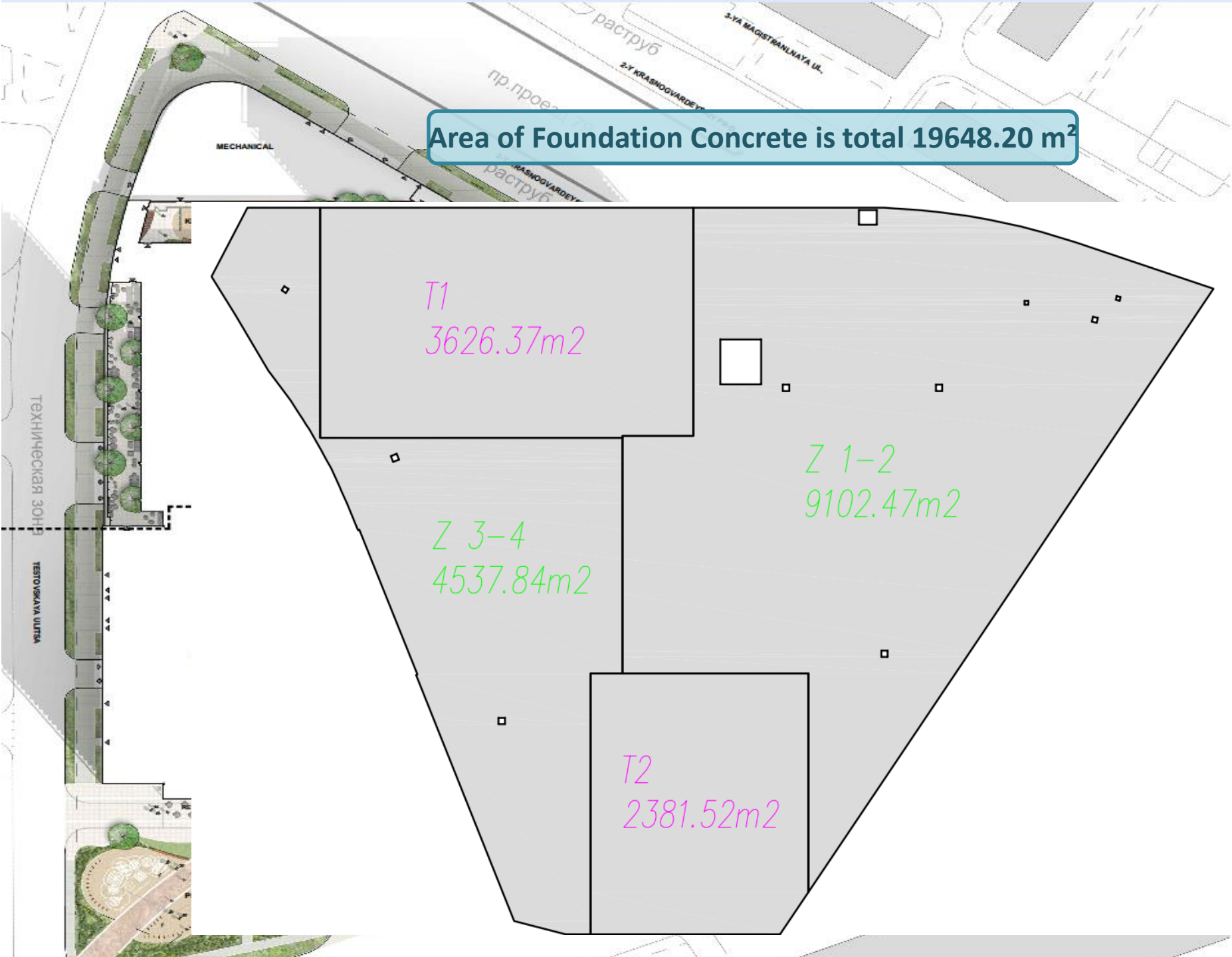
- APARTMENT 1761,78 m²
- CORE 580,62 m² (thickness 500mm)

Landscape Concept Design Plan



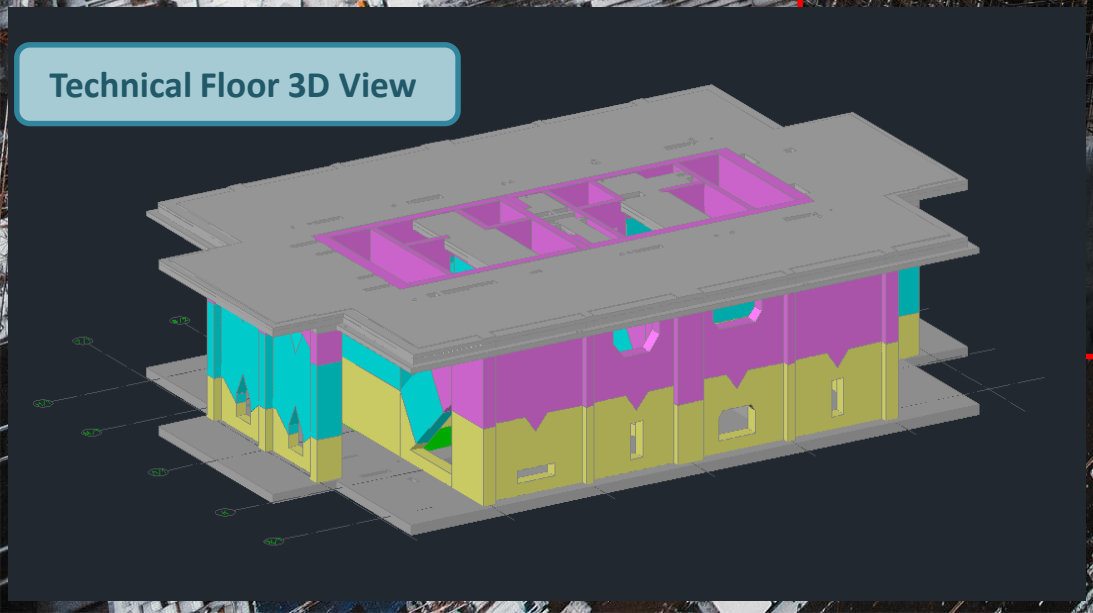
+16.80 Level – Mood Render

+16.80 Level – Mood Render


Area of Foundation Concrete is total 19648.20 m²
T1
3626.37m2
Z 1–2
9102.47m2
Z 3–4
4537.84m2
T2
2381.52m2
MECHANICAL
2-YA MAGISTRAANLNAYA UL.
2-Y KRASNOGVARDEYSKAYA UL.
раструб
пр.проезд
Техническая зона
TESTOVSKAYA ULITSA

Technical floors (total 4 floors) are the most complicated reinforced concrete parts of the towers.

Technical Floor 3D View



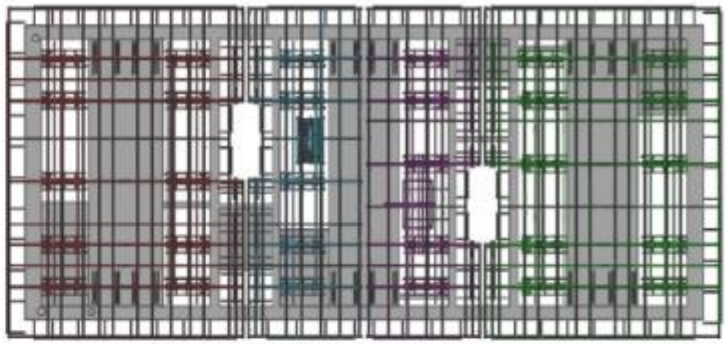
Technical Floor Outrigger Beams Concrete Works

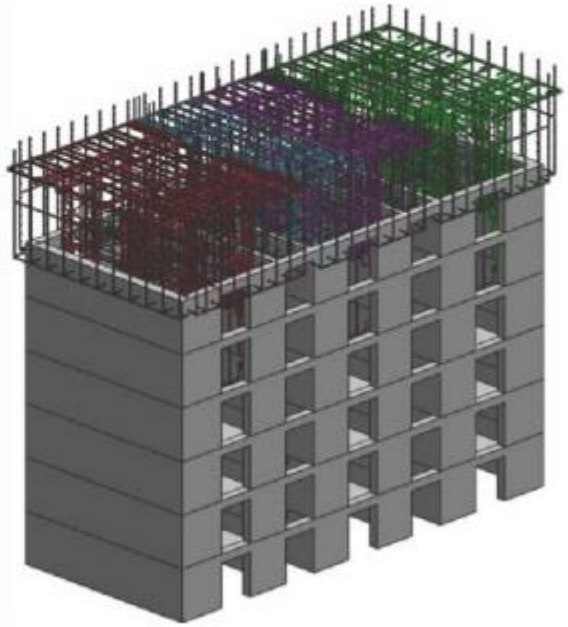
Formworks of Slab (Skydeck – PERI)

Southwest View

Core Formwork System

Hydraulic Climbing Platforms





Re	
Cr (R	
Pr	
Reduces number of workers	80% of the system reusable at another project
Reduces construction period	

FACADE TYPE 2
(TOWER TOP)

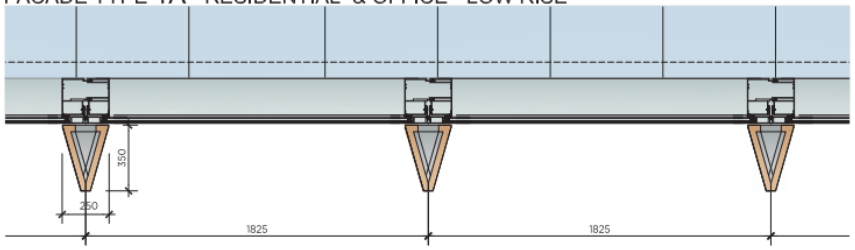
FACAD

TYPE 1D

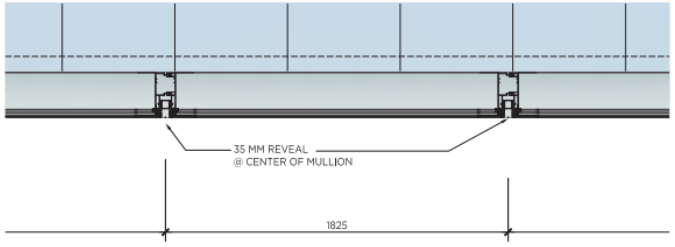
TYPE 2
TOP)

FACAD

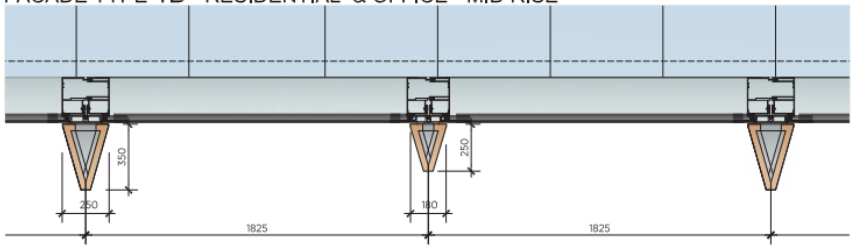
FACADE TYPE 1A - RESIDENTIAL & OFFICE - LOW RISE



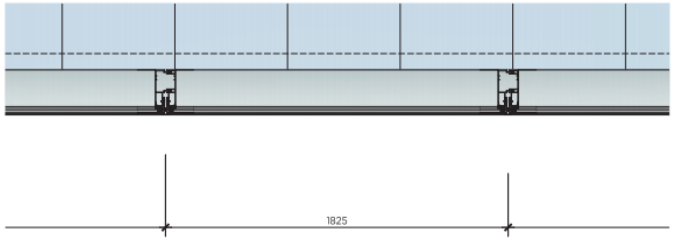
FACADE TYPE1D - RESIDENTIAL-TOP - SOUTH&NORTH FACADES



FACADE TYPE 1B - RESIDENTIAL & OFFICE - MID RISE



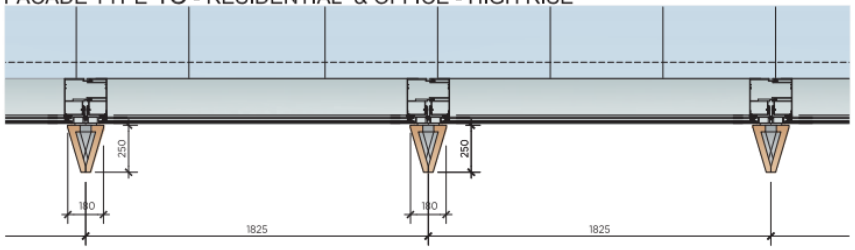
FACADE TYPE 2 - RESIDENTIAL&OFFICE - WINDOW DETAIL - NOSE



TYPE 1C

FACAD

FACADE TYPE 1C - RESIDENTIAL & OFFICE - HIGH RISE



FACADE - MAIN MATERIAL COLOR PALETTE

CAST STONE - GFRC

ALUMINUM - BRONZE

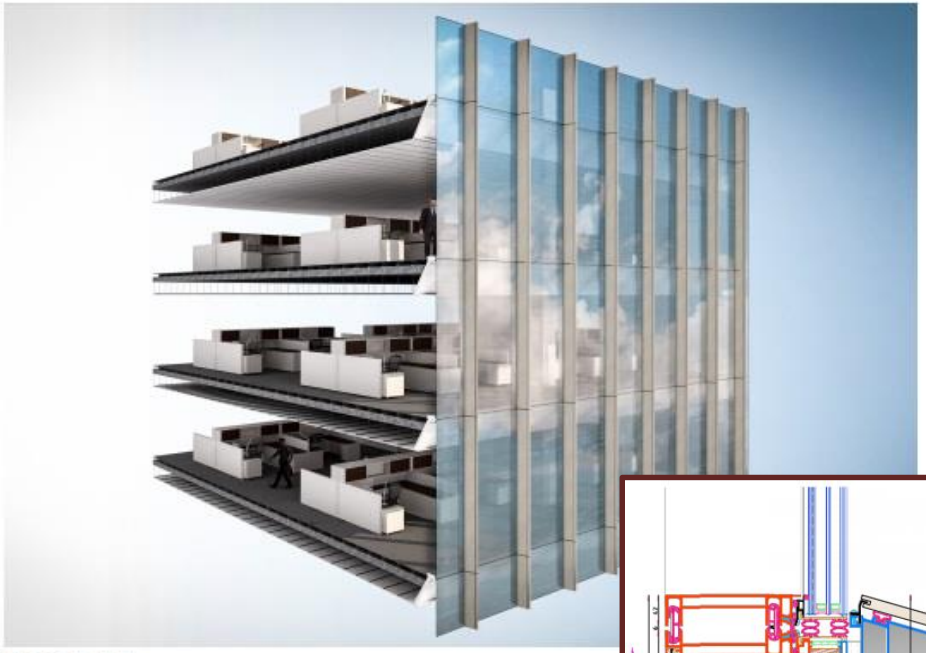
ALUMINUM - BRONZE

TYPE 2
NOSE)

