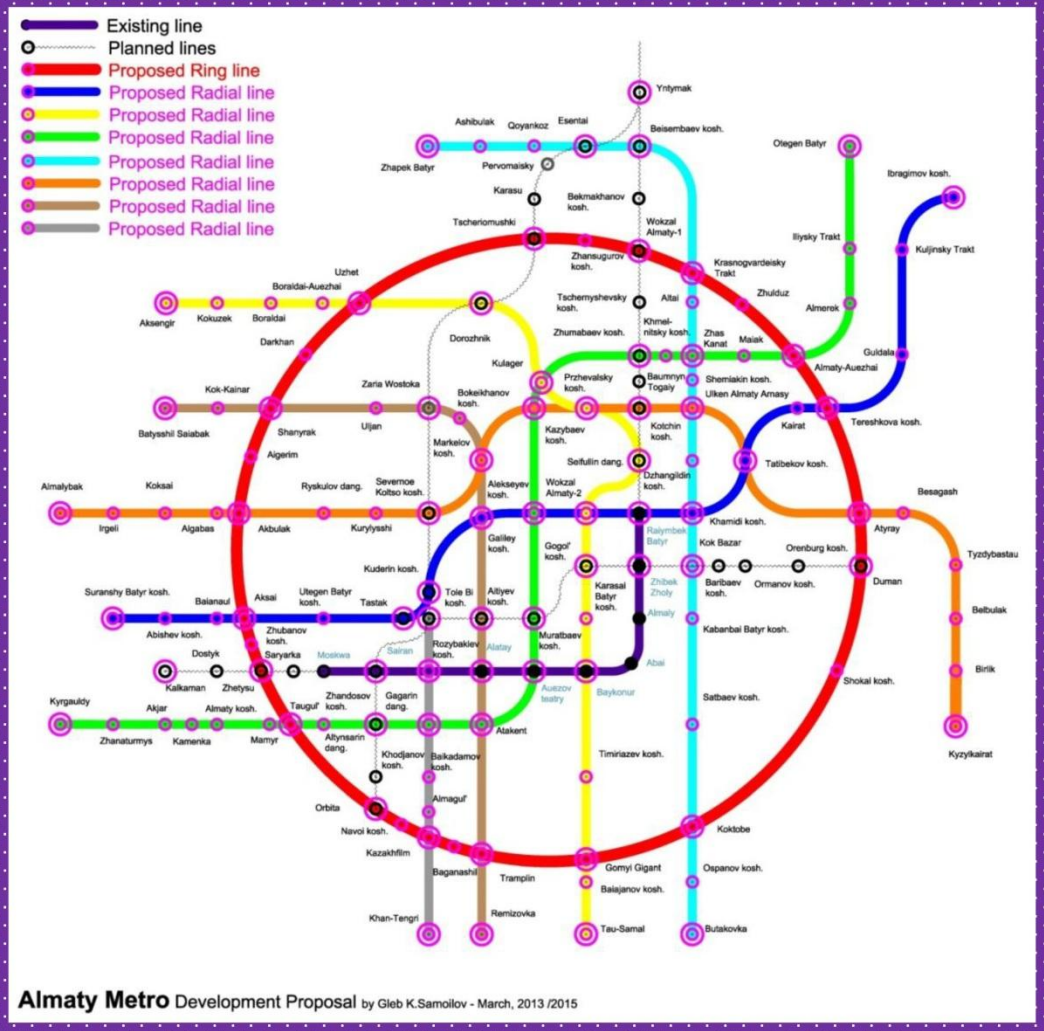


Almaty Metro Development Proposal by Gleb K.Samoilov - March, 2013 /2015

DEVELOPMENT PROSPECTS OF THE ALMATY METRO

***

Ppt-Presentation by
Gleb K.Samoilov
2016

1. The Almaty Metro Map (the "ALMALY station" Hall, 2013)

Start of operation of the Almaty Metro opens a new stage in the development of public transport in the City.

New kind of public transport for country - off-street public transport - will significantly improve the comfort and speed of daily travels.

So, a trip from the station "Raiymbek Batyr" to station "Moscow" takes 18-20 minutes; while traveling in a bus or trolley bus on the same route takes 30 to 40 minutes in normal times or 60 to 80 minutes in the morning and evening rush hour.

The ever-increasing passenger traffic at the section with nine stations of the first (2011) and second (2015) stages of the Metro development ("Raiymbek Batyr" – "Zhibek Zholy" – "Almaly" – "Abai" – "Baikonur" – "Theatre named after M.Auezov" – "Alatau" – "Sayran" – "Moscow") has already allowed to proceed to the optimization of the existing ground Public transport Route Network.

The Album includes of 52 illustrations: 19 photos and 33 drawings.
Keywords: *City Public transport, Integrated Public transport network, Metro Ring-radial scheme, Almaty Metro, Off-street transport, Urban transport development*

Source: the Photo by G.K.Samoilov, 2013

2. Concepts of the Almaty Urban Rapid Transit development in the 20th century middle

The population growth and the territorial increase of the Almaty made the actuality of the Urban Rapid Transit development in the middle of the 20th century.

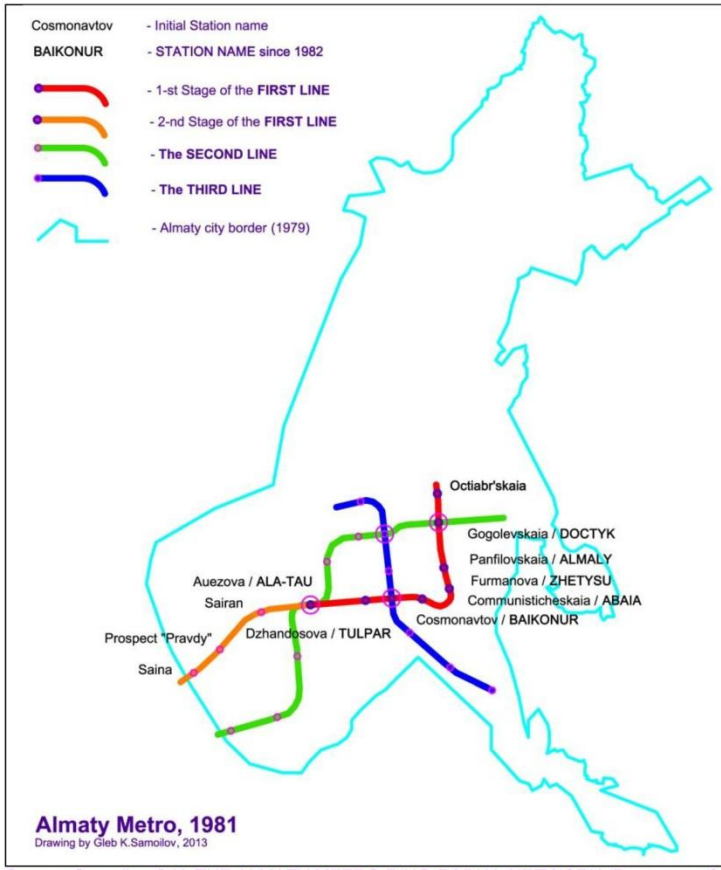
In the late 1950s, was planned construction of large residential areas to the West direction. This made actual task of creating a system of high-speed off-street traffic. The main route from new areas to the Urban center was considered the Arykovaia Street (the Abai Avenue, since 1960). In the zone of new construction along the South side of the Avenue was provided the corridor, which has a width about 80 meters (90 yards). In this corridor did not provide the new construction. Here eventually was supposed to build the Metro line at the shallow depth. This corridor (without high-rise buildings) still exists from the 6th-line Street to the Altynsarin Avenue.

In the mid-1970s started designing of the High-speed passenger transport system on magnetic levitation (Скоростная пассажирская транспортная система – СПТС). The Project was approved in 1977: the "VNIIPItransprogress" («ВНИИПИтранспрогресс»), the Kazakh branch of the "PromtransNIIproekt" (Казахское отделение «ПромтрансНИИпроект»); N.Karasiov – the Project Author, M.Lesovichenko – the Chief Project engineer. This was the Double-track Line on the viaduct over the roadway. The First stage (3.5 km): "Orbita" micro districts – along the Al-Farabi Avenue – along the Sain Street – the Abai Avenue. The Second stage (12 km): along the Abai Avenue – along the Mir Street (now the Zheltoksan Street) – the Railway station "Alma-Ata -2nd". Perspectives: the extension to the Railway station "Alma-Ata -1st" (8 km), extending to recreational areas "Kapshagay" (70 km); an offshoot to the Sport complex "Medeo" (17 km).

The history of the active development of the Metro in Almaty starts at the beginning of the 1980s. Government solutions have defined the procedure for design and construction (Order of August 4, 1980, № 1537p by the Council of Ministers of the USSR: the ensuring of the development of a Feasibility Study for the construction of the Almaty Metro in 1981-1982, and the inclusion of the Almaty Metro Design and Start of the Construction into the draft of the State Plan for 1981-1985).

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

3. The Initial planned lines scheme of the Almaty Metro, 1981



In 1981-1982, the "Metrogiprotrans" Institute («Метрогипротранс») with the participation of the "Lenmetrogiprotrans" Institute («Ленметрогипротранс») completed the First phase of the Almaty Metro project. The initial scheme of Metro lines (1981) consist of three lines.

The First Line - from the Avenue named after 50th anniversary of the October (now the Raiymbek Avenue) along the Furmanov Street to the Abai Avenue; along the Abai Avenue to the Sain Street – 11 stations, 3 interchange nodes.

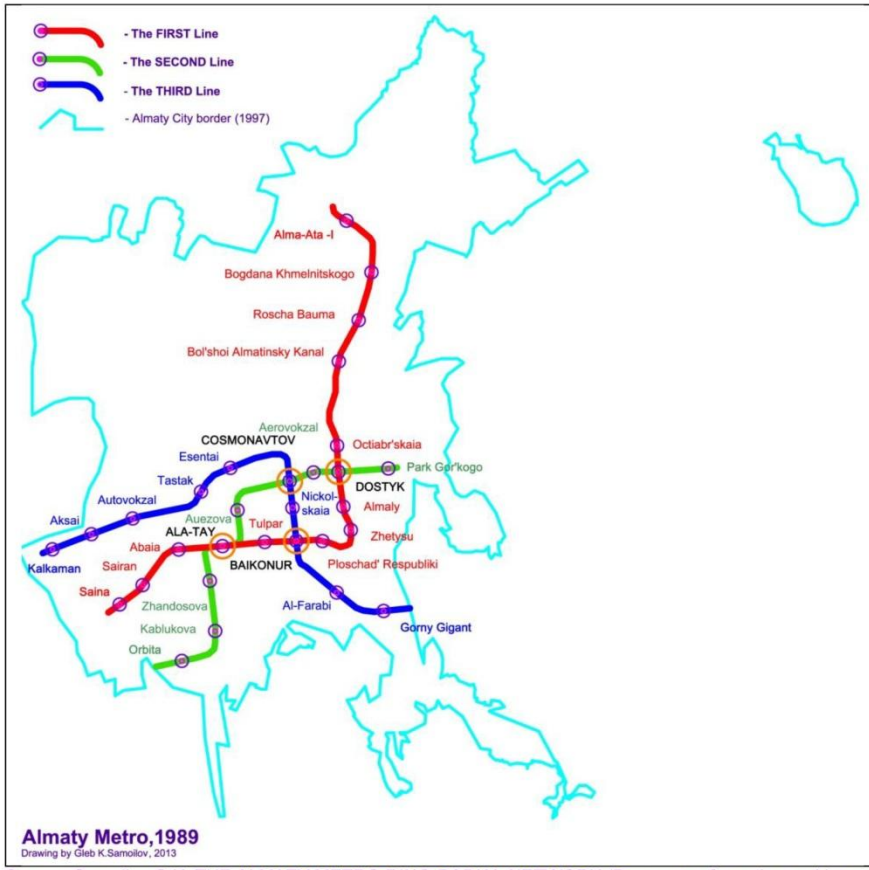
The Second Line (9 stations, 3 interchange nodes).