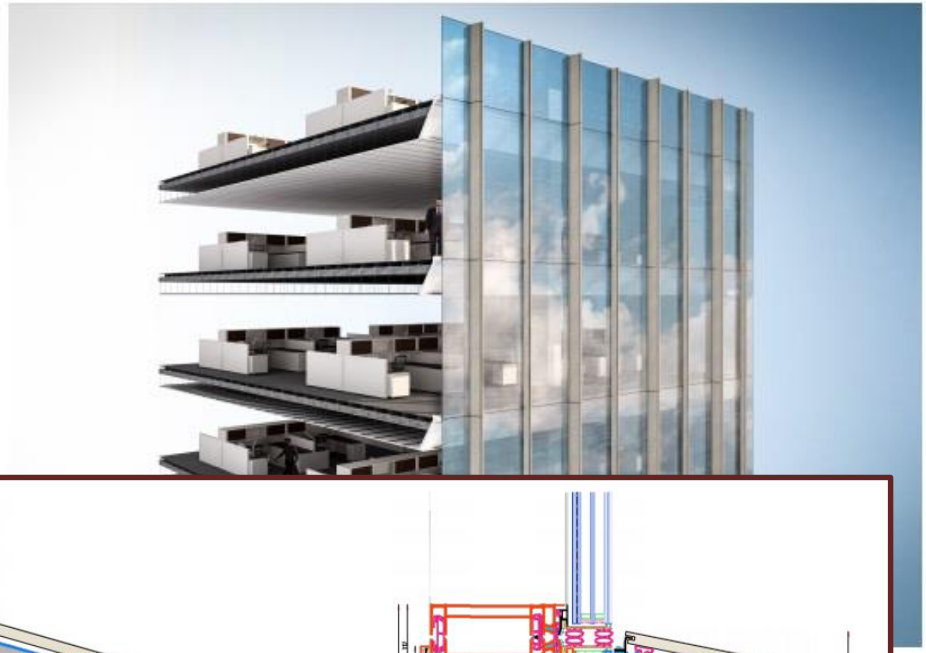
FACAD

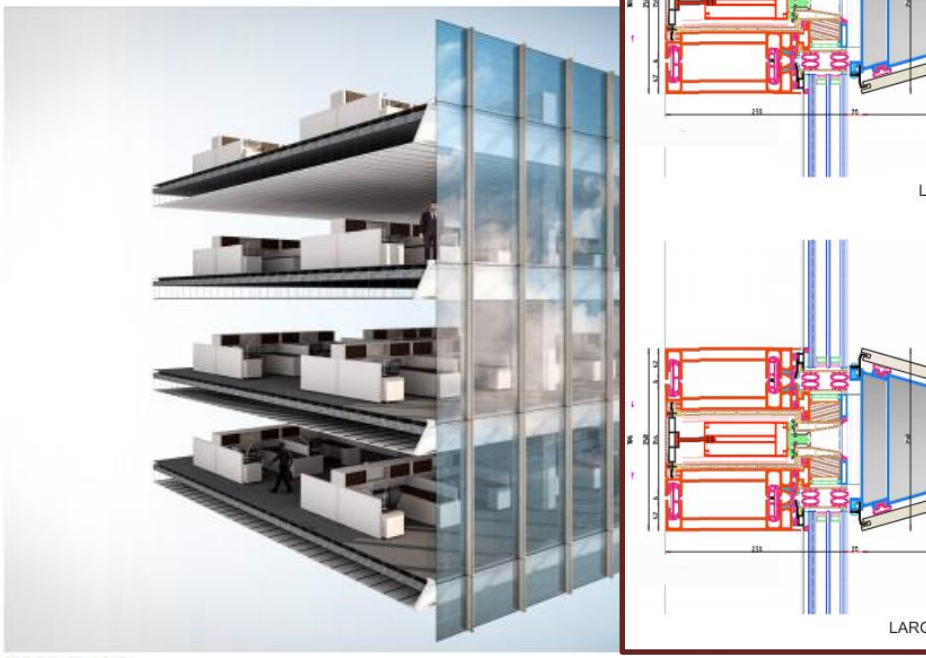
FACADE TYPE 2
(TOWER NOSE)

FACADE TYPE 3

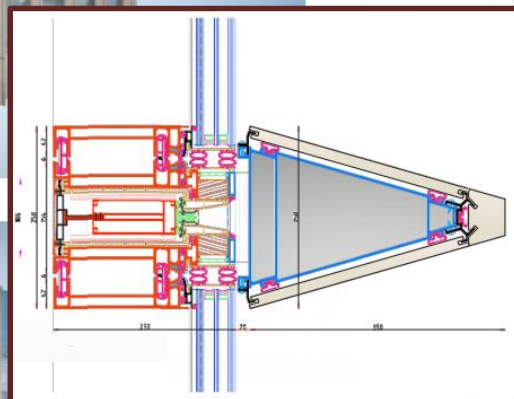


TYPE 1A

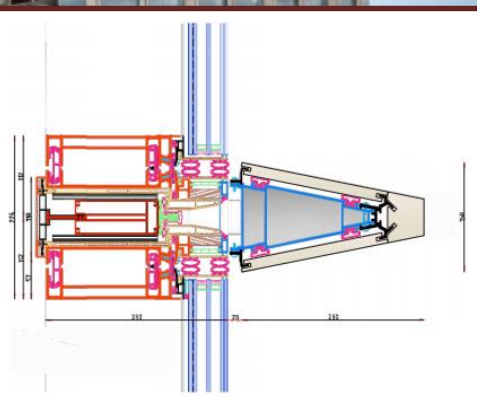




TYPE 1C

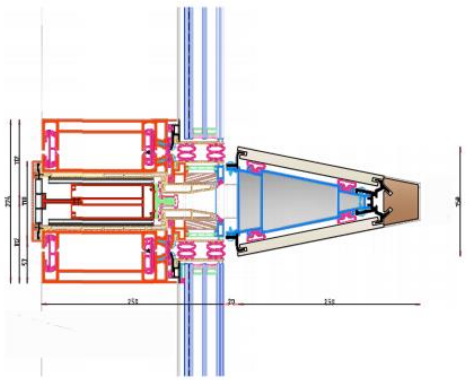


LARGE FIN WITH STONE NOSE



SMALL FIN WITH STONE NOSE

LARGE FIN WITH ALUMINUM NOSE



SMALL FIN WITH ALUMINUM NOSE

TYPE 1D

Facade Inspection and Testing

Facade Inspection and Testing is implemented by FACADE TESTING INSTITUTE, and all test results are observed and consulted by PRIEDMANN

Façade Testing Institute

priedemann facade experts

TESTS

Curtain Wall Test Sequence :

Air Permeability - EN 12153

Water Penetration Under Static Pressure - EN 12155

Structural Performance Under Design Load - EN 12179

Water Penetration Under Dynamic Pressure – EN 13050

Structural Performance Under Extreme Design Load – EN 12179

Acoustic Test - EN ISO 10848-2 and EN ISO 10140-2

Impact Resistance Test Method - EN 14019

TYPE 1C

RENAISSANCE

Facade Inspection and Testing

Façade Testing Institute

TURKISH ACCREDITATION AGENCY

COPY OF THE ACCREDITATION CERTIFICATE

As a Testing Laboratory,

FTI Fasad Teknoloji Merkezi A. Ş.

Çakıl Mah. Şehit Teğmen Tamer Aydın Sok.No:76/A 34540 Çatalca
34540 ISTANBUL / TURKEY

is accredited in accordance with TS EN ISO/IEC 17025:2012 standard within the scope given in Annex following the assessment conducted by **TURKAK**.

Accreditation Number : **AB-0531-T**

Accreditation Date : **04 July 2012**

Revision Date / Number : **28 December 2016 / 05**

This certificate shall remain in force until **07 November 2020**, subject to continuing compliance with the standard **TS EN ISO/IEC 17025:2012**, related regulations and requirements.

Dr. H. İbrahim ÇETİN
Secretary General

Turkish Accreditation Agency (TURKAK) is a signatory to the European co-operation for Accreditation (EA) Multilateral Agreement (MLA) and International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Agreement (MRA) in the scope of ISO/IEC 17025.

Certificate of membership

This is to certify that

FTI Fasad Teknoloji Merkezi A.S.

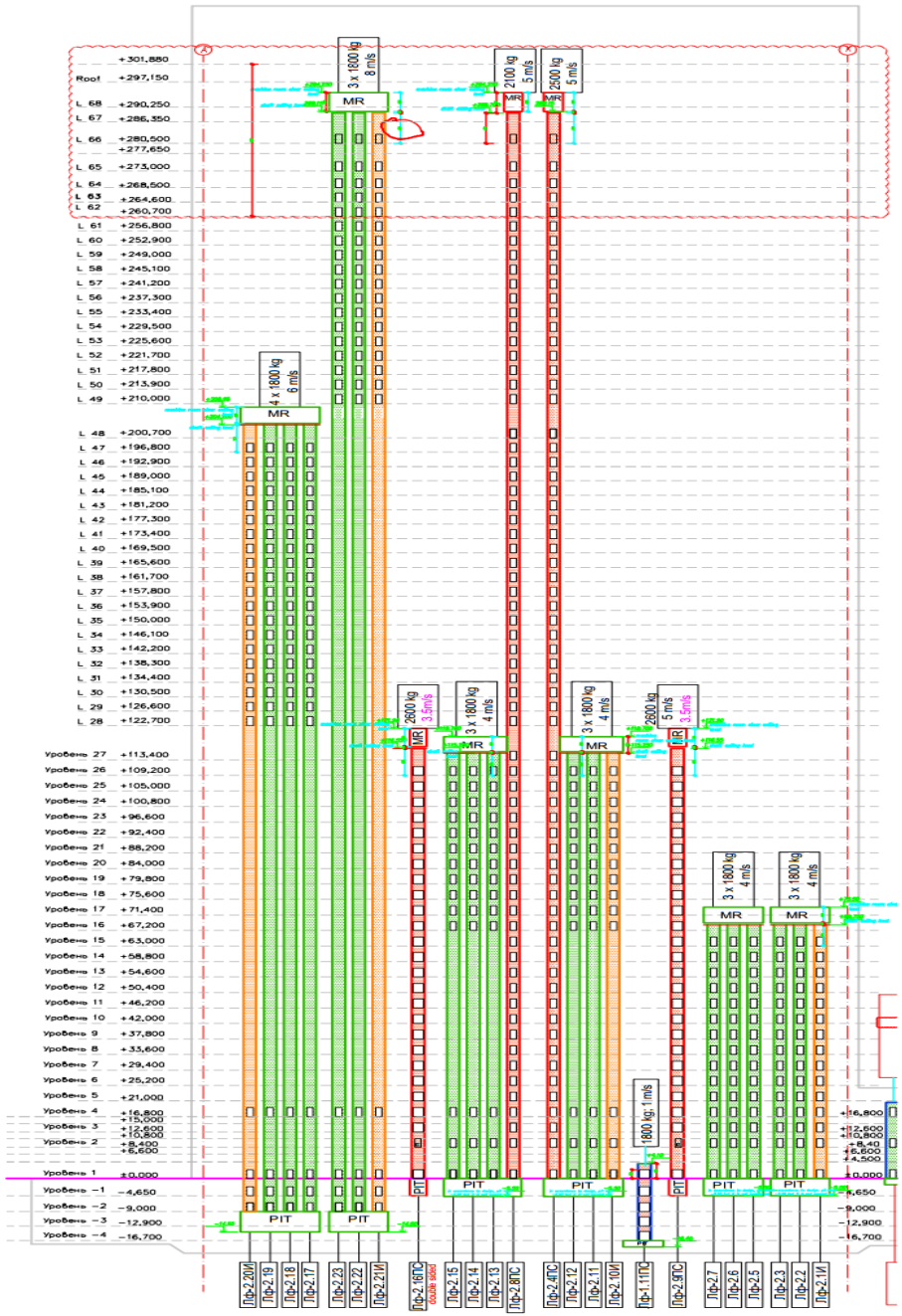
is a subscribing member of the
Centre for Window and Cladding Technology

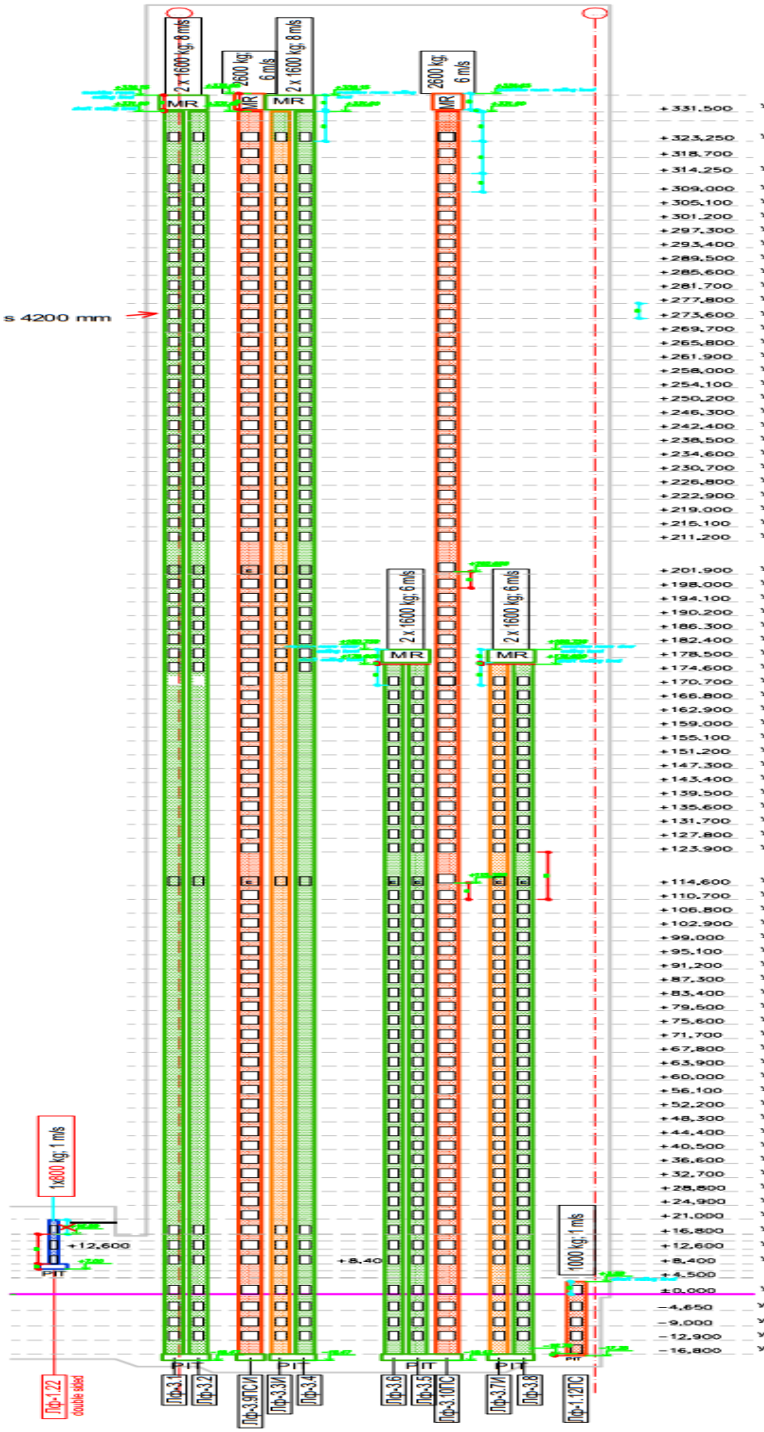
1 April 2013 to 31 December 2018

Director

CENTRE FOR WINDOW AND CLADDING TECHNOLOGY

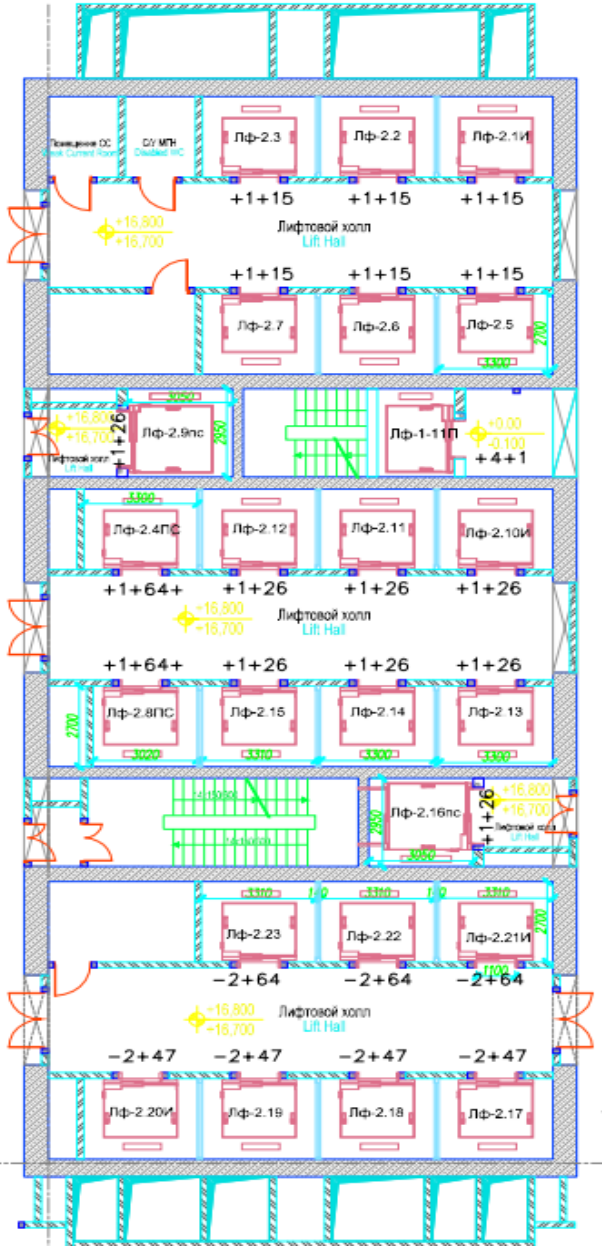
Tower 2 – Tower 1 Lift Plan





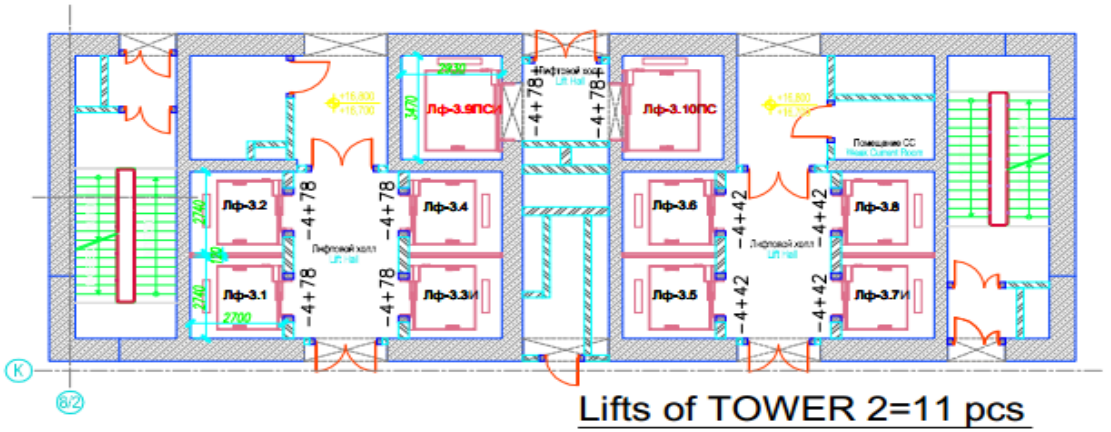
Tower 2 – Tower 1 Lift Positions

LIFTS OF TOWER 1
Plan +16.80



Lifts of TOWER 1= 24 pcs
Firefighting lifts = 4 pcs
Disabled lifts = 4 pcs

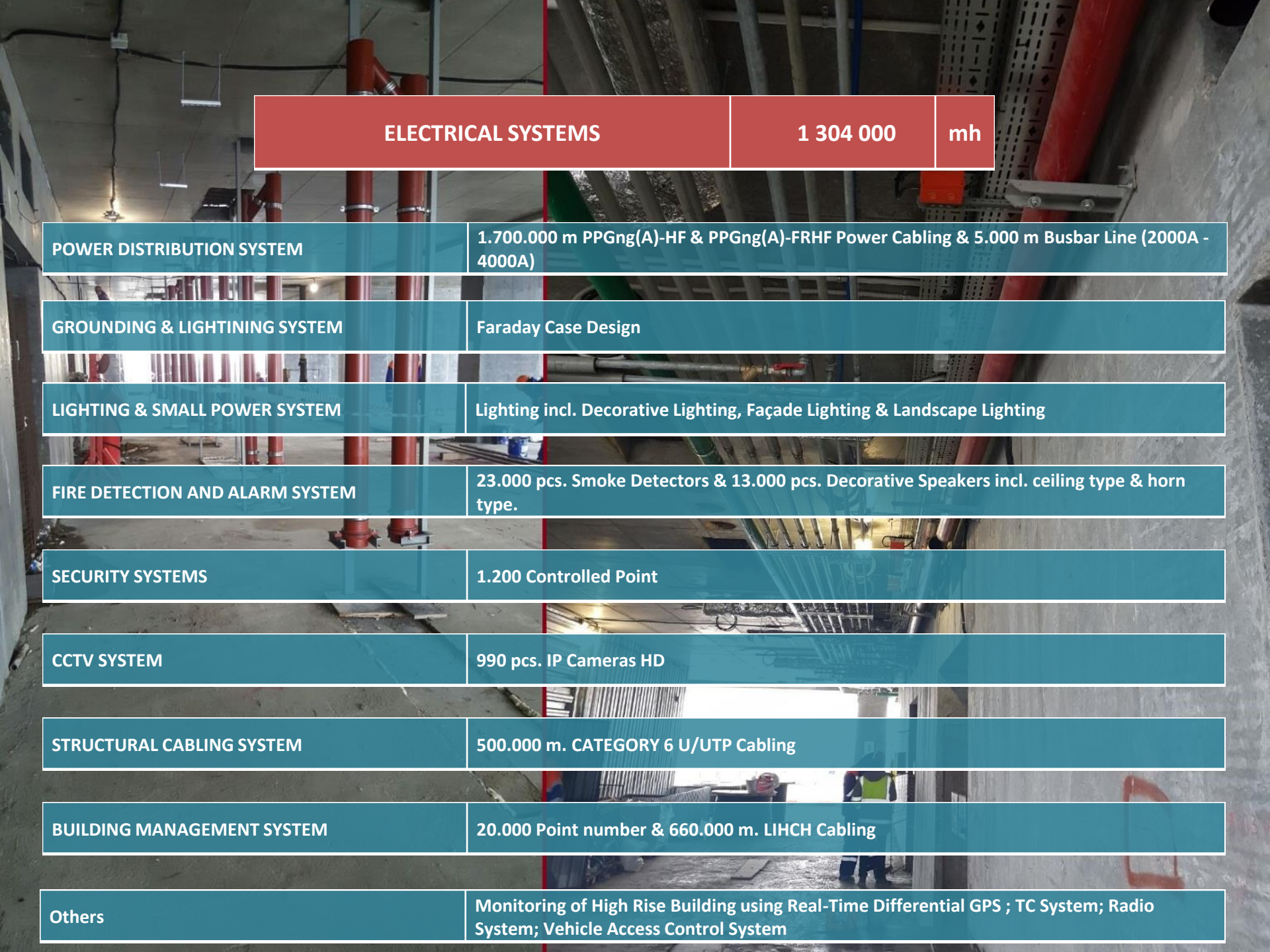
LIFTS OF TOWER 2
Plan +16.80



Lifts of TOWER 2=11 pcs
Firefighting lifts = 3 pcs
Disabled lifts = 2 pcs

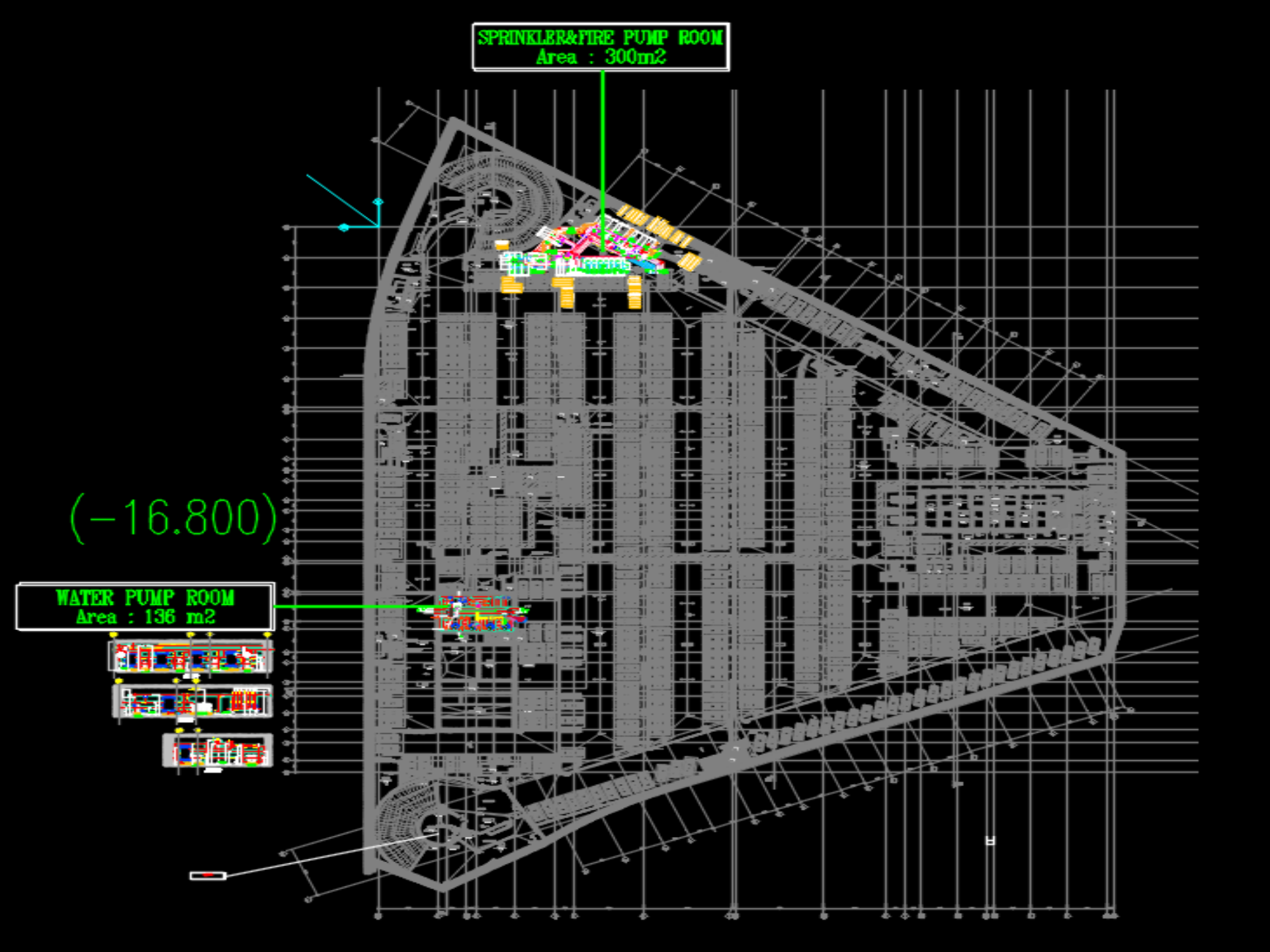
MECHANICAL SYSTEMS	3 265 000	mh

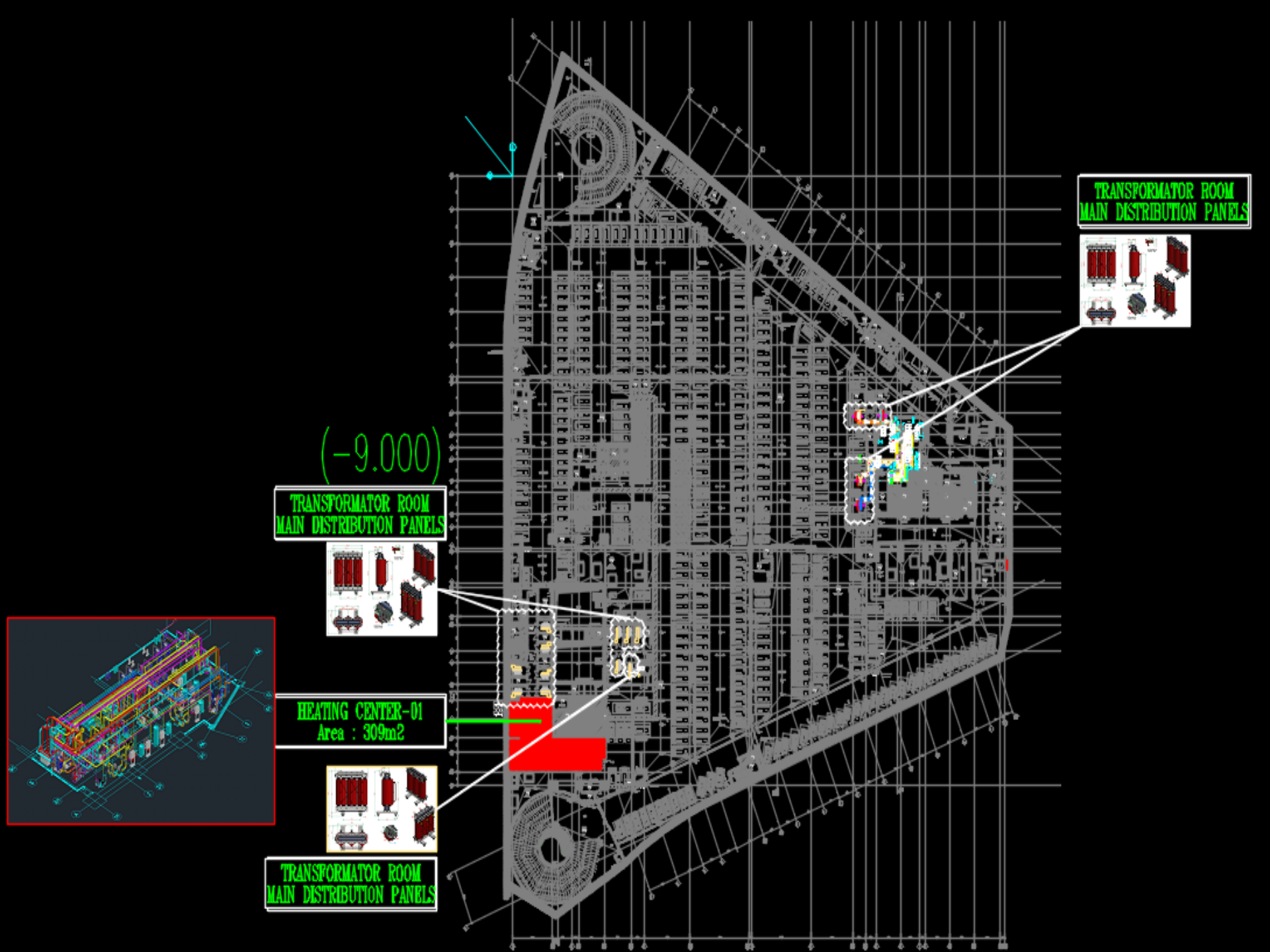
FIRE FIGHTING SYSTEM (SPRINKLER AND FIRE HOSE CABINETS	62.000 pcs. Sprinkler nozzle including Pendent & Upright & Concealed type sprinklers & 1.270 pcs. Decorative Type Fire Hose Cabinets
PLUMBING SYSTEM (DOMESTIC WATER SUPPLY AND DRAINAGE)	110.000 m. Galvanized Steel Pipe for Plumbing System Lines & 55.000 m Cast Iron Pipe for Sewage System Lines
CENTRAL HEATING HOT WATER SYSTEM	Central Heating Capacity = 43.18 Gcal/h (with 4 sub-heating systems)
CENTRAL COOLING CHILLED WATER SYSTEM	Cooling Capacity = 16 mW; Free Cooling Capacity 9 mW at -5 °C. (4 pcs. x 3.375 kW Centrifugal Chillers, 2 pcs. x 1.250 kW Screw Chillers, 6 pcs. x Closed Cooling Towers, 2 pcs. x 0,45 mW Dry Coolers for Server Free Cooling)
VENTILATION SYSTEM	Fresh Air = 1.600.000 m3/h & Exhaust Air (incl. Kitchen Hoods) = 2.700.000 m3/h