The Third Line (7 stations, 2 interchange nodes).

Four interchange nodes redistribute passengers – the Parallel type (1 point: the Ala-Tau station) and the Perpendicular type (3 points: the Baikonur Station, the Dostyk Station and the Station at the intersection of the Second and the Third line).

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

4. The Planned lines scheme of the Almaty Metro, 1989



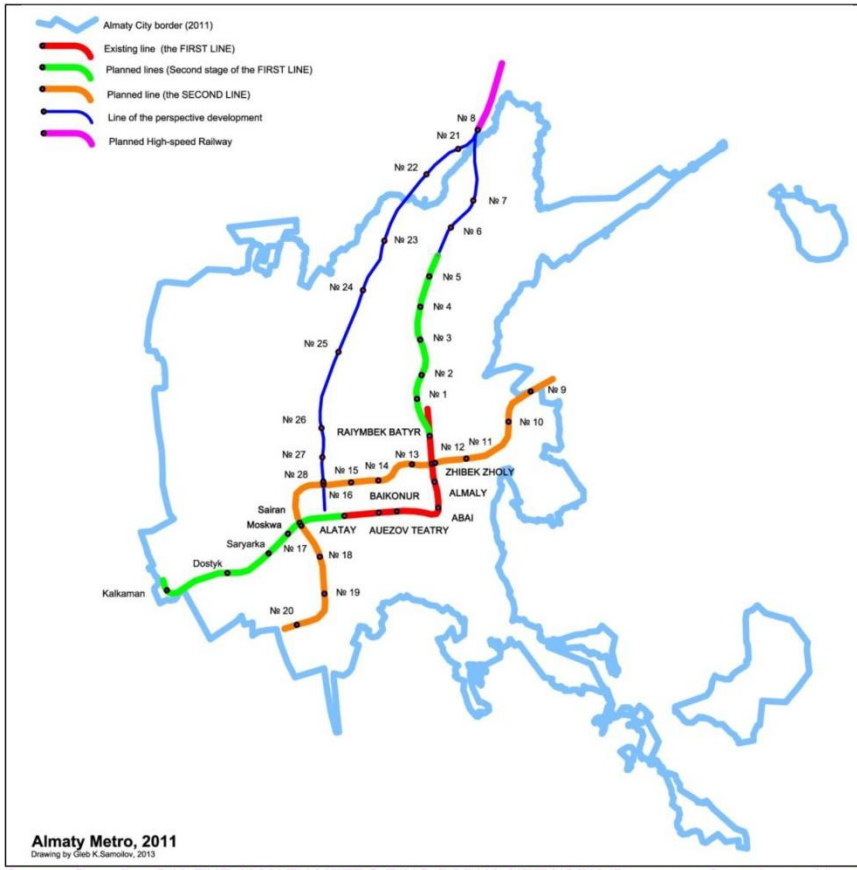
By the end-1980s, the Initial plan for the development of the Metro network was supplemented – the First line was extended along the Suyunbai Avenue to the Railway Station "Alma-Ata - 1st", the Third line was extended along the Raiymbek Avenue to the Rozybakiev Street, and after rotated – along Tole Bi Street to the Kalkaman Micro District:

- **the First Line** (Red) – 15 stations, 3 interchange nodes:;
- **the Second Line** (Green) – 9 stations, 3 interchange nodes;
- **the Third Line** (Blue) – 10 stations , 2 interchange nodes.

The First line was supposed to continue from the Almaty-1st Railway Station to the Pervomaisky village and the Burundai village.

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

5. Existing, Constructed and Planned lines of the Almaty Metro, 2011



At the end of 2011 (the beginning of the Metro operation) was published the scheme of the future network development – "The Scheme of the Almaty metropolitan (2011)":

- **planned lines – two sections of the FIRST LINE Second stage**: along the Abai Avenue from the "Alatau" Station ("SAIRAN" – "MOSKWA" – "SARYARKA" – "DOSTYK" – "KALKAMAN") and along the Seifullin Avenue from the "Raiymbek Batyr" Station to the Railway Station "Almaty-1st" (5 stations: №№ 1, 2, 3, 4, 5);
- **the planned line – the SECOND LINE** (12 stations: №№ 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20). This line will connect Duman micro districts with Tastak district and the Orbita micro district. Interchange nodes of this Line: the station №17 / the "Sairan" station (the section of the FIRST LINE Second stage), the station №16 / the station №28 (the Line of the perspective development), the station №12 / the "Zhibek Zholy" station (the existing section of the FIRST LINE);
- **two sections of the perspective development line**: First section is the extending of the FIRST LINE Second stage from the Railway station "Almaty-1st" to the High-speed Railway station – the Route to the Kapshagai Recreation zone (3 stations: №№ 6, 7, 8*) . Second section is Line from the station №28 to the station №8 will locate along the Northern Ring Street to the High-speed Railway station (9 stations: № 28, 27, 26, 25, 24, 23, 22, 21, 8*).

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

6. The “RAIYMBEK BATYR station” (2011)

Source: Photos by G.K.Samoilov, 2016

7. The “ZHIBEK ZHOLY station” (2011)

Source: Photos by G.K.Samoilov, 2016

8. The “ALMALY station” (2011)

Source: Photos by G.K.Samoilov, 2016

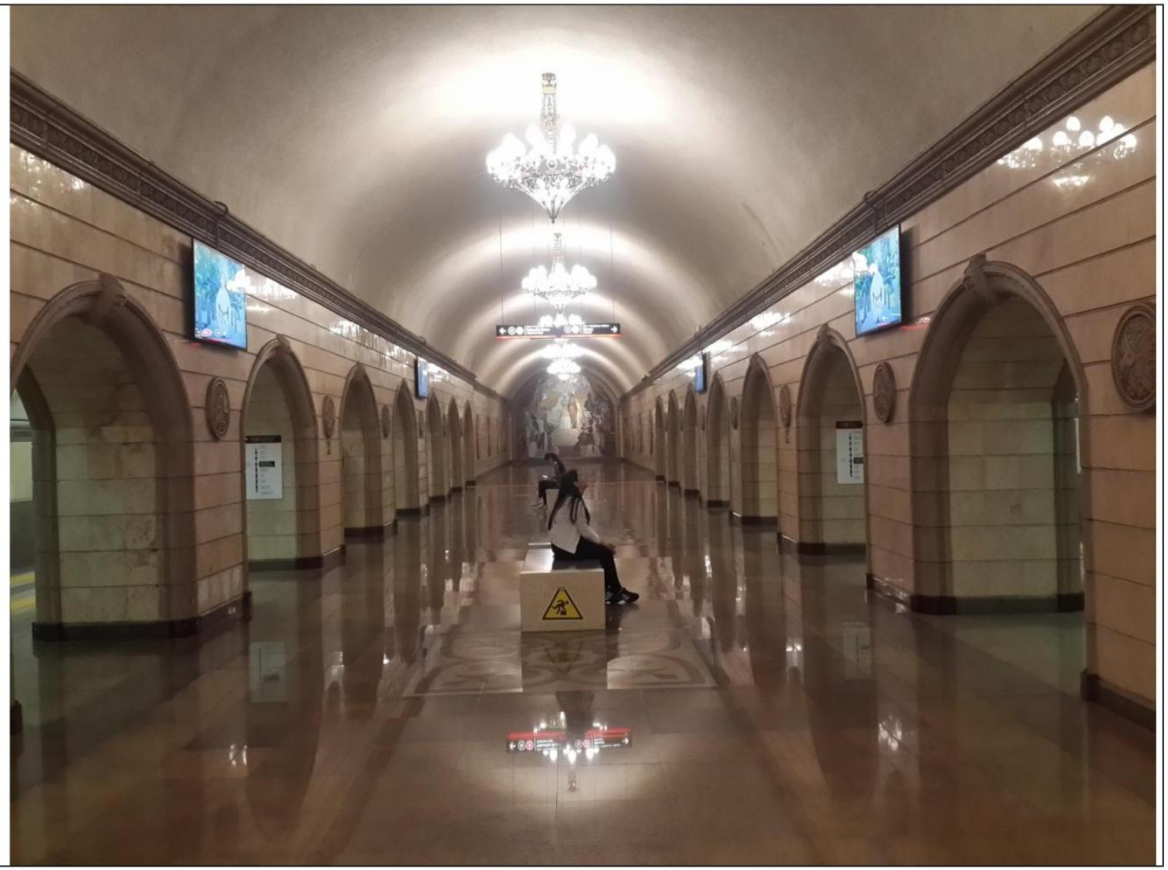
9. The “ABAI station” (2011)