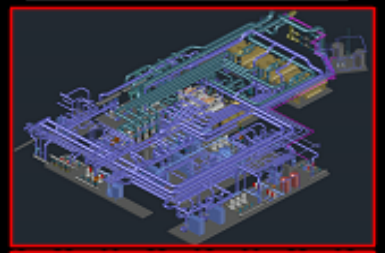
ELECTRICAL SYSTEMS	1 304 000	mh

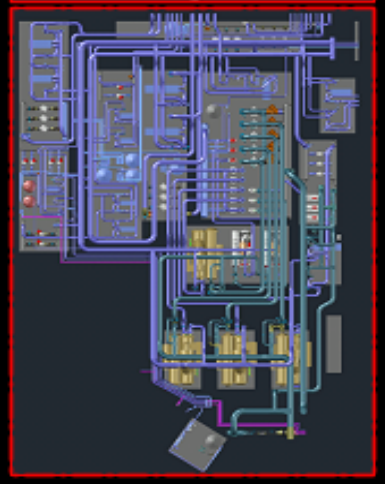
POWER DISTRIBUTION SYSTEM	1.700.000 m PPGng(A)-HF & PPGng(A)-FRHF Power Cabling & 5.000 m Busbar Line (2000A - 4000A)
GROUNDING & LIGHTINING SYSTEM	Faraday Case Design
LIGHTING & SMALL POWER SYSTEM	Lighting incl. Decorative Lighting, Façade Lighting & Landscape Lighting
FIRE DETECTION AND ALARM SYSTEM	23.000 pcs. Smoke Detectors & 13.000 pcs. Decorative Speakers incl. ceiling type & horn type.
SECURITY SYSTEMS	1.200 Controlled Point
CCTV SYSTEM	990 pcs. IP Cameras HD
STRUCTURAL CABLING SYSTEM	500.000 m. CATEGORY 6 U/UTP Cabling
BUILDING MANAGEMENT SYSTEM	20.000 Point number & 660.000 m. LIHCH Cabling
Others	Monitoring of High Rise Building using Real-Time Differential GPS ; TC System; Radio System; Vehicle Access Control System


SPRINKLER&FIRE PUMP ROOM
Area : 300m2
(-16.800)
WATER PUMP ROOM
Area : 136 m2


(-9.000)
TRANSFORMATOR ROOM
MAIN DISTRIBUTION PANELS
TRANSFORMATOR ROOM
MAIN DISTRIBUTION PANELS
HEATING CENTER-01
Area : 309m2
TRANSFORMATOR ROOM
MAIN DISTRIBUTION PANELS

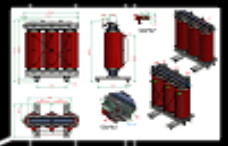
COOLING CENTER
Area 1046m2

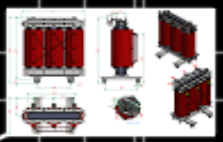


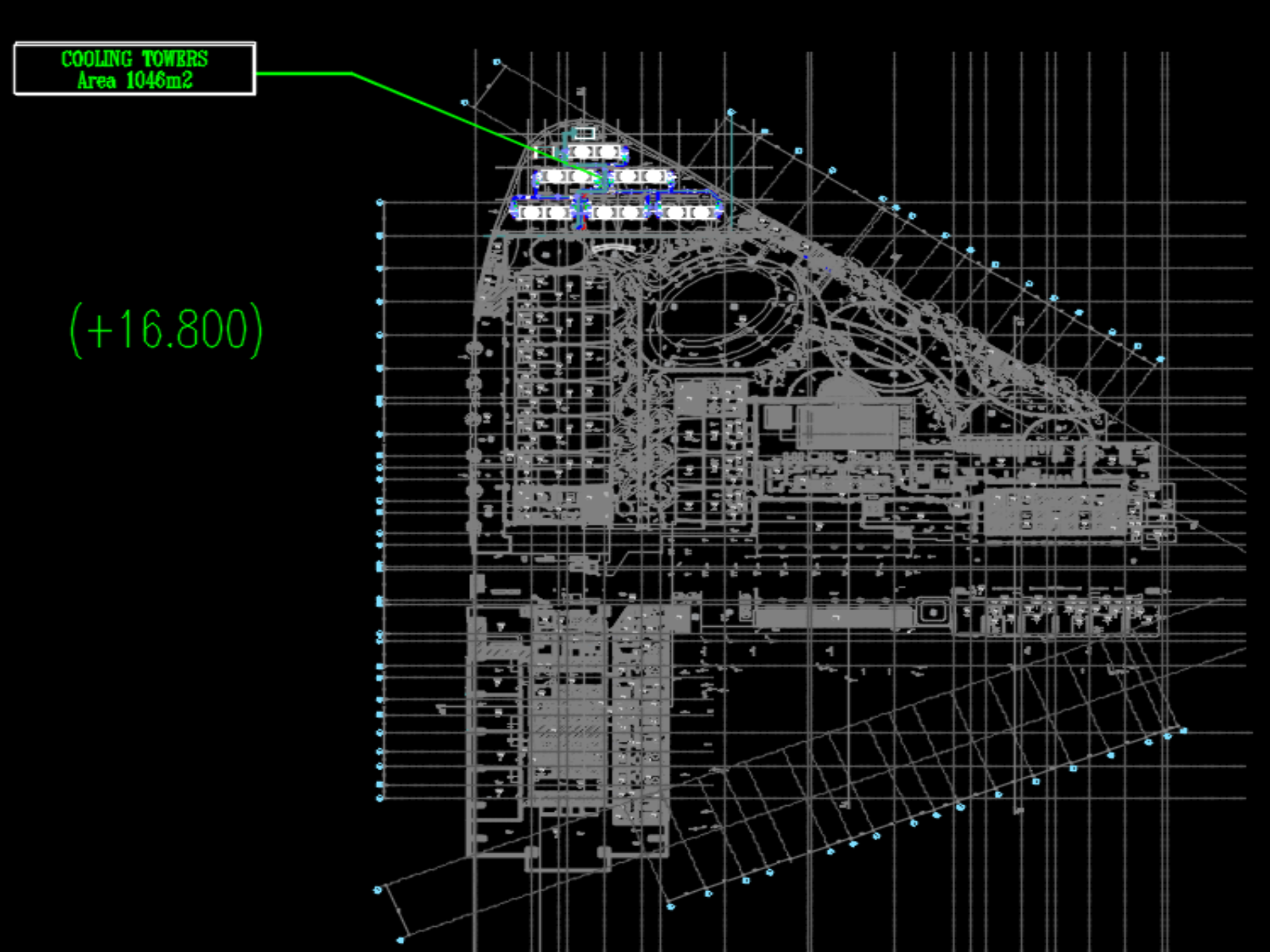


(0.000)

TRANSFORMATOR ROOM
MAIN DISTRIBUTION PANELS






COOLING TOWERS
Area 1046m2
(+16.800)

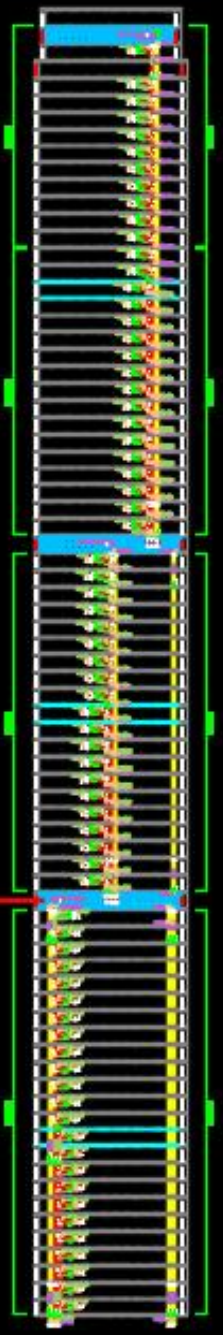
29.TECNICAL FLOOR

MAIN DISTRIBUTION PANELS

FIRE PUMPS ROOM

HEATING CENTER-02.1

CENTRAL CORE



VENTILATION ROOMS

WATER PUMPS ROOM

Renaissance Mixed-Use Development

Moscow City, Moscow, Russia

Detailed Stack Effect Study – Draft Report

RWDI # 1202156
December 17, 2015

SUBMITTED TO

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1. Introduction

This report presents the results of a stack effect study for the proposed Towers 1 and 2 (T1 and T2) of the Renaissance Mixed-Use Development. The stack effect study is conducted based on the architectural drawing set "MOSCOW CITY P17-18/20150910_TORWDI" and "46500-Tower2-Mech.Rooms and Roof" received by RWDI on September 14 and September 29, 2015 respectively.

2. Background

Stack Effect

Stack effect is a phenomenon that can exist in all buildings and is induced by the buoyancy force originated from indoor-outdoor temperature differences. A conceptual image illustrating typical impacts of stack effect during heating seasons, which is commonly referred to as *normal* stack effect, is shown in Figure 1. During cooling seasons, *reverse* stack effect occurs and the directions of airflows are the reverse of that shown in Figure 1.

In case of either normal or reversed stack effect, the indoor-outdoor temperature difference results in uncontrolled airflows and pressure differences across building elements (such as doors, windows, and the building envelope), which can potentially cause problems within a building. These problems range from nuisance conditions such as whistling and malfunctioning elevator doors or internal drafts, to more dangerous conditions such as slamming doors and reduced access to emergency egress paths. These stack effect induced problems are most severe on very cold or very hot days when the difference between indoor and outdoor temperatures is the greatest.

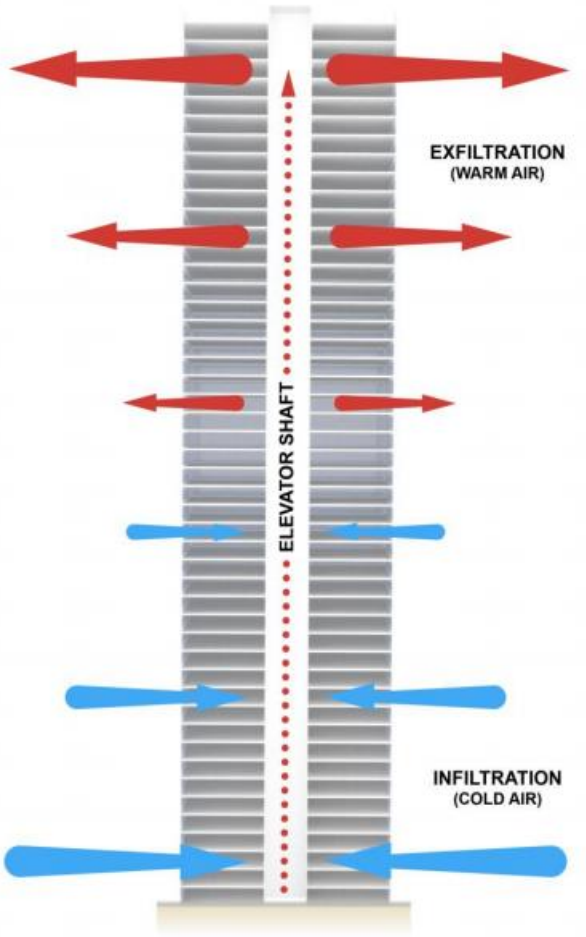


Figure 1: Conceptual image of normal (winter) stack effect airflows in a building.

3. Analysis

3.1 Stack Effect Model

In order to investigate the pressures and flow rates induced by stack effect, RWDI developed a detailed numerical model of each tower separately. Each floor is modeled as a series of nodes representing spaces within the buildings, joined by resistance to airflow across building elements (i.e., building envelope, interior partitions, vestibule doors and elevator/stairwell shaft doors). The assumed leakage rates for different building elements are listed in Appendix A.

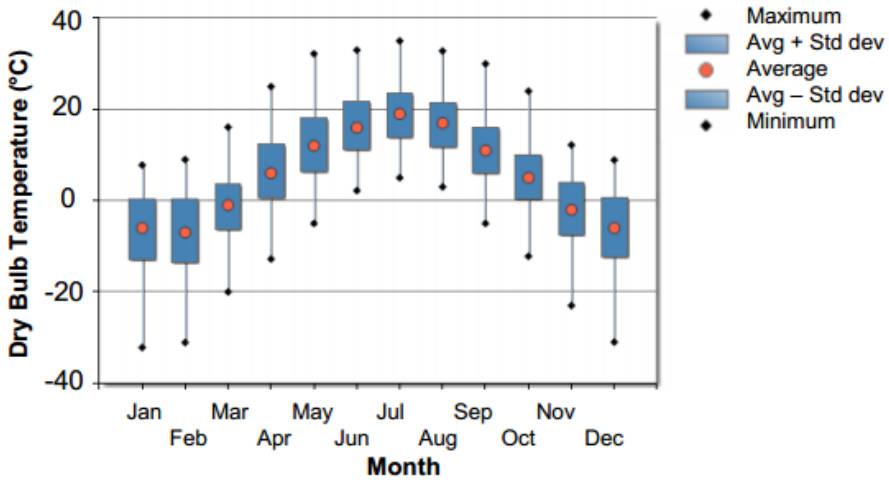


Figure 2: Typical Annual Dry Bulb Temperature Distribution in Moscow, Russia (Vnukovo International Airport)

3.2 Temperature

The annual outdoor temperature profile for Moscow is presented in Figure 2. The range of outdoor temperatures typically experienced throughout the year can lead to both normal (winter) and reverse (summer) stack effect conditions. Winter temperatures give a higher indoor/outdoor temperature difference than in summer, and therefore stronger stack effect. Both winter and summer temperatures were considered in this study.

The indoor and outdoor temperatures used are based on the design specifications "150914 MCP 17-18 Stack Effect Request.docx" received September 14, 2015.

Winter Temperature

Outdoor Temperature = -28.0 °C

T1 Indoor Temperature = 20.0 °C

T2 Indoor Temperature = 24.0 °C

This case gives an indoor/outdoor temperature difference of 48.0 °C for T1 and 52.0 °C for T2.

Note that the outdoor temperature provided for winter represents a very extreme temperature. Based on ASHRAE climate data for Moscow, an outdoor dry bulb temperature of -28.0 °C is between the 5-year and 10-year return period value of extreme cold temperature.

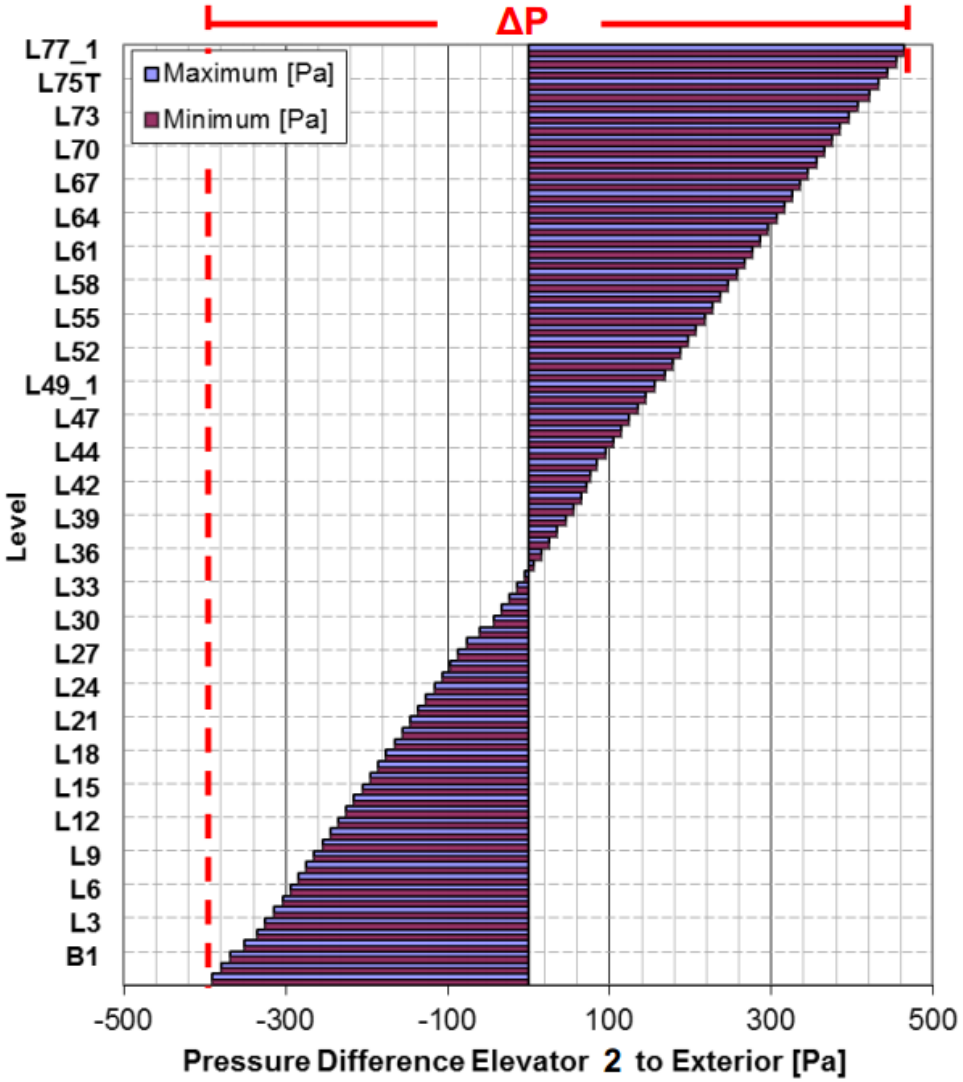


Figure 13: Pressure difference between Elevator 2 and the exterior during winter, calm wind – T2 Case 1

Tower 2 Pressure Differences

Case 1: Extreme winter temperature (-28.0 °C), calm wind

- Figure 13 shows the pressure difference between the Elevator 2 shaft and exterior space on a very cold day in Moscow.
- In this case, ΔP is approximately 850 Pa on a very cold day. In comparison with T1 Case 1 (Figure 3), the pressure difference in T2 is higher due to the larger height of the tower and the higher temperature difference between the interior and the exterior in comparison to T1.
- The peak positive pressure difference is 460 Pa on L77_1, and the peak negative pressure difference is -390 Pa on B3.

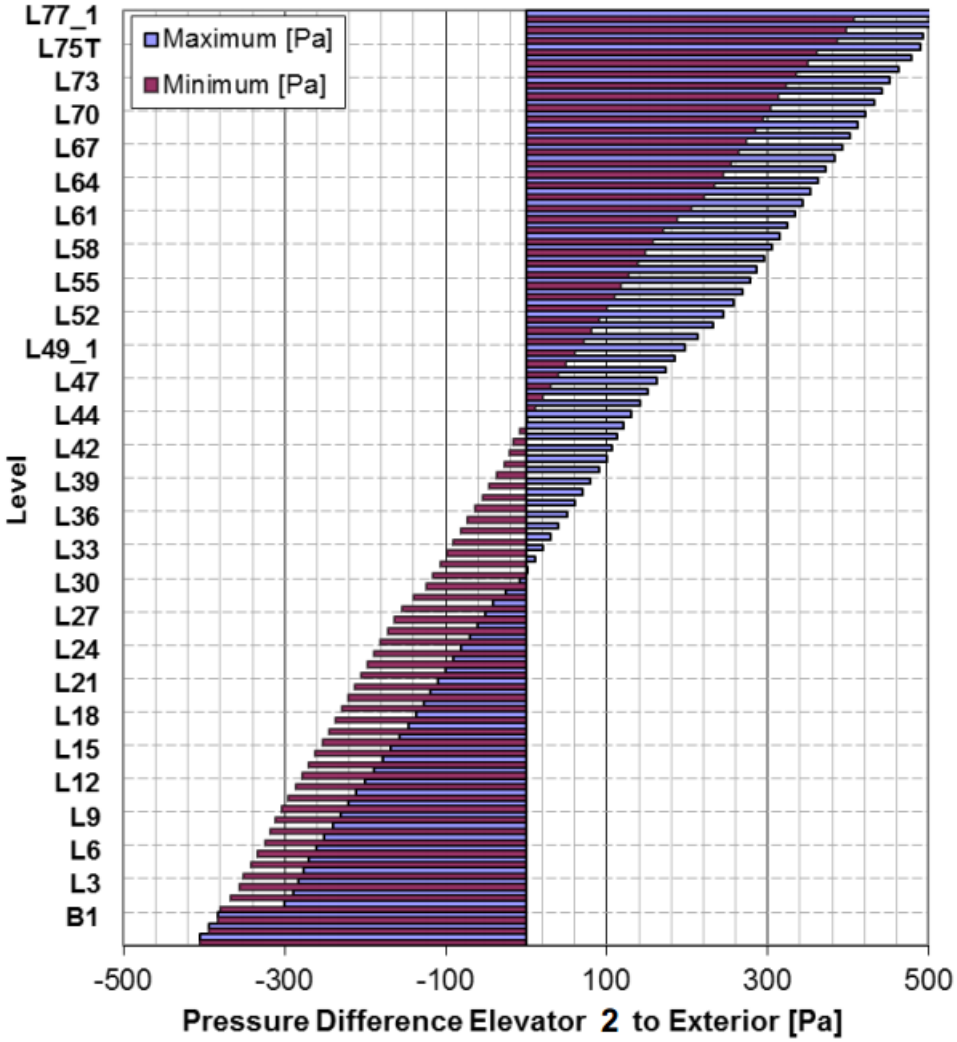


Figure 14: Pressure difference between Elevator 2 and the exterior during winter, 29 km/hr Southwest wind – T2 Case 2

Tower 2 Pressure Differences

Case 2: Extreme winter temperature (-28.0 °C), 29 km/hr Southwest wind

- Figure 14 shows the pressure difference between the Elevator 2 shaft and the exterior space on an extremely cold and windy day in Moscow.
- Similar to T1 Case 2, the introduction of wind results in a non-uniform pressure distribution around the building. Wind applies a positive pressure to the windward sides of the building and a negative pressure to the leeward sides, resulting in a difference between the maximum and minimum pressures on each floor.
- The peak shaft-to-exterior pressure difference on B3 and L77_1 is approximately -410 and 510 Pa respectively.

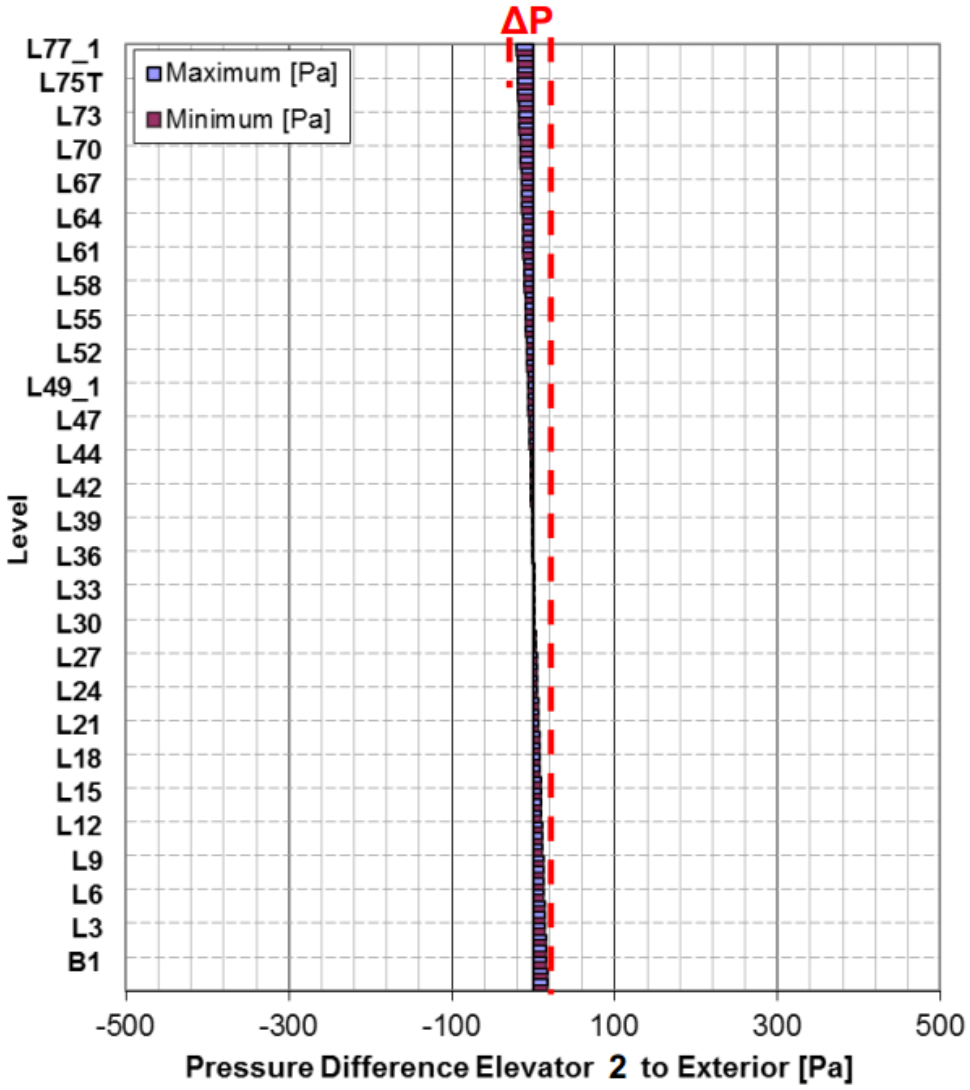


Figure 15: Pressure difference between Elevator 2 and the exterior during summer, calm wind – T2 Case 3

Tower 2 Pressure Differences

Case 3: Extreme summer temperature (28.0 °C), calm wind

- Figure 15 shows the level-by-level pressure difference between the Elevator 2 shaft and the exterior space on a very hot day in Moscow.
- Due to the smaller interior-to-exterior temperature difference, the pressure differences are less than that shown in the winter cases.
- The peak positive pressure difference is 20 Pa on B3, and the peak negative pressure difference is -20 Pa on L77_1.
- In this case, ΔP is approximately 40 Pa. This is slightly lower than the ΔP for T1 Case 3 (50 Pa) due to the warmer interior temperature setpoint in T2. Since the pressure differences between the shaft and the exterior space are below 130 Pa, swing door operability issues are not likely to occur on hot days.

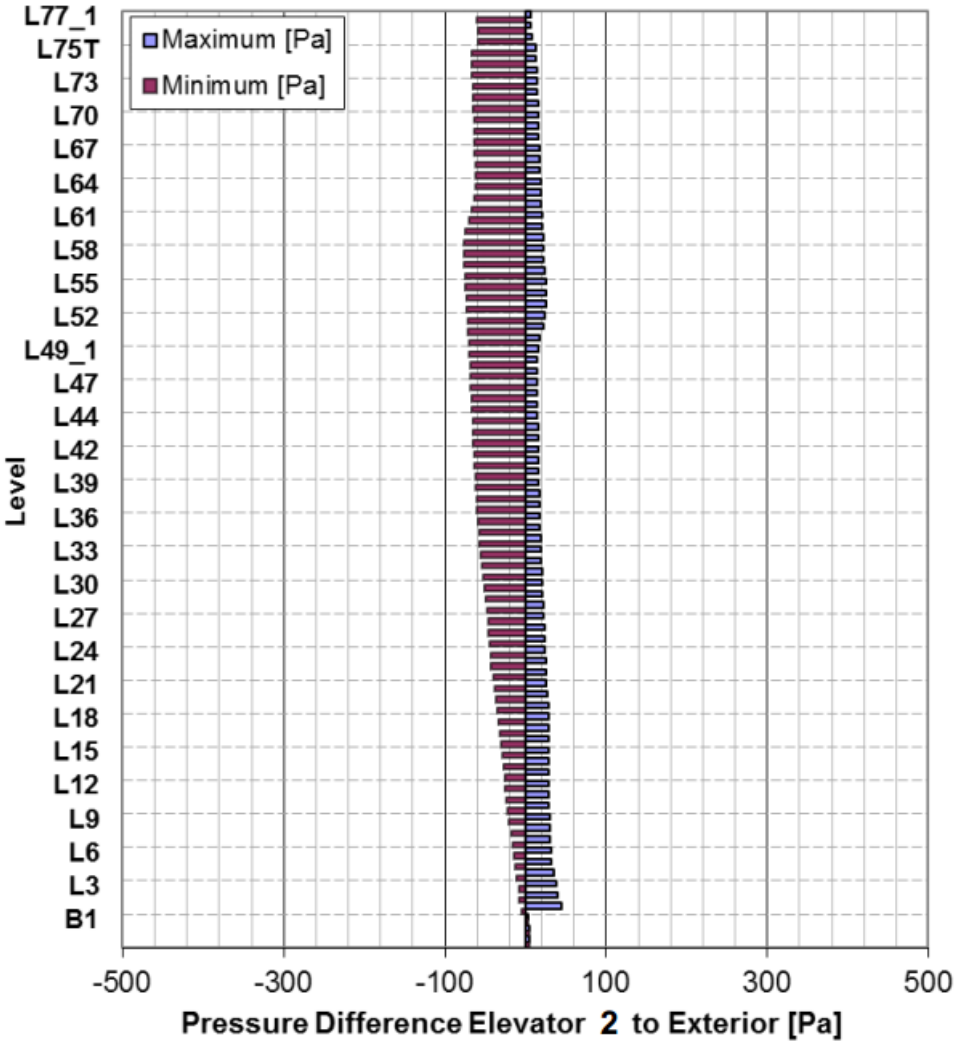


Figure 16: Pressure difference between Elevator 2 and the exterior during summer, 25 km/hr Southwest wind – T2 Case 4

Tower 2 Pressure Differences

Case 4: Extreme summer temperature (28.0 °C), 25 km/hr Southwest wind

- Figure 16 shows the pressure difference between the Elevator 2 shaft and the exterior space on a very hot and windy day in Moscow.
- Similar to T1 Case 4, many levels have both positive and negative pressure differences between the shaft and the exterior space as result of the low stack effect pressure difference and a combination of positive and negative wind pressures on different sides of the building.
- The peak shaft-to-exterior pressure difference occurs on L59 and is approximately -80 Pa.
- Since the pressure differences between the shaft and the exterior space are below 130 Pa, swing door operability issues are not likely to occur on hot windy days.