Source: Photos by G.K.Samoilov, 2016

10. The “BAIKONUR station” (2011)

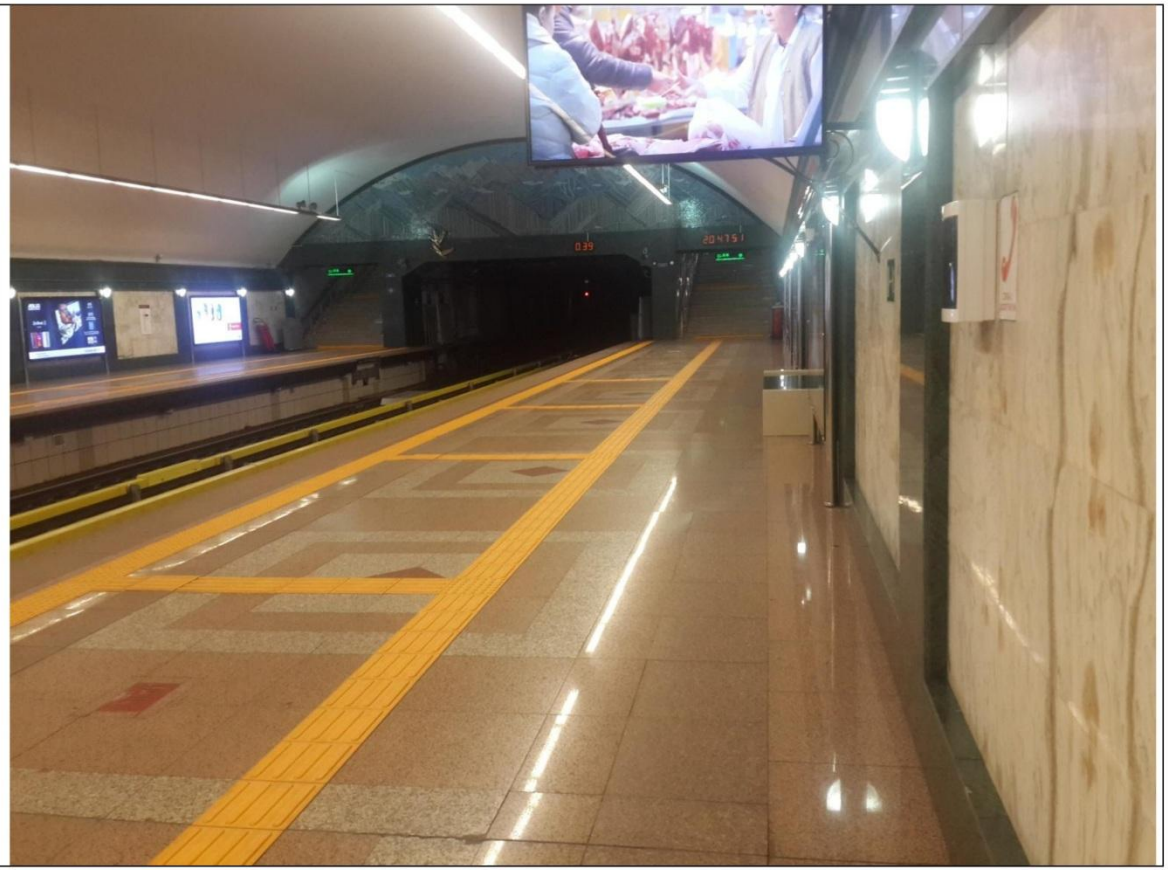
Source: Photos by G.K.Samoilov, 2016

11. The “THEATRE NAMED AFTER MUKHTAR AUEZOV station” (2011)



Source: Photos by G.K.Samoilov, 2016

12. The “ALATAY station” (2011)



Source: Photos by G.K.Samoilov, 2016

13. The Almaty Metro development proposal by G.K.Samoilov (March, 2013)

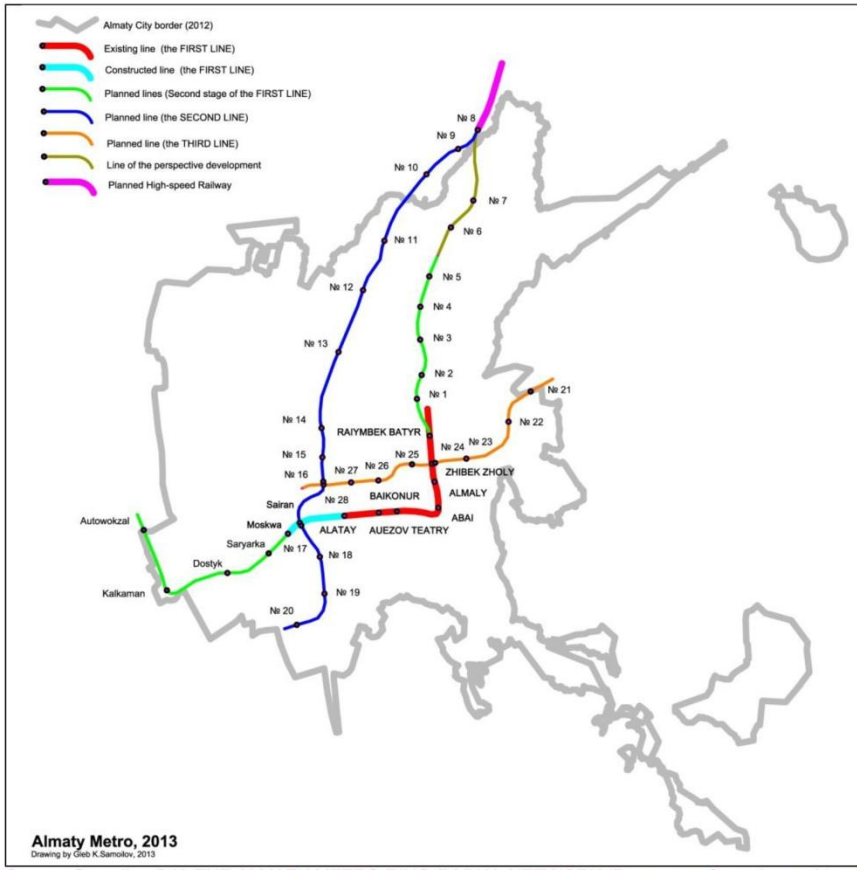
Images source:
***Drawing of the Almaty Metro Development Proposals Author** - Gleb K.Samoilov (March, 2013)*
Источник:
***Чертёж автора Передложений по развитию Алматинского метро** - Глеба К.Самойлова (Март, 2013)*

In 2013, for the Metro development was proposed the Radial-Ring scheme (the Concept by G.K.Samoilov; the first published – April 22, 2013):

- the Total number of stations 188;
- the Existing line (7 stations, 5 interchange nodes);
- the Constructed line (3 stations, 2 interchange nodes);
- Planned lines (37 stations, 24 interchange nodes);
- **Proposed lines (139 stations, 59 interchange nodes).**

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

14. Existing, Constructed and Planned lines of the Almaty Metro, 2013



In mid-2013, according to published "The Scheme of the Almaty metropolitan", the further development consists of some sections:

- **the Constructed line / the Continue of the FIRST LINE**: along the Abai Avenue from the "Alatau" Station ("SAIRAN" – "MOSKWA");

- **two sections of the FIRST LINE Second stage**: along the Abai Avenue from the "Moskwa" Station ("SARYARKA" – "DOSTYK" – "KALKAMAN" – "AUTOWOKZAL") and along the Seifullin Avenue from the "Raiymbek Batyr" Station to the Railway Station "Almaty-1st" (5 stations: №№ 1, 2, 3, 4, 5) – this section of the Line will be on the overpass;

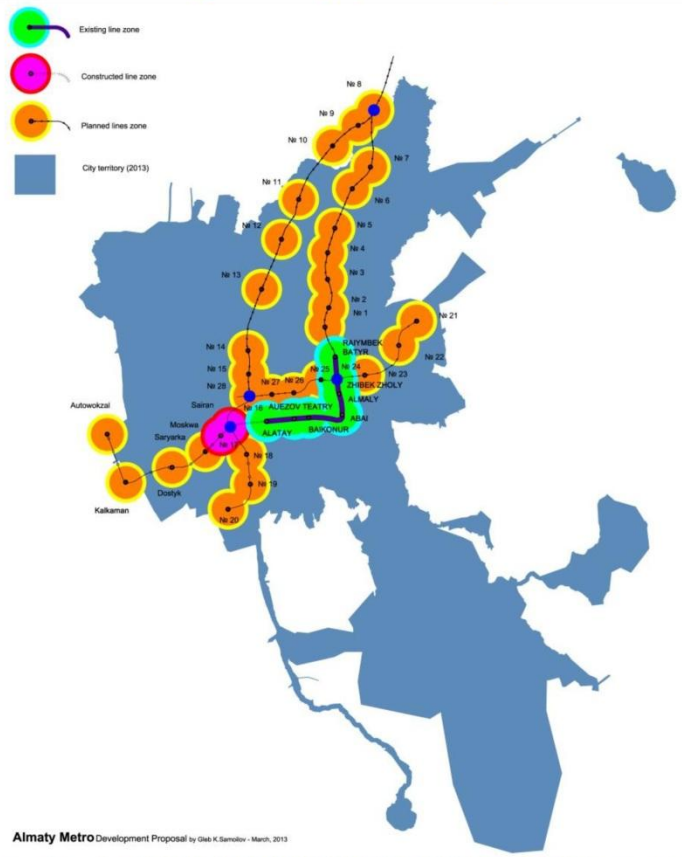
- **the SECOND LINE** (13 stations: №№ 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20). This line will connect Orbita micro districts with the High-speed Railway station (the Route to the Kapshagai Recreation zone). The section of the Line from the station №16 to the station №8 will locate along the Northern Ring Street. Interchange nodes of this Line: the station №17 / the "Sairan" station (the FIRST LINE), the station №16 / the station №28 (the THIRD LINE), the station №8 – the Combined station: the Metro station of two lines and the High-speed Railway station;

- **the THIRD LINE** (8 stations: № 28, 27, 26, 25, 24, 23, 22, 21). This line will connect the Tastak district with the Duman micro district. Interchange nodes of this Line: the station №24 / "Zhibek Zholy" (the FIRST LINE) and the station №28 / the station №16 (the SECOND LINE);

- **the Perspective development** (3 stations: №№ 6, 7, 8*) – extending of the FIRST LINE from the Railway station "Almaty-1st" to the High-speed Railway station.

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

15. Optimal accessibility zones of the Almaty Metro network: Existing, Constructed and Planning lines (1,0 km / 0,62 mi to the station)



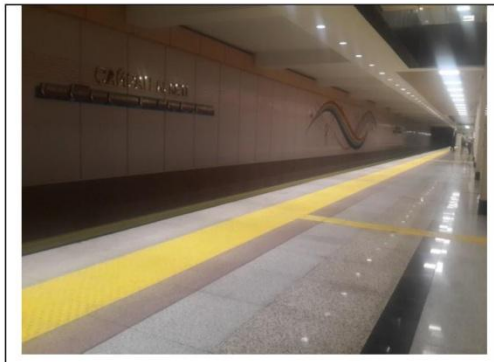
The World practice of Metro systems operation shows that convenient for passengers distance to Metro station – 1.00 km / 0.62 miles. This corresponds to: 15 minutes of Walking; 5 minutes on the Scooter; 4 minutes on the Bicycle; 3 minutes on the Bike; 2 stops by Bus. However, the existing network of the Almaty Metro does not cover all potential passengers even by crow-fly distances.