Examples of Areas Prone to Stack Effect Issues

Tower 2 L1 Pressure Differences, Extreme Cold Day (-28.0 °C)

- Figure 25 shows the pressure differences across the T2 entrance doors on L1 on a very cold day.
- Very high pressures of up to 350 Pa are expected on these doors. Door operability issues are anticipated for the swing doors, which will likely be very difficult to open.
- Adding vestibules around the exterior swing doors will help to reduce the pressures on these doors, although the doors will still exceed the pressure difference criterion (130 Pa).
- It will be important to select swing doors that can operate well under the high predicted pressures for the main entrance.
- The door pressures shown in Figure 25 can be reduced through the use of positive building pressurization. However, this will consequently increase the pressure difference across apartment and exterior swing doors on the upper levels.
- The revolving door manufacturer should be consulted to determine the maximum pressure that the doors can reliably operate under. Specifically, if the doors are collapsible ensure the settings can account for the range of stack effect pressures on the door.

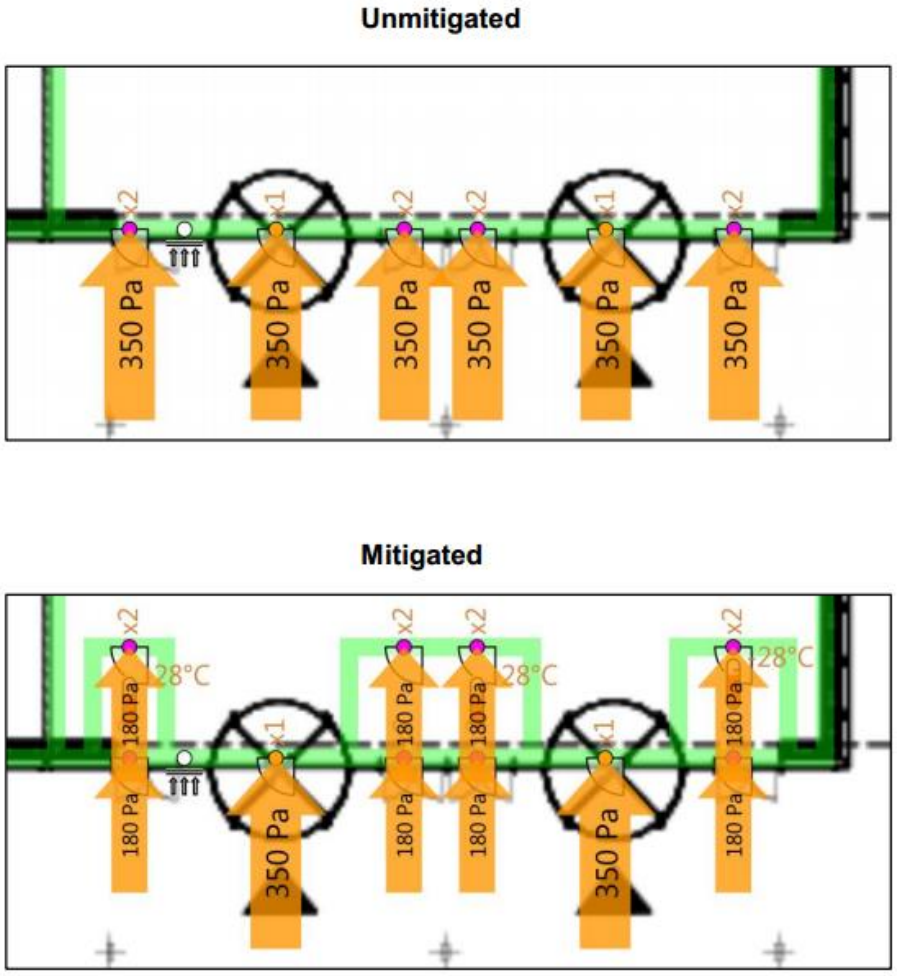


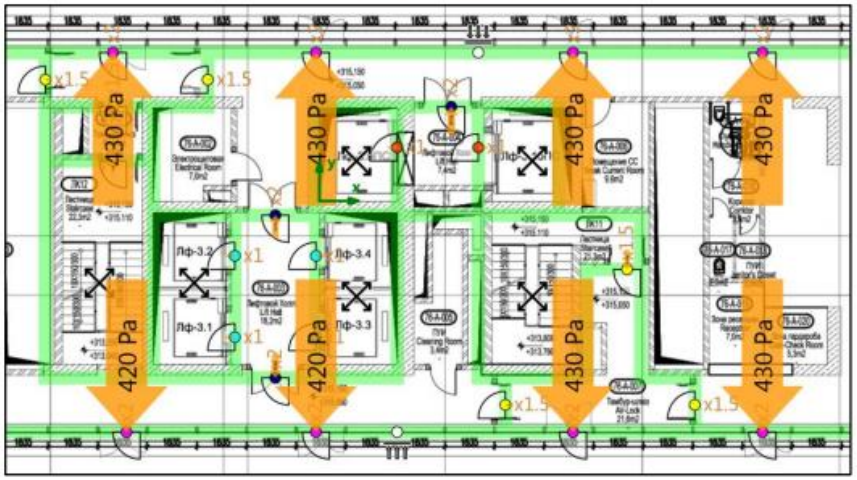
Figure 25: Pressure differences across main entrance doors on L1 – T2 Case 1: winter, calm wind – mitigated vs. unmitigated

Examples of Areas Prone to Stack Effect Issues

Tower 2 L76 Pressure Differences

- Figure 27 shows the pressure differences across the exterior swing doors on L76 on cold days with calm winds. Similar to T1, these doors are anticipated to have very high pressures.
- On an extremely cold day (-28.0 °C), these doors are expected to experience very high pressures of approximately 430 Pa. These pressures greatly exceed the door operability criterion of 130 Pa.
- Door operability issues are anticipated; doors that open outwards to the exterior will be very difficult to close or keep closed.
- On an average day in January (-6.5 °C – based on the average ASHRAE temperature at Vnukovo International Airport in January), the exterior doors are expected to experience pressures of up to 230 Pa, which still exceeds the door operability criterion.
- Adding vestibule doors for the roof access would improve door operability by distributing the pressure difference across two sets of doors. However, pressures would still exceed the operability limit on very cold days.
- Note that positively pressurizing the building would increase the pressures shown in Figure 27. Wind will also increase the pressure acting on some exterior doors on this level and decrease pressures on others depending on its direction.

Extremely Cold Winter Day (-28.0 °C)



Average Day in January (-6.5 °C)

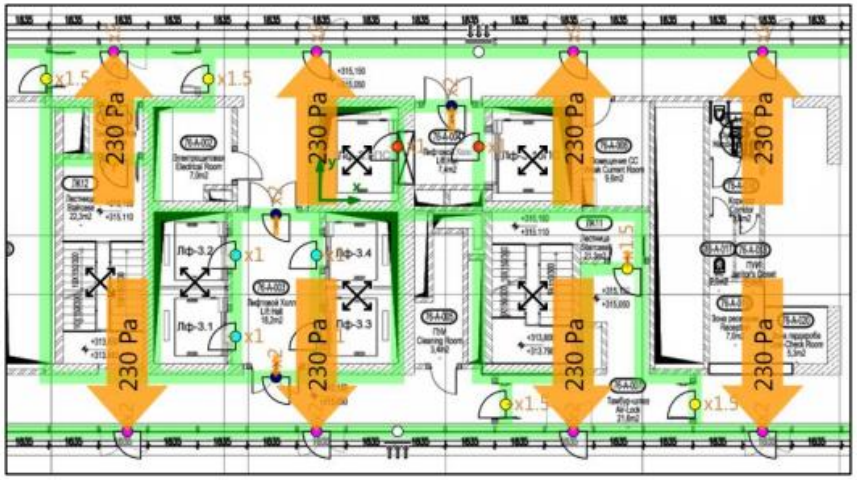


Figure 27: Pressure differences across exterior swing doors on L76 – T2 Case 1: winter, calm wind – extremely cold day vs. average January day

A – QUALITY ORGANIZATION

Company Quality Management

Handbooks

- Company Quality Management Organization Handbook
- Quality Control System Handbook

Procedures

- Internal Technical and System Audit
- Management of Non-conformities
- Corrective, Preventive, Improving Actions
- Follow Up Client's Satisfaction
- Follow Up Company's Performance

B – QUALITY CONTROL SYSTEM

- Quality Control Organization
- Quality Control Planning
- Submittals
- Three-Phase Control
- Testing
- Completion Inspection
- Documentation
- Notification and Follow-up of Non-conformities
- Quality Control System Audit
- Review of Quality Control Activities
- Three- Phase Quality Control System

RENAISSANCE
CONSTRUCTION

NEVA TOWERS
QUALITY PLAN

RENAISSANCE CONSTRUCTION

THREE PHASE CONTROL SYSTEM

PREPARATORY PHASE

- A review of each paragraph of applicable specifications , reference codes and standards
- Review of the contract.
- Check to assure that all materials and/or equipment have been tested, submitted and approved.
- Review of provisions that have been made to provide required control inspection and test plan.
- Examination of the work area to assure that all required preliminary work has been completed in compliance with the contract.
- Examination of required materials, equipment and sample work to assure that they are on hand, conform to approved shop drawings or submitted data and are properly stored.
- Review of the appropriate activity hazard analysis.
- Discussion of documented procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that work item.

STARTING PHASE

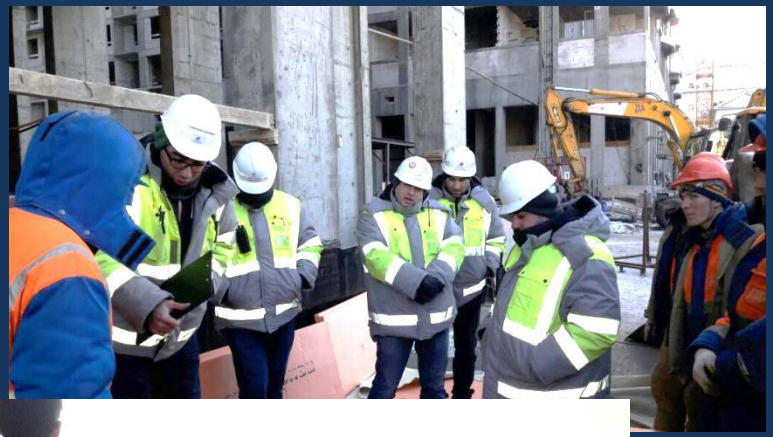
Check work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meetings.

- Verify adequacy of controls to ensure full contract compliance.
- Level of workmanship is determined and verified that it meets minimum acceptable workmanship standards. Workmanship of sample and actual work are compared.
- All differences are resolved.
- Compliance with safety plan and activity hazard analysis is checked. Activity hazard analysis is reviewed with workers.
- The client or client representative must be notified prior to the initial phase and should be invited to the 'initial phase' meeting.
- The initial phase should be repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.

FOLLOW-UP PHASE

- Daily checks are performed until completion of work item to assure compliance with contract requirements. Tests are included in daily control.
- Daily checks are recorded. Prior to the start of following feature of work, final follow-up checks should be conducted and all deficiencies should be corrected for previous feature of work.
- Follow-up activities executed by Quality Control Staff should be based on standards that determined in preparatory and initial phases.
- Executed activities on follow-up phase are recorded on `Daily QC Report`

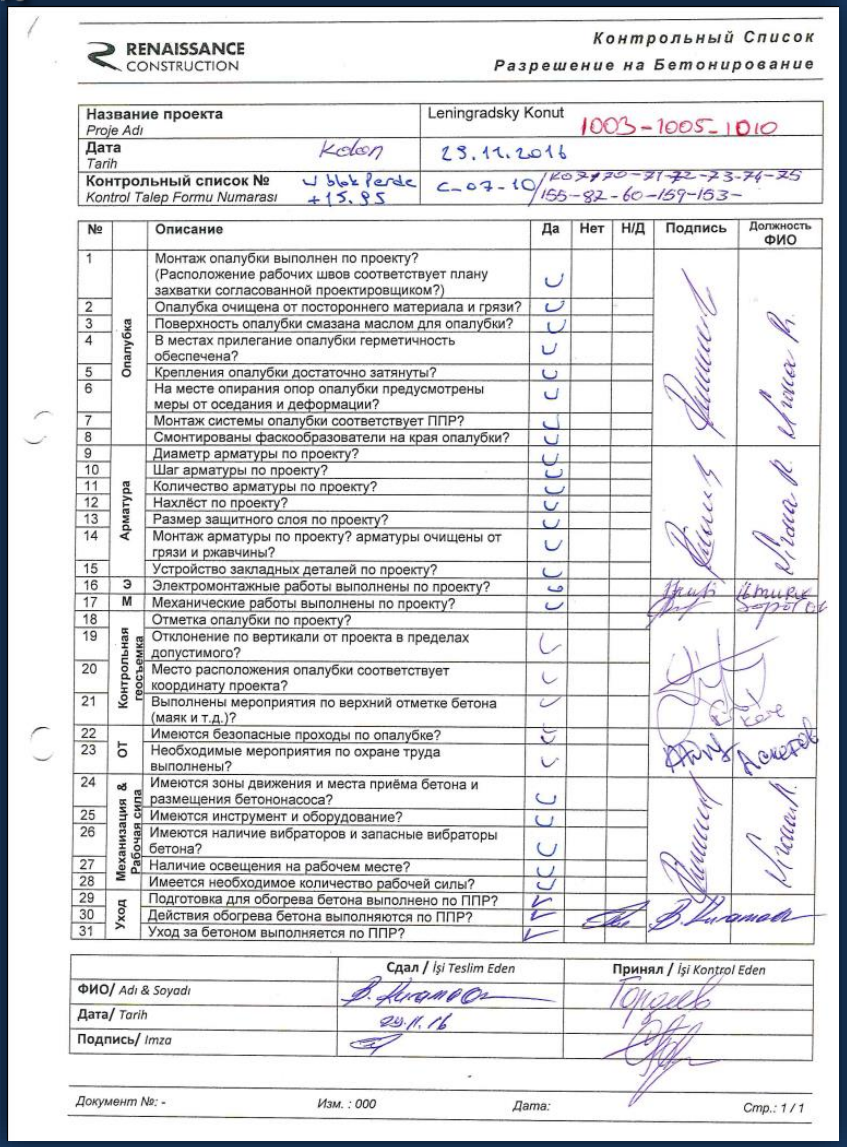
TRAININGS



Each type of work at the site is training by engineer to workers regularly.