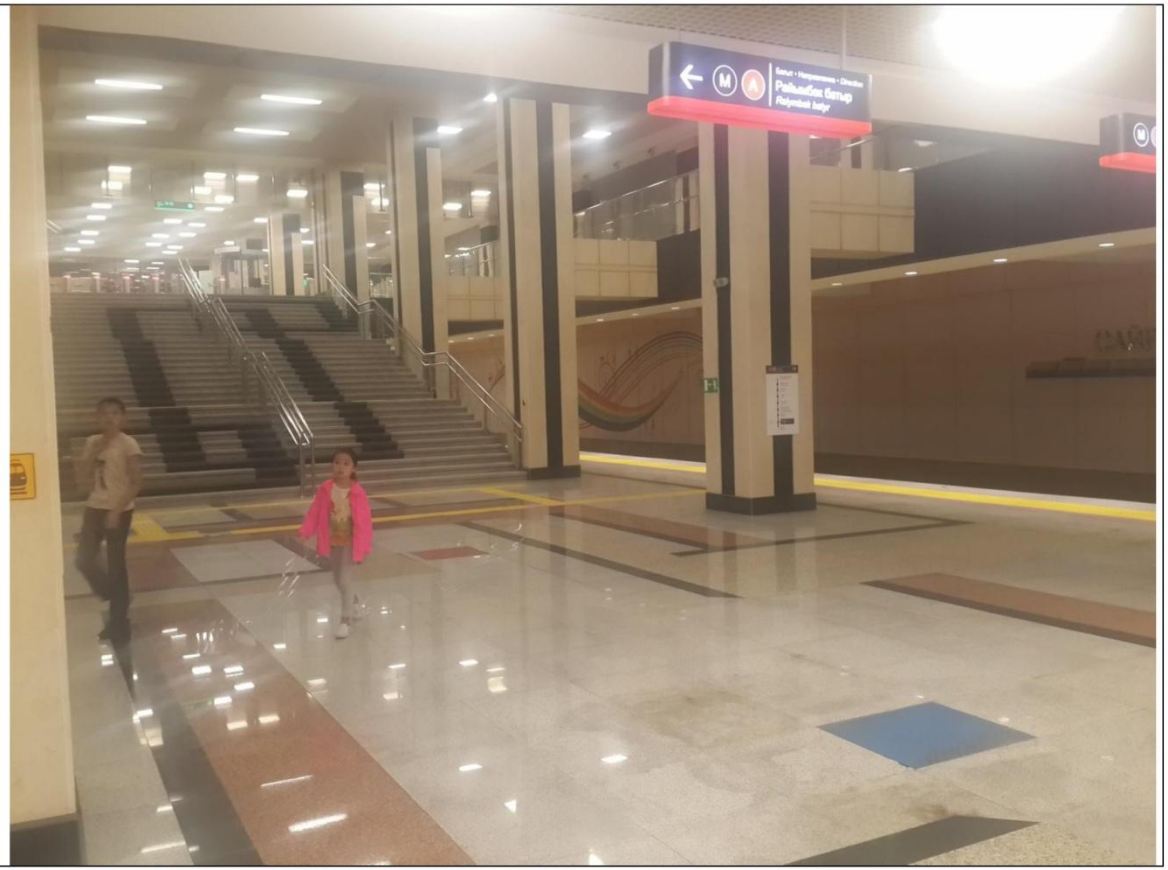
Those are next sites as: the Southern part of the City (residential areas, administrative and public facilities, recreation areas), the Airport area, new residential areas in the North-West. Prospects for increasing the Almaty city necessitate a significant expansion of the Subway network.

One example of solution to this problem – the formation of Ring-Radial Metro network – it's the Tyne and Wear Metro development proposals by Author – G.K.Samoilov (2011).

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

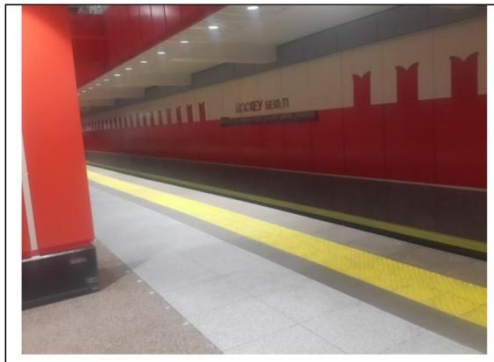
16. The “SAYRAN station” (2015)

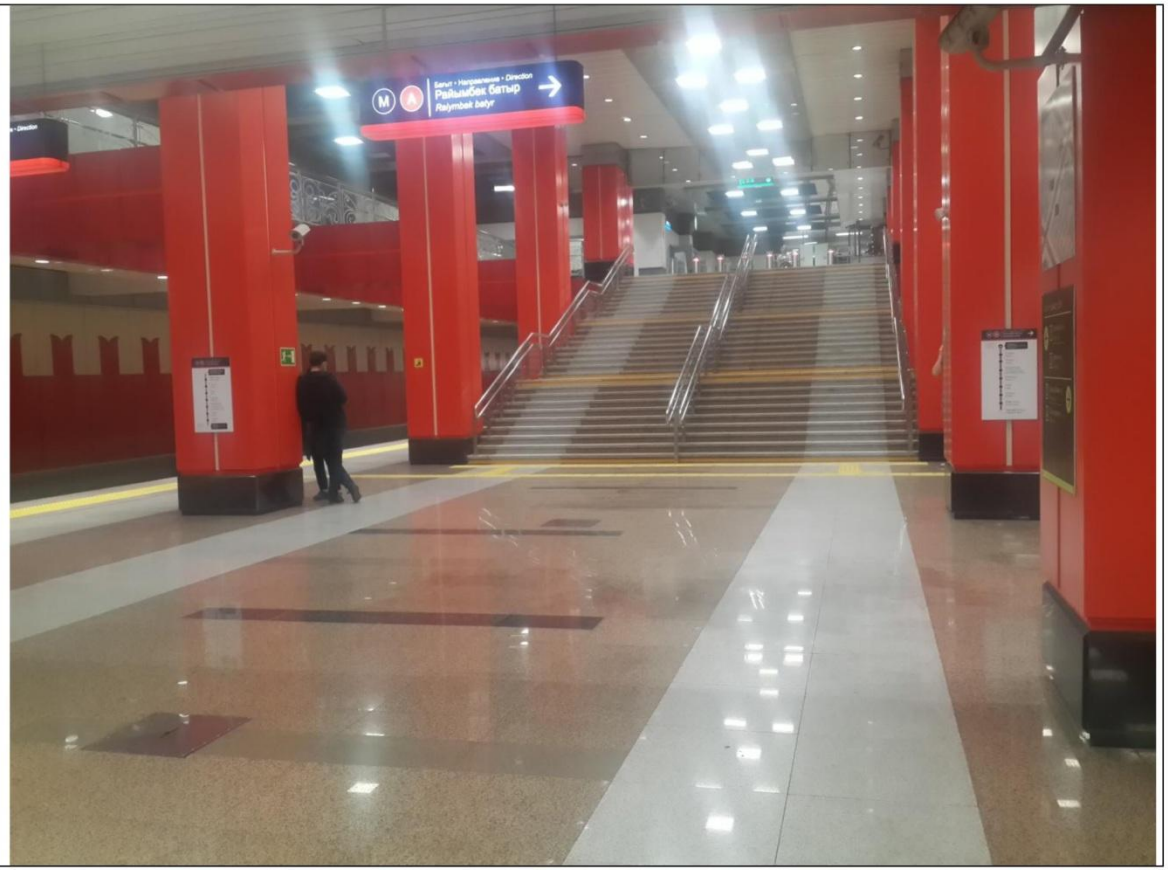




Source: Photos by G.K.Samoilov, 2016

17. The “MOSCOW station” (2015)





Source: Photos by G.K.Samoilov, 2016

18. The Conception of the Almaty Metro Development

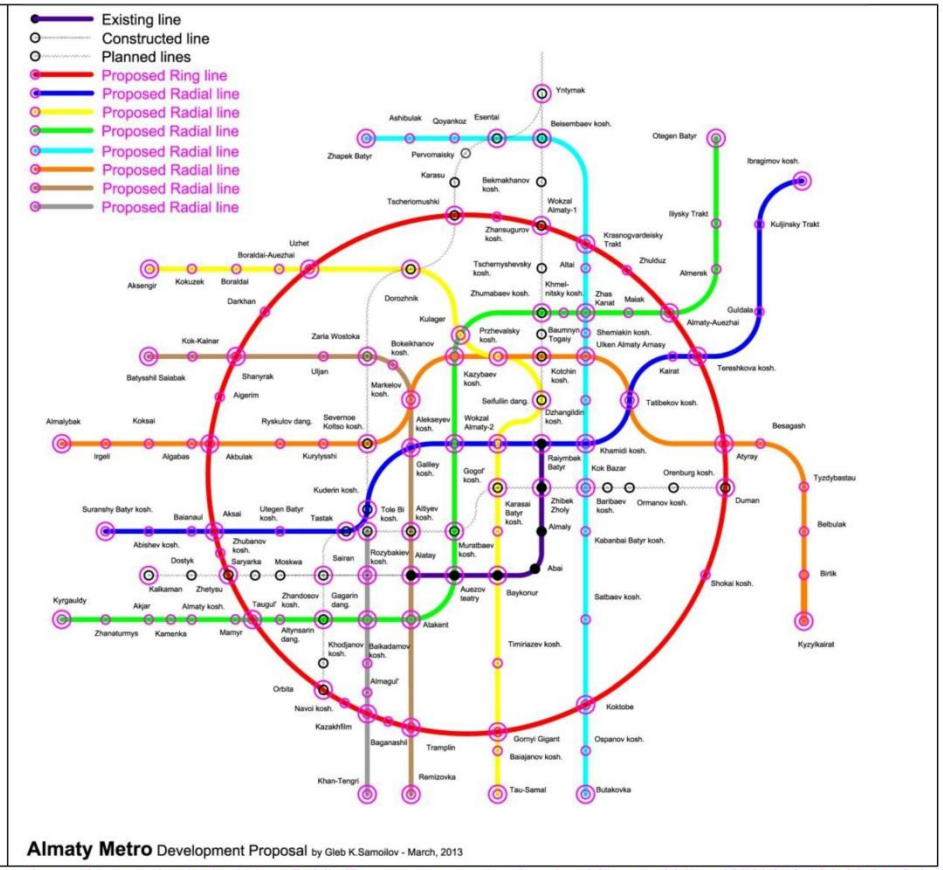
According to this concept developed network of the Almaty Metro is as follows. **The total number of stations 188; the Existing line (7 stations, 5 interchange nodes); the Constructed line (3 stations, 2 interchange nodes); 4 Planned lines (37 stations, 24 interchange nodes); 8 Proposed lines (139 stations, 59 interchange nodes):**

- **the Existing Line** (7 stations, 5 interchange nodes): Raiymbek Batyr– Alatay (8 km / 4,97 mi);
- **the Constructed Radial Line – the Continuation of the Existing Line** (3 stations, 2 interchange nodes): Alatay – Moskwa (3 km / 1,86 mi);
- **the 1st Planned Radial Line – the Continuation of the Existing Line** (9 stations, 6 interchange nodes): Raiymbek Batyr – Yntymak (20 km / 12,43 mi);
- **the 2nd Planned Radial Line – the Continuation of the Constructed Line** (4 stations, 1 interchange node): Moskwa – Kalkaman (8 km / 4,97 mi);
- **the 3rd Planned Radial Line** (15 stations, 10 interchange node): Orbita – Duman (24 km / 14,91 mi);
- **the 4th Planned Line** (9 stations, 7 interchange node): Tole Bi koshesi – Yntymak (22 km / 13,67 mi);
- **the Proposed Ring RED Line** (26 stations, 18 interchange nodes): *Almaty-Auezhai – Koktobe – Taugul' – Shanyrak – Wokzal Almaty-1* (68 km / 42,25 mi);
- **the Proposed Radial BLUE Line** (18 stations, 10 interchange nodes): Suranshy Batyr koshesi – Ibragimov koshesi (48 km / 29,83 mi);
- **the Proposed Radial GREEN Line** (24 stations, 12 interchange nodes): Kyrgauldy – Otegen Batyr (50 km / 31,07 mi);
- **the Proposed Radial ORANGE Line** (20 stations, 9 interchange nodes): Almalybak – Kyzylkairat (46 km / 28,58 mi);
- **the Proposed Radial BROWN Line** (13 stations, 8 interchange nodes): Batysshil Saiabak – Remizovka (26 km / 16,16 mi);
- **the Proposed Radial YELLOW Line** (17 stations, 9 interchange nodes): Aksengir – Tau-Samal (37 km / 22,99 mi);
- **the Proposed Radial CELADON Line** (18 stations, 8 interchange nodes): Zhapek Batyr – Butakovka (40 km / 24,85 mi);
- **the Proposed Radial GREY Line** (7 stations, 4 interchange nodes): Tole Bi koshesi – Khan-Tengri (10 km / 6,21 mi).