Pre-Concrete Check-List

- For all pre-concrete works, site team should provide check-list to the quality department



RENAISSANCE CONSTRUCTION

Контрольный Список
Разрешение на Бетонирование

Название проекта *Proje Adı*		Leningradsky Konut 1003-1005-1010
Дата *Tarih*	Kolon	23.11.2016
Контрольный список № *Kontrol Talep Formu Numarası*	U blok Perde +15.85	C-07-10/ K03730-31-32-33-34-35 155-82-60-159-153-

№		Описание	Да	Нет	Н/Д	Подпись	Должность ФИО
1	Опалубка	Монтаж опалубки выполнен по проекту? (Расположение рабочих швов соответствует плану захватки согласованной проектировщиком?)	V				
2		Опалубка очищена от постороннего материала и грязи?	V				
3		Поверхность опалубки смазана маслом для опалубки?	V				
4		В местах прилегание опалубки герметичность обеспечена?	V				
5		Крепления опалубки достаточно затянуты?	V				
6		На месте опирания опор опалубки предусмотрены меры от оседания и деформации?	V				
7		Монтаж системы опалубки соответствует ППР?	V				
8		Смонтированы фаскообразователи на края опалубки?	V				
9	Арматура	Диаметр арматуры по проекту?	V				
10		Шаг арматуры по проекту?	V				
11		Количество арматуры по проекту?	V				
12		Нахлёст по проекту?	V				
13		Размер защитного слоя по проекту?	V				
14		Монтаж арматуры по проекту? арматуры очищены от грязи и ржавчины?	V				
15		Устройство закладных деталей по проекту?	V				
16	Э	Электромонтажные работы выполнены по проекту?	V				
17	М	Механические работы выполнены по проекту?	V				
18	Контрольная геосъемка	Отметка опалубки по проекту?					
19		Отклонение по вертикали от проекта в пределах допустимого?	V				
20		Место расположения опалубки соответствует координату проекта?	V				
21		Выполнены мероприятия по верхний отметке бетона (маяк и т.д.)?	V				
22	ОТ	Имеются безопасные проходы по опалубке?	V				
23		Необходимые мероприятия по охране труда выполнены?	V				
24	Механизация & Рабочая сила	Имеются зоны движения и места приёма бетона и размещения бетононасоса?	V				
25		Имеются инструмент и оборудование?	V				
26		Имеются наличие вибраторов и запасные вибраторы бетона?	V				
27		Наличие освещения на рабочем месте?	V				
28		Имеется необходимое количество рабочей силы?	V				
29	Уход	Подготовка для обогрева бетона выполнено по ППР?	V				
30		Действия обогрева бетона выполняются по ППР?	V				
31		Уход за бетоном выполняется по ППР?	V				

	Сдал / *İşi Teslim Eden*	**Принял** / *İşi Kontrol Eden*
ФИО/ *Adı & Soyadı*		
Дата/ *Tarih*	23.11.16	
Подпись/ *Imza*		

Документ №: - *Изм. : 000* *Дата:* *Стр.: 1 / 1*

Nonconformity Reports

Structural Works

RÖNESANSHOLDİNG

İç Uygunsuzluk Raporu

Rapor No
P1718-RC -STR-NCR-18-58265/19.4.2018

Şirket	RENAISSANCE CONSTRUCTION	Birim Personel	Umut YEMENOGLU
Proje	Plot 17-18	Alt Yüklenici Birim Personel	Olkan Kum
Aktivite	BETONARME İŞLERI - GENEL	Alt Yüklenici	Prestij
Proje Lokasyon	Kule Konut	Durum	Tüm İşlemler Tamamlandı
Uygunsuzluk Türü	İmalat	Minor/Majör	Major
Lokasyon Ek Açıklama		Raporlayan	Emirhan ALEMDAR

Referans Dokümanlar	
Uygunsuzluk Açıklama	T2 kule konut binasi +269.600/+273.500 kotu K//9/1-9/2 akslari arasi CTM-66-010 nolu cekirdek perdesinde vibrator ve paspayi eksikliginden dolayi betonda segregasyon ve bosluk olustugu
Ekler	VBWL0843.JPG TOGS7119.JPG KZMC1732.JPG

Uygunsuzluk Kök Nedenleri	sadece bir bolgede vibrator eksikliginden dolayi segragasyon olusmustur. resimlerde gozuken demirler LK-11 merdiven sahanlik sakallaridir. Dolayisiyla paspayi eksikliginden dolayi kaynaklanan bir sikinti yoktur.
Önerilen Faaliyet	betoncu ekipi vibrator vurulmasi konusunda uyarilacaktir.
Planlanan Kapatma Tarihi	24.04.2018
Ekler	

Düzeltici İşlem	Tamir
Açıklama	uygun tamir harci ile tamir edildi.
Kapatma Tarihi	20.04.2018
Ekler	-EZLY9796.JPG -PGVX7235.JPG -XHZW8278.JPG -BFHV5656.JPG

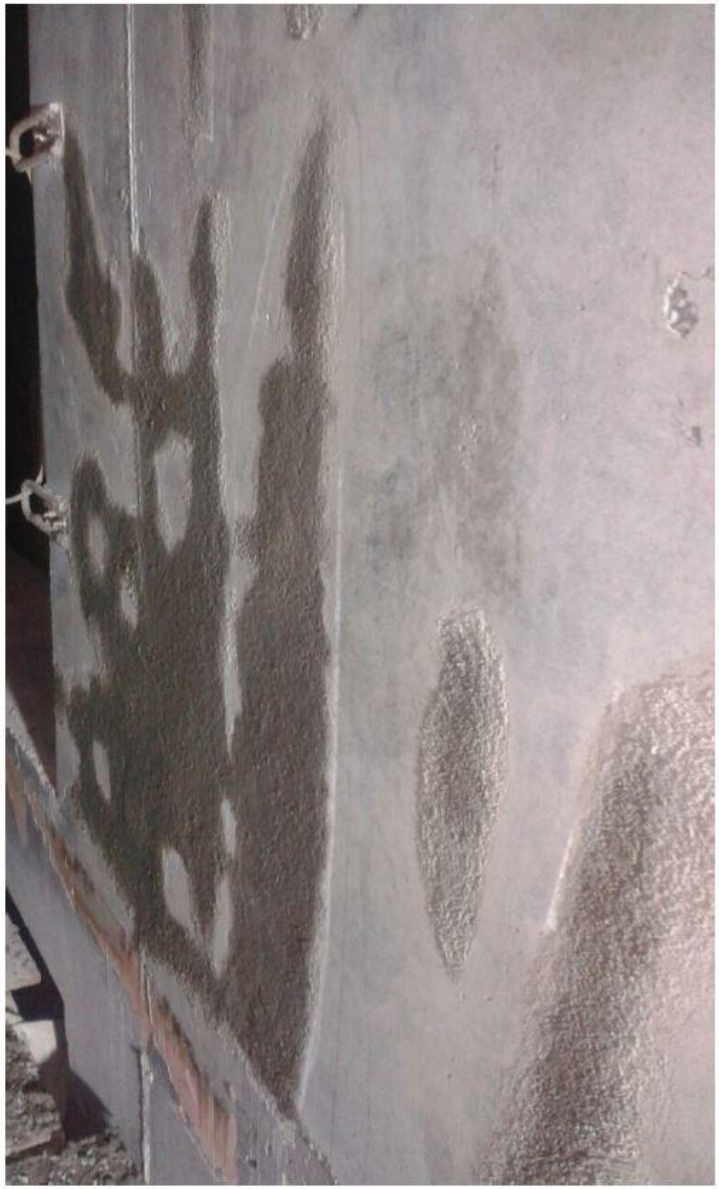
Düzeltici Öleyici Faaliyet Gerekli	Evet		
Maliyet Etkisi	124 $	Zaman Etkisi	1 Gün
Değerlendirme	Uygundur.		
Sınıflandırma	Şartname/Prosedürden Sapma		
Ekler			

RÖNESANSHOLDİNG

İç Uygunsuzluk Raporu

Rapor No
P1718-RC -STR-NCR-18-58265/19.4.2018

RÖNESANS HOLDİNG
İç Uygunsuzluk Raporu
Rapor No
P1718-RC -STR-NCR-18-58265/19.4.2018



Temperature List

- **All data is recorded to temperature list where is able to see how strength does the components have.**

RENAISSANCE CONSTRUCTION — Температурный лист/Beton Sicakligi Kayit Formu — № 225

Ж/Б конструкция:	Плита перекрытия
Марка бетонной смеси:	B 30
Дата бетонирования:	13.01.2017
Время нач. бетон-ия:	6:35
Время оконч. бетон-ия:	12:10
t C° бет. смеси перед бетон-ем:	13,4
Объем бетонирования:	71,5 м³
Тип обогрева констукций:	кабельный, тепл. пушки

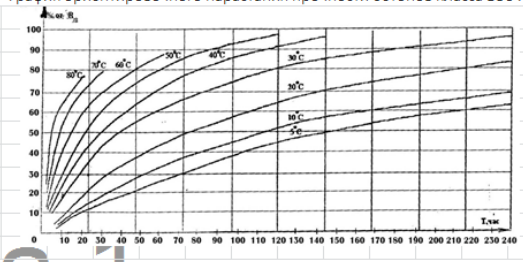
В осях: (Блок "В") 9-10 / Ж/1-К
На отм. +32,450
Дата и время начала распалубки:
Снятие опалубки разрешил:
(лаборант ООО "Строй-Тест")
BDK 1232

Данные о температуре ж/б конструкций по часам

Дата и время	t° воз п	Часы	1	2	3	4	5	6	7	8	9	10	11	12
13.01.2017 13:40	-6	0	7,8	8,0	10,8	11,7								
13.01.2017 15:40	-6	2	9,4	8,6	11,9	13,8								
13.01.2017 17:40	-6	4	9,0	9,4	13,0	12,4								
13.01.2017 19:40	-4	6	9,1	15,7	13,6	12,8	17,4							
13.01.2017 21:40	-4	8	9,4	16,7	14,1	13,0	19,9							
13.01.2017 23:40	-5	10	11,2	19,4	16,7	15,4	20,9							
14.01.2017 1:40	-5	12	13,4	20,1	19,4	16,7	23,1							
14.01.2017 3:40	-5	14	14,2	22,4	21,2	17,1	24,7							
14.01.2017 5:40	-5	16	15,3	23,7	22,7	17,7	25,5							
14.01.2017 7:40	-6	18	15,8	23,4	23,6	18	25,4							
14.01.2017 9:40	-6	20	16,0	23,0	24,1	18,0	24,8							
14.01.2017 11:40	-6	22	16,8	21,8	23,8	18,8	23,8							
14.01.2017 13:40	-6	24	17,0	20,8	23,0	19,4	24,0							
14.01.2017 15:40	-6	26	17,4	21,8	22,8	18,7	23,1							
14.01.2017 17:40	-6	28	15,7	23,4	20,7	18,1	20,4							
14.01.2017 19:40	-1	30	16,0	23,3	20,9	18,6	20,7							
14.01.2017 21:40	-1	32	16,6	22,8	21,1	18,8	20,9							
14.01.2017 23:40	-2	34	14,1	17,2	19,4	17	18,2							
15.01.2017 1:40	-2	36	13,8	15,4	17,2	17,0	15,3							
15.01.2017 3:40	-2	38	13,0	13,2	16,2	16,2	14,2							
15.01.2017 5:40	-2	40	12,6	13,0	15,0	15,8	12,5							
15.01.2017 7:40	-2	42	12,5	12,4	10,9	12,4	10,3							
15.01.2017 9:40	-2	44	11,9	9,4	9,2	11,0	9,5							
15.01.2017 11:40	-2	46	11,5	7,3	8,7	9,2	7,2							
15.01.2017 13:40	-0	48	11,4	5,6	7,8	7,3	5,9							

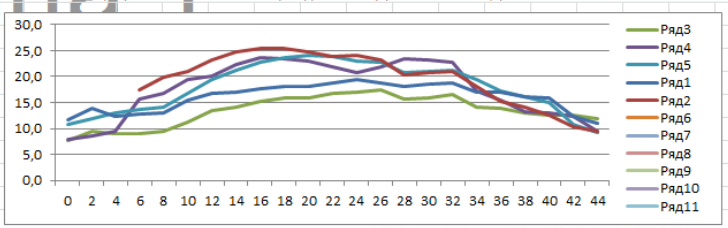
Контролируемый параметр	Номера точек температурных датчиков											
	1	2	3	4	5	6	7	8	9	10	11	12
Средняя температура каждой точки, +C°	13,2	16,7	17,1	15,4	18,5							
Время прогрева, часов	72	72	72	72	72							
Средняя температура всех точек на момент отключения прогрева	17											
Ориентировочная прочность %R на момент отключения прогрева	44%											
Ориентировочная прочность %R на момент снятия опалубки	80%											

График ориентировочного нарастания прочности бетонов класса В30 и В40 (% от R28)



Страница 1

График изменения температуры конструкций в точках, указанных на плане ниже.



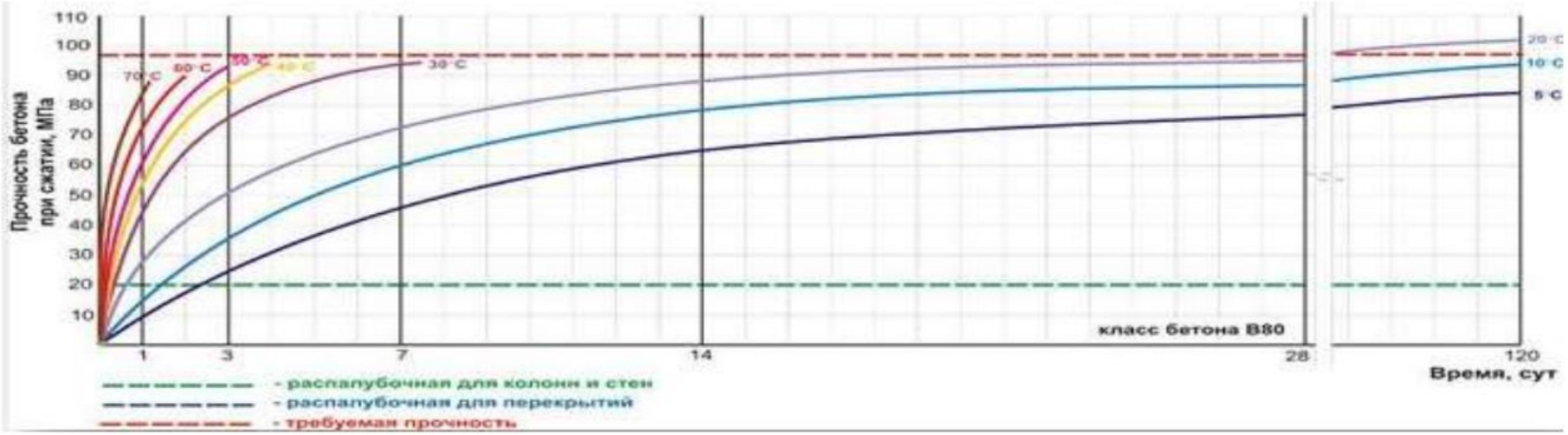
П13.01.2017 (165) | К13.01.2017 (166) | К13.01.2017 (167) | С13.01.2017 (168) | П14.01.2017 (169) | К14.01.2017 (170) | С14.01.2017 (171) | П14.01.2017 (172) | К15.01.2017 (173) | К15.01.2017 (174) | С15.01

Готово

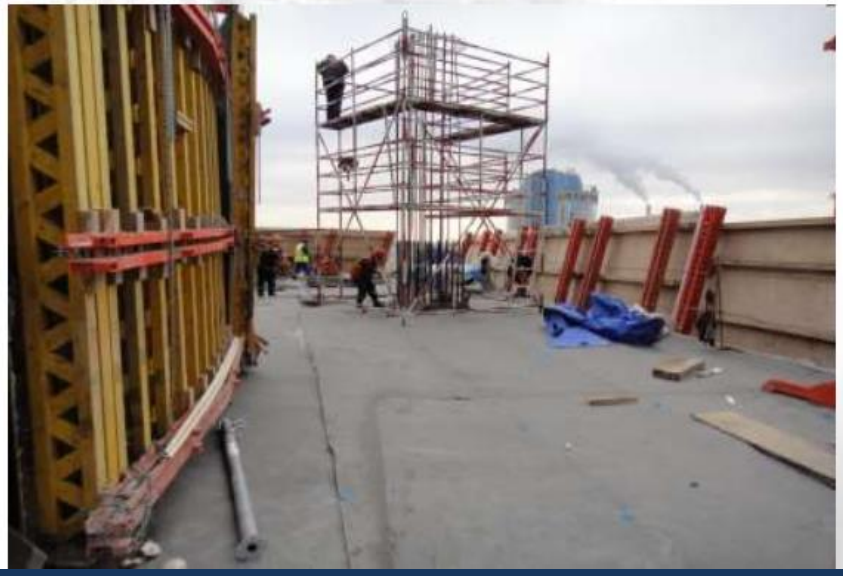
High Strength Concrete

Supervision of МАСТЕР БЕТОН **in Neva Towers**

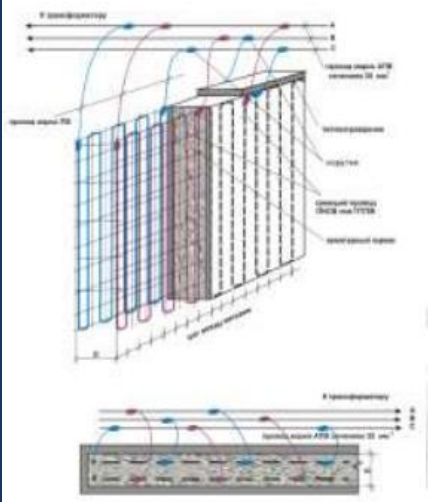
Time-Strength curve B80 Class concrete depends on temperature