One (the "Blue", the "Yellow", the "Celadon") or both (the "Green", the "Orange") Endpoints of proposed radial Metro lines (with the exception of the "Grey" and the "Brown") linked to the Line of the Big Almaty Ring Road – "БАКАД".

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

19. The Conception of the Almaty Metro Development (the Map and Scheme)



Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

20. Existing, constructed and planned lines in the proposed Radial-Ring network of the Almaty Metro

THE EXISTING LINE (7 stations, 5 interchange nodes): Raiymbek Batyr *(the Interchange node with the Planned Radial Line and with the Proposed Radial BLUE Line)* – Zhibek Zholy *(the Interchange node with the Planned Radial Line)* – Almaly – Abai – Baykonur *(the Interchange node with the Proposed Radial YELLOW Line)* – Auezov teatry *(the Interchange node with the Proposed Radial GREEN Line)* – Alatay *(the Interchange node with the Constructed Line and with the Proposed Radial BROWN Line)*. The situation from 2011 to 2015.

THE CONSTRUCTED RADIAL LINE – the Continuation of the Existing Line (3 stations, 2 interchange nodes): Alatay *(the Station of the Existing Line, the Interchange node with the Proposed Radial BROWN Line)* – Rozybakiev koshesi *(the NEW PROPOSED STATION, the Interchange node with the Proposed Radial GREY Line)* – Sairan *(the Interchange node with the Planned Radial Line)* – Moskwa *(the Interchange node with the Planned Radial Line)*. The situation from 2011 to 2015.

THE 1st PLANNED RADIAL LINE – the Continuation of the Existing Line (9 stations, 6 interchange nodes): Raiymbek Batyr *(the Station of the Existing Line, the Interchange node with the Proposed Radial BLUE Line)* – Seifullin dangyly *(the Interchange node with the Proposed Radial YELLOW Line)* – Kotchin koshesi *(the Interchange node with the Proposed Radial ORANGE Line)* – Baumnyn Togaiy – Zhumabaev koshesi *(the Interchange node with the Proposed Radial GREEN Line)* – Tschernyshevsky koshesi – Wokzal Almaty-1 *(the NEW PROPOSED STATION, the Interchange node with the Proposed Ring RED Line)* – Bekmakhanov koshesi – Beisembaev koshesi *(the Interchange node with the Proposed Radial CELADON Line)* – Yntymak *(the Interchange node with the Planned Radial Line)*.

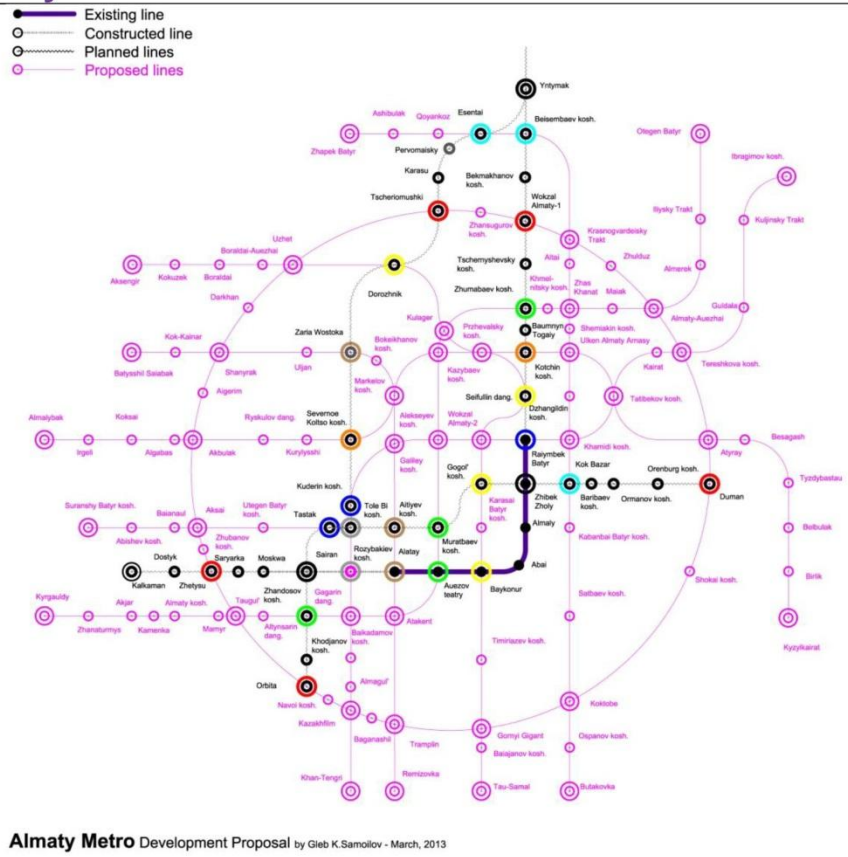
THE 2nd PLANNED RADIAL LINE – the Continuation of the Constructed Line (4 stations, 1 interchange node): Moskwa *(the Station of the Constructed Line)* – Saryarka – Zhetysu *(the NEW PROPOSED STATION, the Interchange node with the Proposed Ring RED Line)* – Dostyk – Kalkaman.

THE 3rd PLANNED RADIAL LINE (15 stations, 10 interchange node): Orbita *(the Interchange node with the Proposed Ring RED Line)* – Khodjanov koshesi – Zhandosov koshesi *(the Interchange node with the Proposed Radial GREEN Line)* – Sairan *(the Interchange node with the Constructed Radial Line)* – Tastak *(the NEW PROPOSED STATION, the Interchange node with the Proposed Radial BLUE Line)* – Tole Bi koshesi *(the Interchange node with the Planned Line / the Proposed Radial GREY Line)* – Aitiyev koshesi *(the Interchange node with the Proposed Radial BROWN Line)* – Muratbaev koshesi *(the Interchange node with the Proposed Radial GREEN Line)* – Gogol' koshesi *(the Interchange node with the Proposed Radial YELLOW Line)* – Zhibek Zholy *(the Interchange node with the Existing Line)* – Kok Bazar *(the NEW PROPOSED STATION, the Interchange node with the Proposed Radial CELADON Line)* – Baribaev koshesi – Ormanov koshesi (*the NEW PROPOSED STATION*) – Orenburg koshesi – Duman *(the Interchange node with the Proposed Ring RED Line)*.

THE 4th PLANNED LINE (9 stations, 7 interchange node): Tole Bi koshesi *(the Interchange node with the Planned Radial Line)* – Kuderin koshesi *(the Interchange node with the Proposed Radial BLUE Line)* – Severnoe Koltso koshesi *(the Interchange node with the Proposed Radial ORANGE Line)* – Zaria Wostoka *(the NEW PROPOSED STATION, the Interchange node with the Proposed Radial BROWN Line)* – Dorozhnik *(the Interchange node with the Proposed Radial YELLOW Line)* – Tscheriomushki *(the Interchange node with the Proposed Ring RED Line)* – Karasu – Pervomaisky – Esentai *(the Interchange node with the Proposed Radial CELADON Line)* – Yntymak *(the Interchange node with the Planned Radial Line)*.

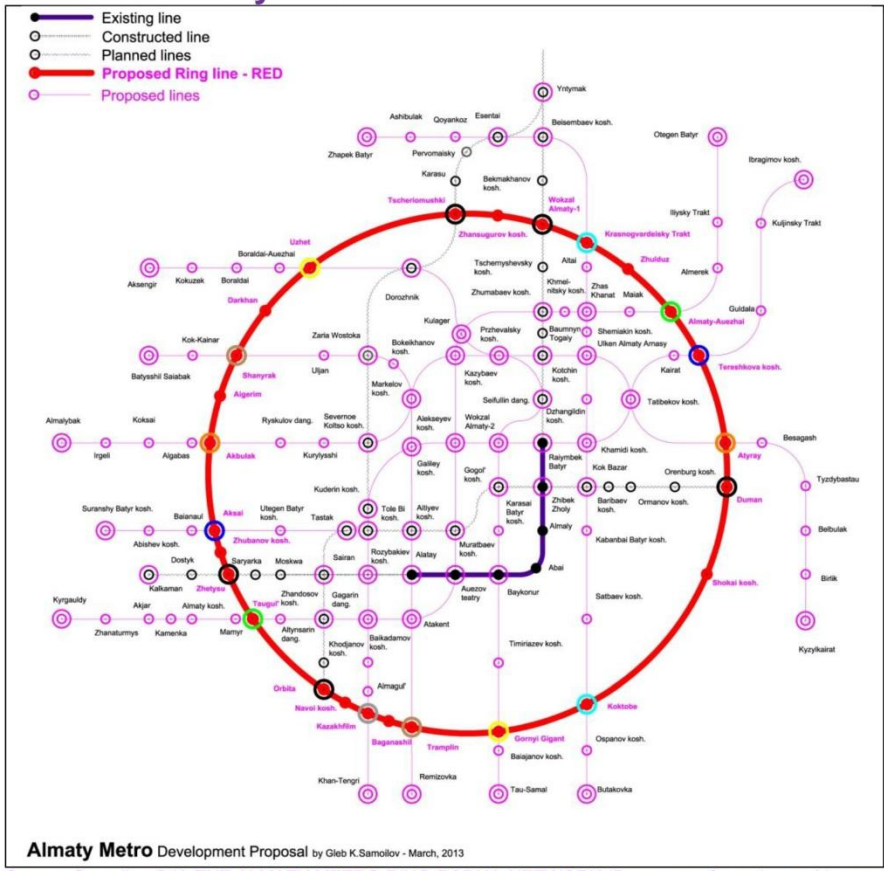
Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

21. Positions of existing, constructed and planned lines in the proposed Radial-Ring network of the Almaty Metro The situation from 2011 to 2015.



Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

22. The position of the proposed Ring Red line in the proposed Radial-Ring network of the Almaty Metro



The 1st proposed line (Ring) in the diagram is shown in Red. The stations of this line provide interchanges to all the radial lines (planned and proposed: Yellow, Blue, Green, Orange, Brown, Grey, Celadon).

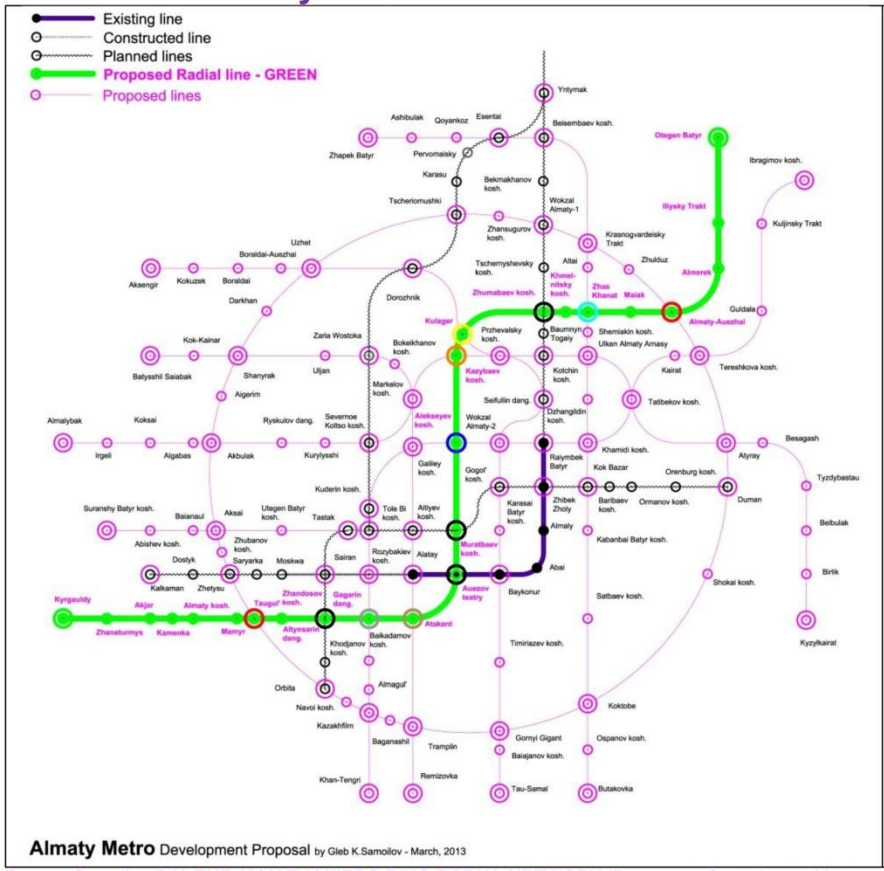
THE PROPOSED RING RED LINE

(26 stations, 18 interchange nodes):

*Almaty-Auezhai *(the Interchange node with the Proposed Radial GREEN Line)* – Tereshkova koshesi *(the Interchange node with the Proposed Radial BLUE Line)* – Atyray *(the Interchange node with the Proposed Radial ORANGE Line)* – Duman *(the Interchange node with the Planned Radial Line)* – Shokai koshesi – Koktobe *(the Interchange node with the Proposed Radial CELADON Line)* – Gornyi Gigant *(the Interchange node with the Proposed Radial YELLOW Line)* – Tramplin *(the Interchange node with the Proposed Radial BROWN Line)* – Baganashil – Kazakhfilm *(the Interchange node with the Proposed Radial GREY Line)* – Navoi koshesi – Orbita *(the Interchange node with the Planned Radial line)* – Taugul' *(the Interchange node with the Proposed Radial GREEN Line)* – Zhetysu *(the Interchange node with the Planned Radial Line)* – Zhubanov koshesi – Aksai *(the Interchange node with the Proposed Radial BLUE Line)* – Akbulak *(the Interchange node with the Proposed Radial ORANGE Line)* – Aigerim – Shanyrak *(the Interchange node with the Proposed Radial BROWN Line)* – Darkhan – Uzhet *(the Interchange node with the Proposed Radial YELLOW Line)* – Tscheriomushki *(the Interchange node with the Planned Radial Line)* – Zhansugurov koshesi – Wokzal Almaty-1 *(the Interchange node with the Planned Radial Line)* – Krasnogvardeisky Trakt *(the Interchange node with the Proposed Radial CELADON Line)* – Zhulduz*.

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

23. The position of the proposed Radial Green line in the proposed Radial-Ring network of the Almaty Metro



The 2nd proposed line (Radial) in the diagram is shown in Green. The stations of this line provide interchanges to the ring line and radial lines (existing, planned and proposed: Red, Blue, Yellow, Orange, Brown, Grey and Celadon).

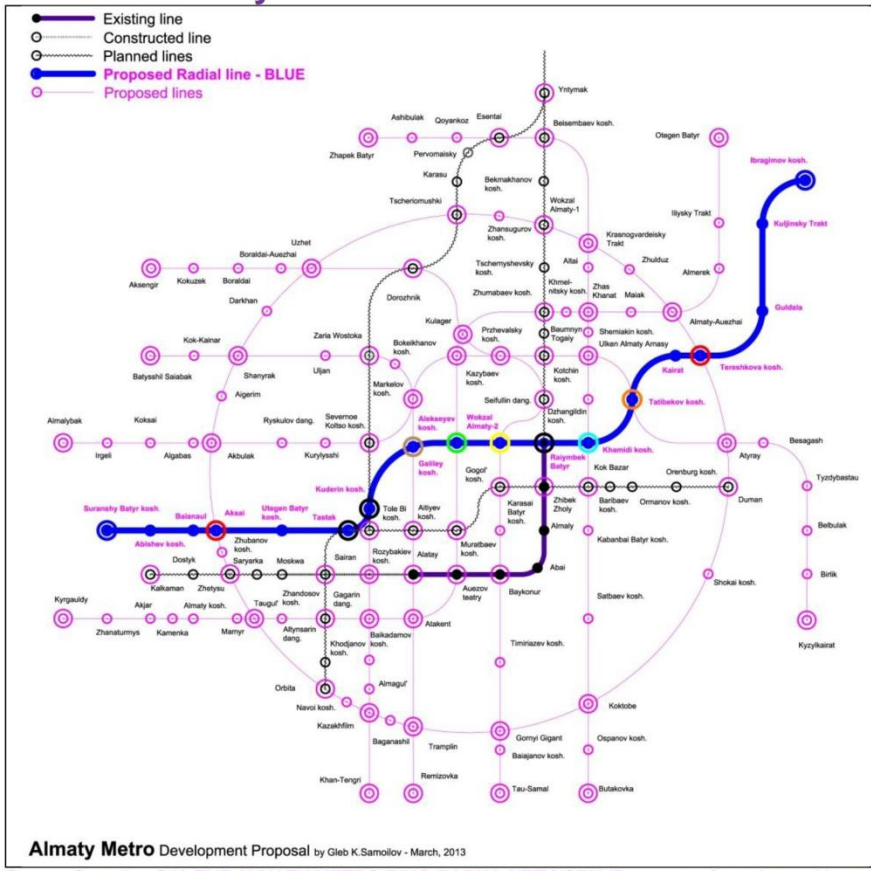
THE PROPOSED RADIAL GREEN LINE

(24 stations, 12 interchange nodes):

Kyrgauldy – Zhanaturmys – Akjar – Kamenka – Almaty koshesi – Mamyr – Taugul' *(the Interchange node with the Proposed Ring RED Line)* – Altynsarin dangyly – Zhandosov koshesi *(the Interchange node with the Planned Radial Line)* – Gagarin dangyly *(the Interchange node with the Proposed Radial GREY Line)* – Atakent *(the Interchange node with the Proposed Radial BROWN Line)* – Auezov Teatry *(the Interchange node with the Existing Line)* – Muratbaev koshesi *(the Interchange node with the Planned Radial Line)* – Alekseev koshesi *(the Interchange node with the Proposed Radial BLUE Line)* – Kazybaev koshesi *(the Interchange node with the Proposed Radial ORANGE Line)* – Kulager *(the Interchange node with the Proposed Radial YELLOW Line)* – Zhumabaev koshesi *(the Interchange node with the Planned Radial Line)* – Khmelknitsky koshesi – Zhas Kanat *(the Interchange node with the Proposed Radial CELADON Line)* – Maiak – Almaty Auezhai *(the Interchange node with the Proposed Ring RED Line)* – Almerek – Iliysky Trakt – Otegen Batyr.

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

24. The position of the proposed Radial Blue line in the proposed Radial-Ring network of the Almaty Metro



The 3rd proposed line (Radial) in the diagram is shown in Blue. The stations of this line provide interchanges to the ring line and radial lines (existing, planned and proposed: Red, Yellow, Green, Orange, Brown and Celadon).

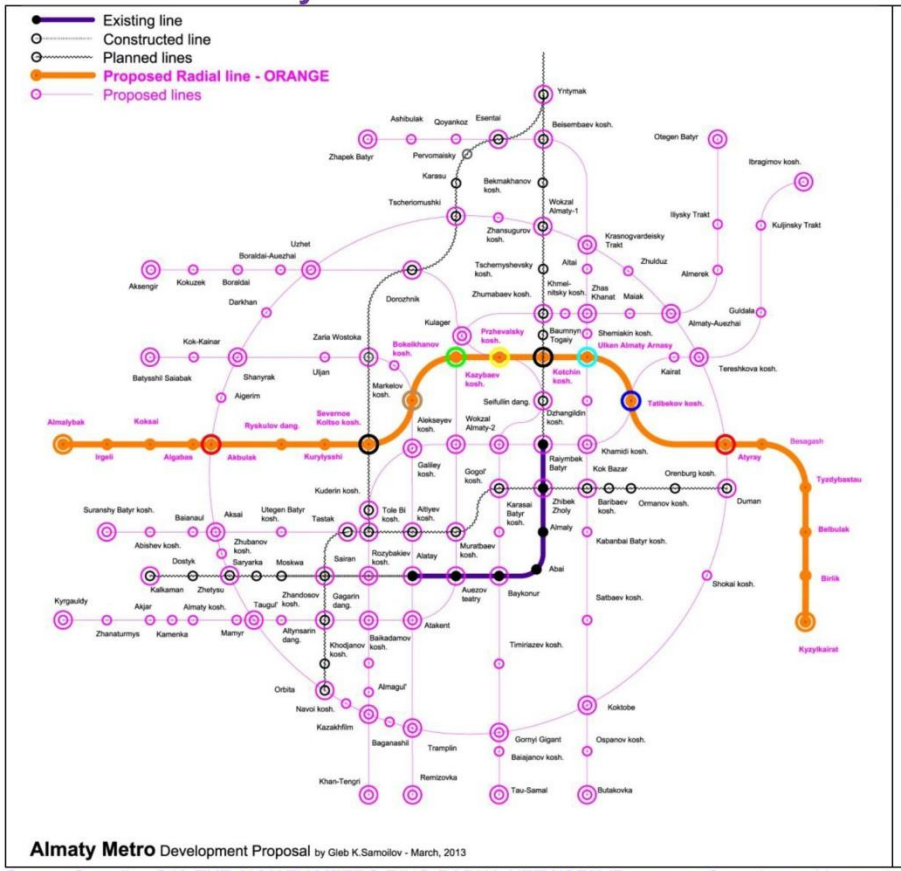
THE PROPOSED RADIAL BLUE LINE

(18 stations, 10 interchange nodes):

Suranshy Batyr koshesi – Abishev koshesi – Baianaul – Aksai *(the Interchange node with the Proposed Ring RED Line)* – Utegen Batyr koshesi – Tastak *(the Interchange node with the Planned Radial Line)* – Kuderin koshesi *(the Interchange node with the Planned Radial Line)* – Galiley koshesi *(the Interchange node with the Proposed Radial BROWN Line)* – Alekseyev koshesi *(the Interchange node with the Proposed Radial GREEN Line)* – Wokzal Almaty-2 *(the Interchange node with the Proposed Radial YELLOW Line)* – Raiymbek Batyr *(the Interchange node with the Existing Line / Planned Radial Line)* – Khamidi koshesi *(the Interchange node with the Proposed Radial CELADON Line)* – Tatibekov koshesi *(the Interchange node with the Proposed Radial ORANGE Line)* – Kairat – Tereshkova koshesi *(the Interchange node with the Proposed Ring RED Line)* – Guldala – Kuljinsky Trakt – Ibragimov koshesi.