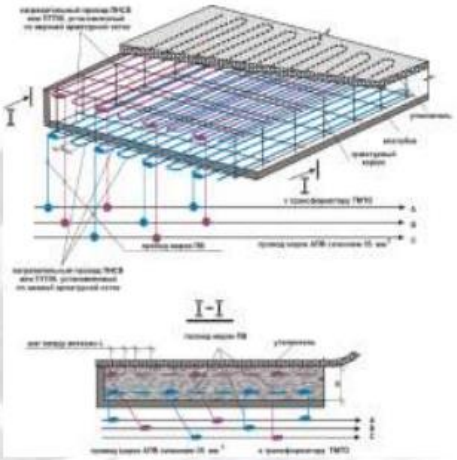


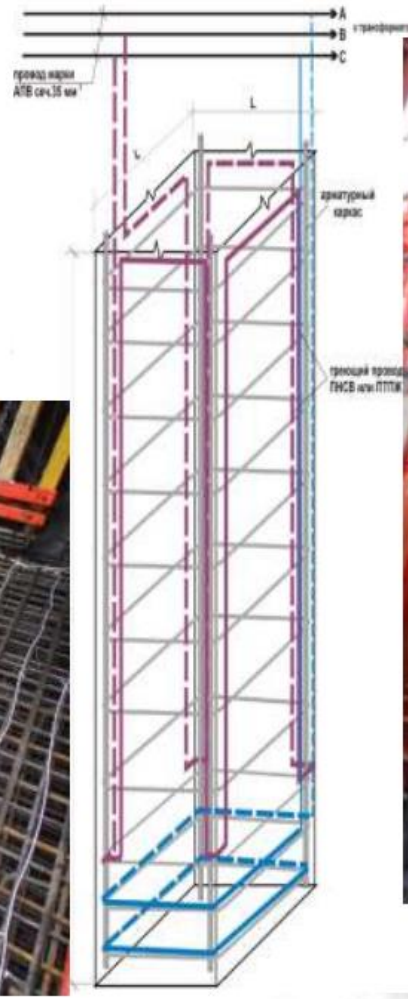
Concreting in Winter



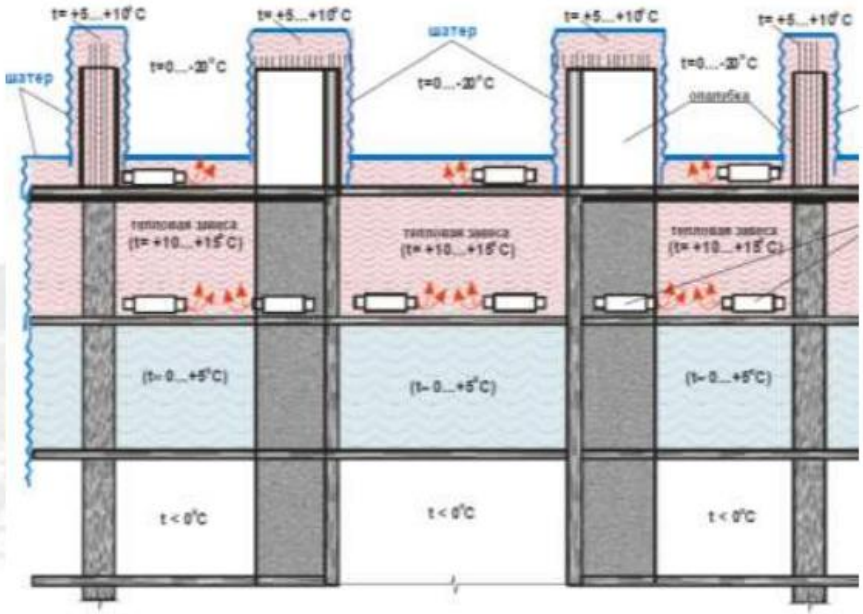
Concreting in Winter







Concreting in Winter



RENAISSANCE CONSTRUCTION

NEVA TOWERS

Health And Safety Executive

ZERO TOLERANCE

In addition to the measures taken for development of Health, Safety and Environment applications and for preventing apparent absolute hazards from bringing undesired results in the projects and establishments of Rönesans Holding and its affiliates, in case of violation of the below written rules, this ZERO TOLERANCE POLICY shall be applied in the scope of Rönesans Holding HSE Disciplinary Standard (HOL-HSE-STD-005).

CANCELLATION OF THE LABOR/EMPLOYMENT CONTRACT

1. To be involved in physical assault and/or fight
2. To use alcohol and/or drugs during the working hours, to be under the effect of and provide/carry such substances
3. To work at higher altitudes without taking / implementing security measures
4. To change / break scaffoldings and other elevated working platforms without authorization
5. Continuous high-speed driving inside and/or outside of the operations/project site
6. To change/replace emergency equipment without prior permission or to cause damage to such equipment
7. To operate work machines without having a valid license

Without considering the fact that they are the employees of the main contractor or subcontractor, employees violating the rules specified above shall promptly be removed from the projects and operations owned by Rönesans Holding.

RÖNESANS HOLDİNG

HEALTH SAFETY ENVIRONMENT

İŞ SAĞLIĞI GÜVENLİĞİ ÇEVRE

СНАЧАЛА БЕЗОПАСНОСТЬ!
SAFETY FIRST!
ÖNCE İŞ GÜVENLİĞİ !

RÖNESANSHOLDİNG

MONTHLY HSE STATISTICS REPORT

RON-P1718-18-04

Group Company	RC	Project(s)	PLOT 17-18
Project Location	Moscow,Russia	Project Progress Percent	36.9900
Project Start Date	01.10.2013	Total Project Employess	3,389
Project Finish Date	31.12.2019	Direct Personnel	2,859
Project Manager	Bilgehan ÇELİK	Indirekt Personel	530
Project HSE Manager	Osman DOĞRUER	Direct Site HSE Personnel	29
Company HSE Coordinator	Gürcan Güven	Direct HSE / Total manpower	1 /117
Report Owner	Osman DOGRUER	After Last LTI ManHours	890,180

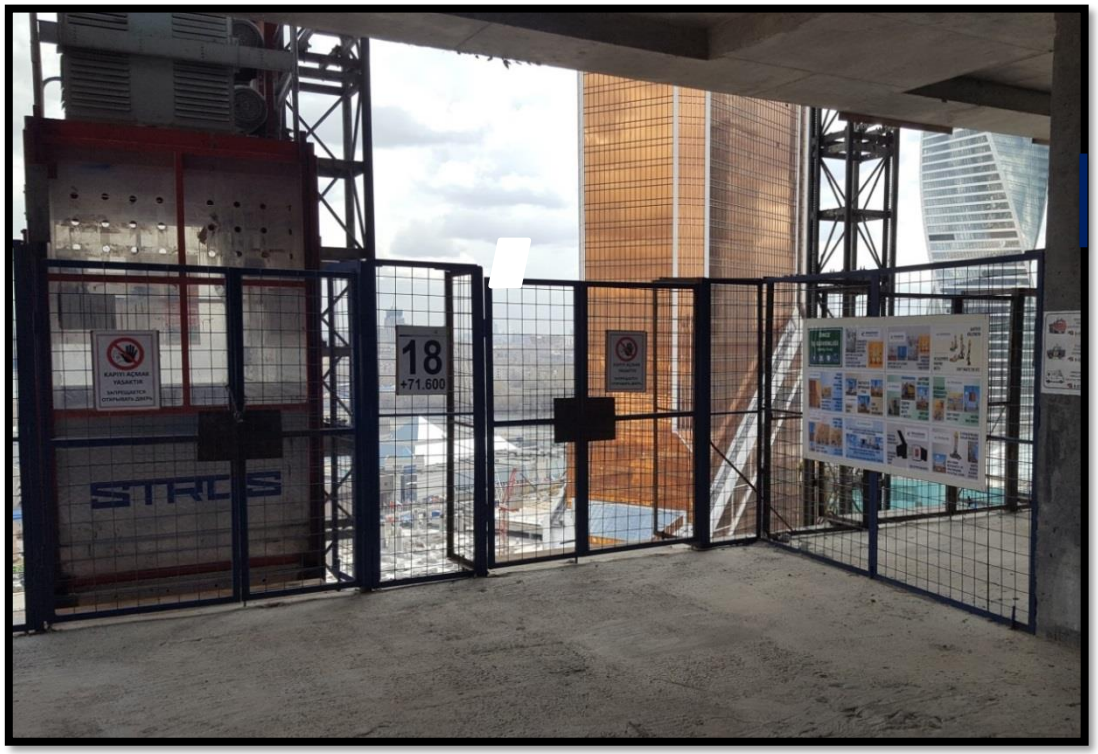
Manhours	CurrentMonth	CurrentYear	Job Inception
	837,120	2,781,700	10,213,195

TRAININGS	CurrentMonth		CurrentYear		Job Inception	
	Attendants	Total Time	Attendants	Total Time	Attendants	Total Time
OSGB Trainings (# of attendees)	0	0	0	0	0	0
HSE Induction (2 hrs) (# of attendees)	565	1130	1600	3200	7429	14858
Toolbox (0,25 hrs) (# of attendees)	22356	5589	88523	22130.75	243258	60814.5
Job Spesific Trainings (Attendees - Total Man Hour)	3161	5925	9832	17766	32959	54431
On-The-Job Trainings (Attendees - Total Man-Hour)	68	68	468	468	2817	2817
Üçüncü Taraf Eğitimleri(Attendees - Total Man-Hour)	0	0	2	176	137	1064
TOTAL (excluding ind. & TBT)	3229	5993	1030	[illegible]	[illegible]	58312
Training hours/man-hour ratio	0.0072		0.0066		0.0057	

Company Target for Trainings is 0.0050

ACCIDENTS/INCIDENTS		CurrentMonth		CurrentYear		Job Inception	
		# Cases	# Freq	# Cases	# Freq	# Cases	# Freq
Fatality	(FAT)	0	0.00	0	0.00	0	0.00
Non Occupational Fatality	(NOF)	0	0.00	0	0.00	3	0.06
Lost Time Incident	(LTI)	0	0.00	1	Company Target for LTI is 0.80	10	0.20
Restricted Work Case	(RWC)	0	0.00	4	0.29	17	0.33
Medical Treatment Case	(MTC)	2	0.48	9	0.65	72	1.41
First Aid Case	(FAC)	28	6.69	116	8.34	596	11.67
Occupational Illness	(OI)	0	0.00	0	0.00	0	0.00
Property / Equipment Damage	(PED)	0	0.00	1	0.07	8	0.16
Motor Vehicle Incident	(MVI)	0	0.00	0	0.00	6	0.12
Fire Incident	(FI)	0	0.00	2	0.14	10	0.20
Environmental Incident	(EI)	0	0.00	0	0.00	0	0.00
Near Miss	(NM)	86	20.55	288	20.71	722	14.14
Unsafe Act / Condition	(UAC)	272	64.98	952	68.45	3,573	69.97
Lost Work Days	(LWD)	0	0.00	20	1.44	191	3.74
Restricted Work Days	(RWD)	0	0.00	41	2.95	170	3.33
Toplam Kaydedilebilir Kaza	(TRI)	2	0.48	14	1.01	99	1.94

EDGE PROTECTIONS



SHAFT PROTECTIONS

RESCUE EQUIPMENTS

Broken Fire Hydrant System

HSE Management Walkdowns

All site personnel has been evacuated in 19 minutes in our last Emergency Situation Drill executed on 31 March 2018.

TRAINING AND INCENTIVE ACTIONS

İSG LİGİ 2018 OCAK-ŞUBAT-MART		LAKHTA MFB		LAKHTA TOWER		NAGATINO		TSARSKAYA PLOSHAD		NEVA TOWERS	
PROJE PUANI		89,13		82,34		86,57		90,98		92,52	
	Hedef Puan	Gerçekleşme oranı	Puan	Gerçekleşme oranı	Puan	Gerçekleşme oranı	Puan	Gerçekleşme oranı	Puan	Gerçekleşme oranı	Puan
PROJE MÜDÜRÜ	48	45,00		40,34		40,76		44,25		43,82	
Dış denetim uygunsuzluk kapatma oranı	30	100%	30,00	91%	27,36	94%	28,13	94%	28,10	100%	30,00
İç denetim uygunsuzluk kapatma oranı	10	100%	10,00	100%	9,98	90%	9,04	91%	9,15	98%	9,82
Haftalık İSG saha yürüyüşü	4	33%	1,33	0%	0,00	50%	2,00	100%	4,00	50%	2,00
Haftalık İSG toplantısı	4	92%	3,67	75%	3,00	40%	1,60	75%	3,00	50%	2,00
ŞANTİYE ŞEFİ	16	13,33		11,47		16,00		14,58		16,00	
Haftalık İSG saha yürüyüşü	8	75%	6,00	67%	5,33	100%	8,00	100%	8,00	100%	8,00
Haftalık İSG toplantısı	8	92%	7,33	77%	6,13	100%	8,00	82%	6,58	100%	8,00
KISIM ŞEFLERİ	8	6,24		3,71		6,75		6,79		7,24	
Haftalık İSG saha yürüyüşü	4	79%	3,14	48%	1,93	93%	3,72	91%	3,63	86%	3,42
Haftalık İSG toplantısı	4	77%	3,09	45%	1,78	76%	3,02	79%	3,15	96%	3,82
SAHA MÜHENDİSLERİ	12	9,17		10,83		8,25		10,35		9,45	
İş başı eğitimi	6	74%	4,41	90%	5,42	88%	5,25	93%	5,60	86%	5,13
İş başı konuşması	6	79%	4,75	90%	5,41	50%	3,00	79%	4,75	72%	4,32
SAHA PERSONELİ	16	15,40		16,00		14,81		15,02		16,00	
Teknik eğitim hedef gerçekleşme	8	96%	7,66	100%	8,00	100%	8,00	88%	7,02	100%	8,00
Ucuz atlatma raporlama	8	97%	7,74	100%	8,00	85%	6,81	100%	8,00	100%	8,00
ÖRNEK UYGULAMALAR	10	5,00		2,50		5,00		4,17		7,92	
Haftalık iş başı konuşma toplantısı (Proje genel)	5	0%	0,00	0%	0,00	50%	2,50	0%	0,00	58%	2,92
Toplu saha temizliği (Haftalık)	5	100%	5,00	50%	2,50	50%	2,50	83%	4,17	100%	5,00

RENAISSANCE CONSTRUCTION
HSE LEAGUE


NEVATOWERS
RENAISSANCE
CONSTRUCTION