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

25. The position of the proposed Radial Orange line in the proposed Radial-Ring network of the Almaty Metro



The 4th proposed line (Radial) in the diagram is shown in Orange. The stations of this line provide interchanges to the ring line and radial lines (planned and proposed: Red, Blue, Green, Yellow, Brown and Celadon).

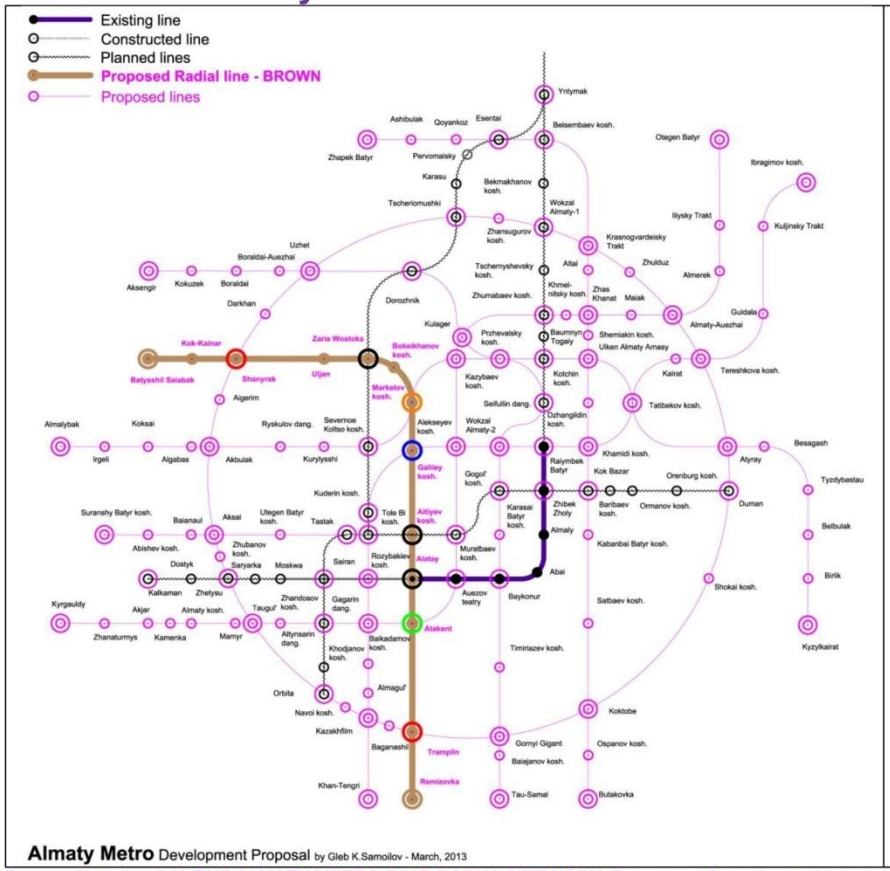
THE PROPOSED RADIAL ORANGE LINE

(20 stations, 9 interchange nodes):

Almalybak – Irgeli – Koksai – Algabas – Akbulak *(the Interchange node with the Proposed Ring RED Line)* – Ryskulov dangyly – Kurylysshi – Severnoe Koltso koshesi *(the Interchange node with the Planned Radial Line)* – Bokeikhanov koshesi *(the Interchange node with the Proposed Radial BROWN Line)* – Kazybaev koshesi *(the Interchange node with the Proposed Radial GREEN Line)* – Przhevalsky koshesi *(the Interchange node with the Proposed Radial YELLOW Line)* – Kotchin koshesi *(the Interchange node with the Planned Radial Line)* – Ulken Almaty Arnasy *(the Interchange node with the Proposed Radial CELADON Line)* – Tatibekov koshesi *(the Interchange node with the Proposed Radial BLUE Line)* – Atyray *(the Interchange node with the Proposed Ring RED Line)* – Besagash – Tyzdybastau – Belbulak – Birlik – Kyzylkairat.

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

26. The position of the proposed Radial Brown line in the proposed Radial-Ring network of the Almaty Metro



The 5th proposed line (Radial) in the diagram is shown in Brown. The stations of this line provide interchanges to the ring line and radial lines (existing, planned and proposed: Red, Blue, Green, Orange).

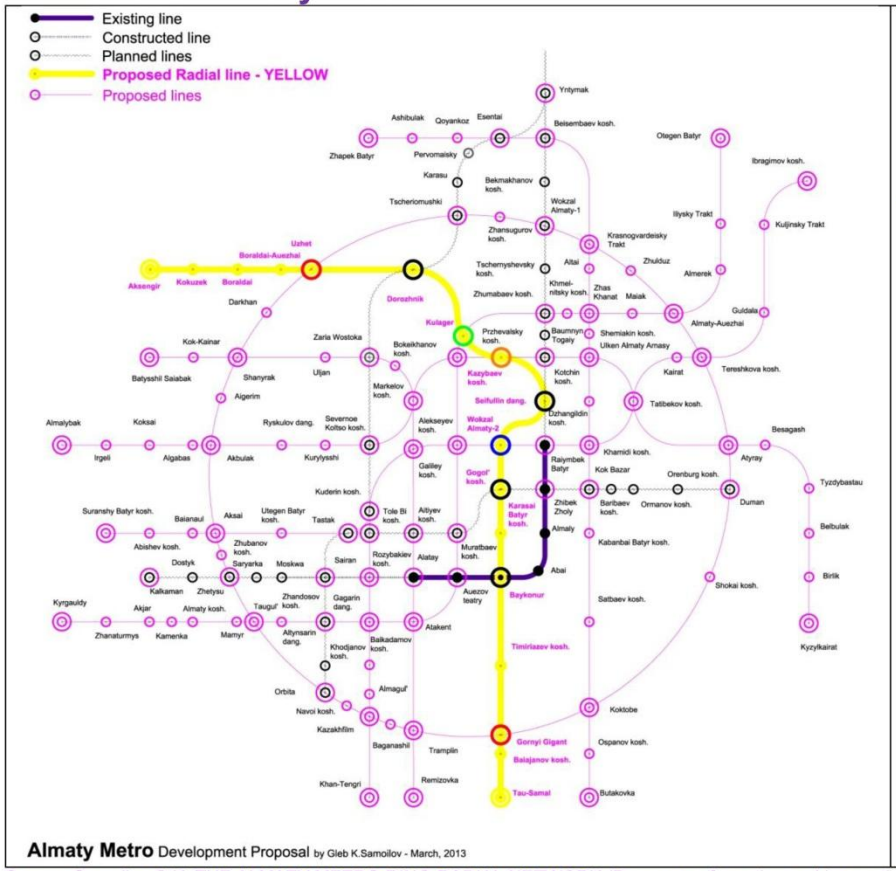
THE PROPOSED RADIAL BROWN LINE

(13 stations, 8 interchange nodes):

Batysshil Saiabak – Kok-Kainar – Shanyrak *(the Interchange node with the Proposed Ring RED Line)* – Uljan – Zaria Wostoka *(the Interchange node with the Planned Radial Line)* – Markelov koshesi – Bokeikhanov koshesi *(the Interchange node with the Proposed Radial ORANGE Line)* – Galiley koshesi *(the Interchange node with the Proposed Radial BLUE Line)* – Aitiyev koshesi *(the Interchange node with the Planned Radial Line)* – Alatay *(the Interchange node with the Existing Line)* – Atakent *(the Interchange node with the Proposed Radial GREEN Line)* – Tramplin *(the Interchange node with the Proposed Ring RED Line)* – Remizovka.

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

27. The position of the proposed Radial Yellow line in the proposed Radial-Ring network of the Almaty Metro



The 6th proposed line (Radial) in the diagram is shown in Yellow. The stations of this line provide interchanges to the ring line and radial lines (existing, planned and proposed: Red, Blue, Green and Orange).

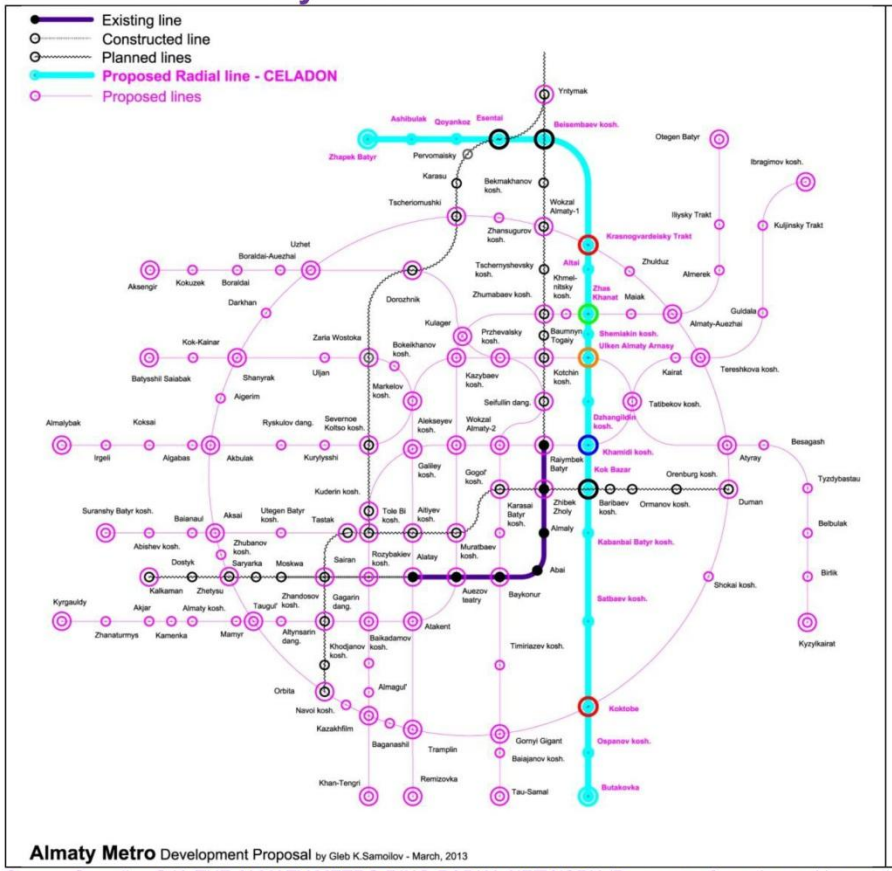
THE PROPOSED RADIAL YELLOW LINE

(17 stations, 9 interchange nodes):

Aksengir – Kokuzek – Boraldai – Boraldai-Auezhai – Uzhet *(the Interchange node with the Proposed Ring RED Line)* – Dorozhnik *(the Interchange node with the Planned Radial Line)* – Kulager *(the Interchange node with the Proposed Radial GREEN Line)* – Przhevalsky koshesi *(the Interchange node with the Proposed Radial ORANGE Line)* – Seifullin dangyly *(the Interchange node with the Planned Radial Line)* – Wokzal Almaty-2 *(the Interchange node with the Proposed Radial BLUE Line)* – Gogol' koshesi *(the Interchange node with the Planned Radial Line)* – Karasai Batyr koshesi – Baykonur *(the Interchange node with the Existing Line)* – Timiriazev koshesi – Gorny Gigant *(the Interchange node with the Proposed Ring RED Line)* – Baiajanov koshesi – Tau-Samal.

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

28. The position of the proposed Radial Celadon line in the proposed Radial-Ring network of the Almaty Metro



The 7th proposed line (Radial) in the diagram is shown in Celadon. The stations of this line provide interchanges to the ring line and radial lines (planned and proposed: Red, Blue, Green, Orange).

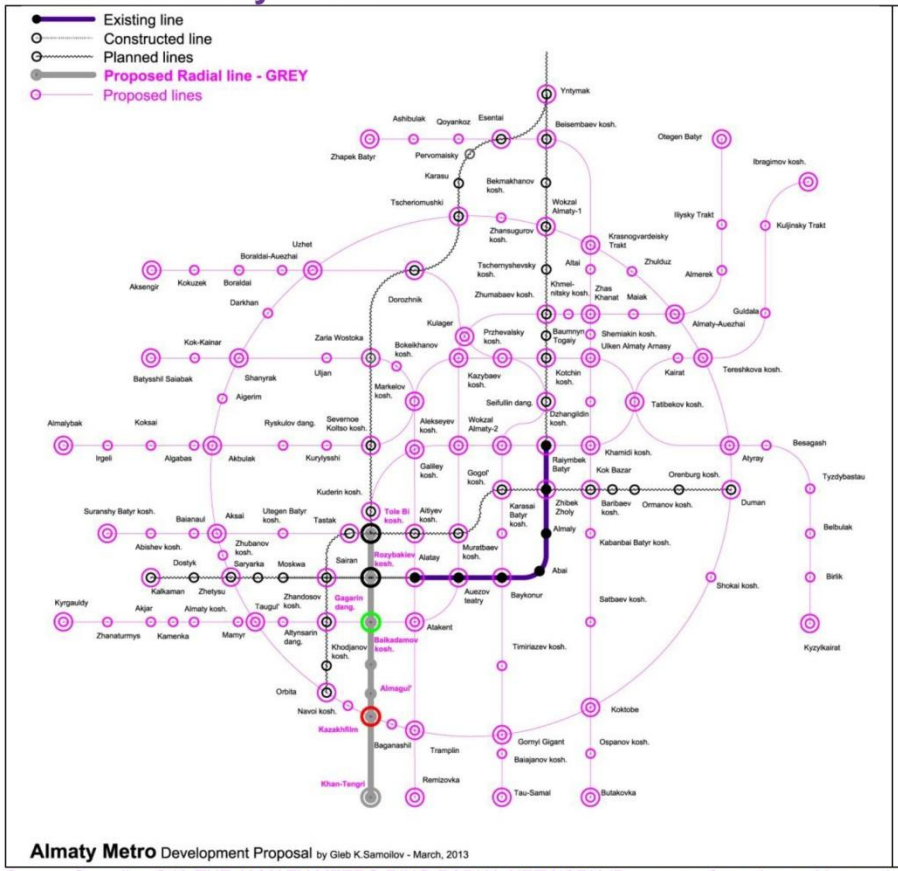
THE PROPOSED RADIAL CELADON LINE

(18 stations, 8 interchange nodes):

Zhapek Batyr – Ashibulak – Qoyankoz – Esentai *(the Interchange node with the Planned Radial Line)* – Beisembaev koshesi *(the Interchange node with the Planned Radial Line)* – Krasnogvardeisky Trakt *(the Interchange node with the Proposed Ring RED Line)* – Altai – Zhas Kanat *(the Interchange node with the Proposed Radial GREEN Line)* – Shemiakin koshesi – Ulken Almaty Arnasy *(the Interchange node with the Proposed Radial ORANGE Line)* – Dzhangildin koshesi – Khamidi koshesi *(the Interchange node with the Proposed Radial BLUE Line)* – Kok Bazar *(the Interchange node with the Planned Radial Line)* – Kabanbai Batyr koshesi – Satbaev koshesi – Koktobe *(the Interchange node with the Proposed Ring RED Line)* – Ospanov koshesi – Butakovka.

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

29. The position of the proposed Radial Grey line in the proposed Radial-Ring network of the Almaty Metro



The 8th proposed line (Radial) in the diagram is shown in Grey. The stations of this line provide interchanges to the ring line and radial lines (constructed, planned and proposed: Red, Green).

THE PROPOSED RADIAL GREY LINE

(7 stations, 4 interchange nodes):

Tole Bi koshesi *(the Interchange node with the Planned Radial Line)* – Rozybakiev koshesi *(the Interchange node with the Constructed Line)* – Gagarin dangyly *(the Interchange node with the Proposed Radial GREEN Line)* – Baikadamov koshesi – Almagul' – Kazakhfilm *(the Interchange node with the Proposed Ring RED Line)* – Khan-Tengri.

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

30. Interchange node types

In proposed extensive Metro scheme the interchanges of two kinds are applied – "Parallel" and "Perpendicular". All the new stations have "Island" platform type. Reconstructed stations have platforms of "Island" type and "Coastal" type.

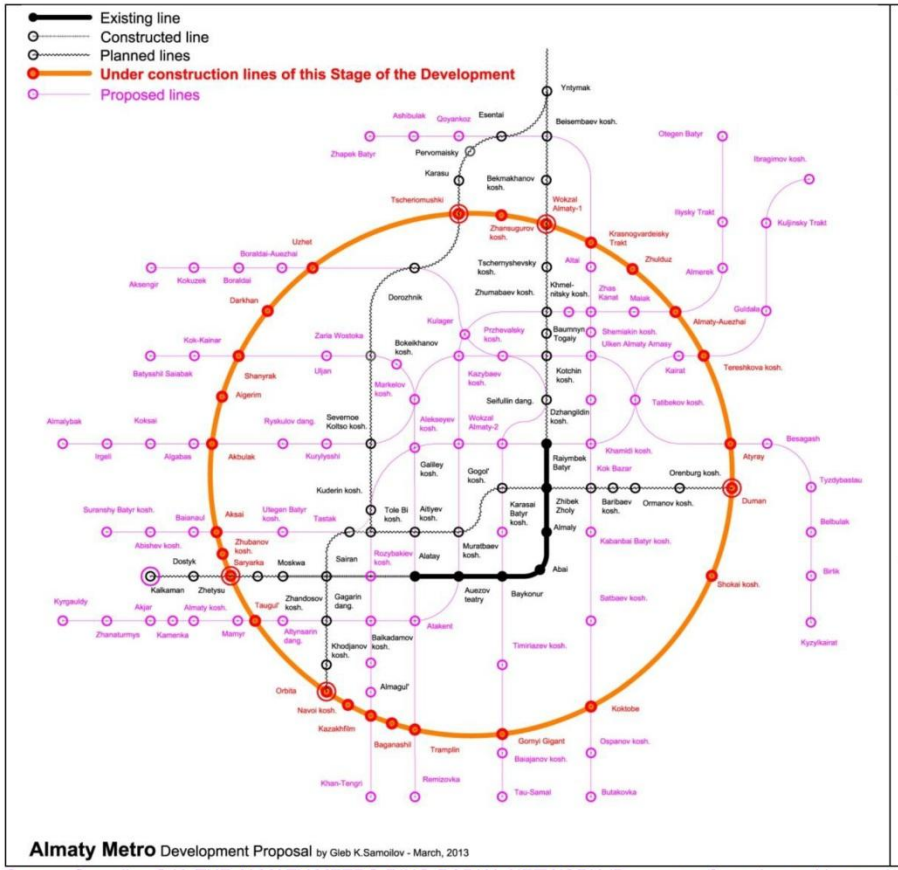
A "Parallel" interchange node provides the transfer on the station in two ways: "On the same platform" with the transfer of passengers in the forward direction, or "Over the platform" for transfer of passengers in the opposite direction. These are interchange nodes with the largest number of passengers (8 points): ***YNTYMAK*** – the Interchange node between Planned Radial Lines; ***ALMATY AUEZHAI*** – the Interchange node between the Proposed Radial GREEN Line and the Proposed Ring RED line; ***SEIFULLIN DANDYLY*** – the Interchange node between the Planned Radial Line and the Proposed Radial YELLOW line; ***TERESHKOVA KOSHESI*** – the Interchange node between the Proposed Radial BLUE Line and the Proposed Ring RED line; ***TATIBEKOV KOSHESI*** – the Interchange node between the Proposed Radial BLUE Line and the Proposed Radial ORANGE line; ***KUDERIN KOSHESI*** – the Interchange node between the Proposed Radial BLUE Line and the Planned Radial line; ***TASTAK*** – the Interchange node between the Proposed Radial BLUE Line and the Planned Radial line; ***BEISEMBAEV KOSHESI*** – the Interchange node between the Proposed Radial CELADON Line and the Planned Radial line.

A "Perpendicular" interchange node provides the passenger transition from the station to the station in three versions: "Side-Side", "Middle-Side" or "Side-Middle", "Middle-Middle" (47 points): ***RAIYMBEK BATYR; ZHIBEK ZHOLY***; ***BAYKONUR***; ***AUEZOV TEATRY***; ***ALATAY***; ***ROZYBAKIEV KOSHESI***; ***SAIRAN***; ***KOTCHIN KOSHESI***; ***ZHUMABAEV KOSHESI***; ***WOKZAL ALMATY-1***; ***ORBITA***; ***ZHANDOSOV KOSHESI***; ***TOLE BI KOSHESI***; ***AITIYEV KOSHESI***; ***MURATBAEV KOSHESI***; ***GOGOL' KOSHESI***; ***KOK BAZAR***; ***DUMAN***; ***SEVERNOE KOLTSO KOSHESI***; ***ZARIA WOSTOKA***; ***DOROZHNIK***; ***TSCHERIOMUSHKI***; ***ESENTAI***; ***ATYRAY***; ***KOKTOBE***; ***GORNYI GIGANT***; ***TRAMPLIN***; ***KAZAKHFILM***; ***TAUGUL'***; ***AKSAI***; ***AKBULAK***; ***SHANYRAK***; ***UZHET***; ***KRASNOGVARDEISKY TRAKT***; ***GAGARIN DANGYLY***; ***ATAKENT***; ***ALEKSEEV KOSHESI***; ***KAZYBAEV KOSHESI***; ***KULAGER*** ; ***ZHAS KANAT***; ***GALILEY KOSHESI***; ***WOKZAL ALMATY-2***; ***KHAMIDI KOSHESI*** ; ***BOKEIKHANOV KOSHESI***; ***PRZHEVALSKY KOSHESI***; ***ULKEN ALMATY ARNASY.***

All new stations vestibules for inputs and outputs from streets (antechambers or anterooms) are located below ground. Each from six existing stations have only one vestibule. The Alatau station has two vestibules. Each new station has two vestibules. The Main vestibule has descent by escalator to the platform (4 escalators); the Second vestibule has descent by elevator to the platform (4 elevators). In some situations the Main vestibule of the Interchange node provides entrances/exits on both stations. This vestibule has 8 escalators – 4 escalators for each platform.

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

31. The First Stage of the Almaty Metro Ring-Radial scheme development



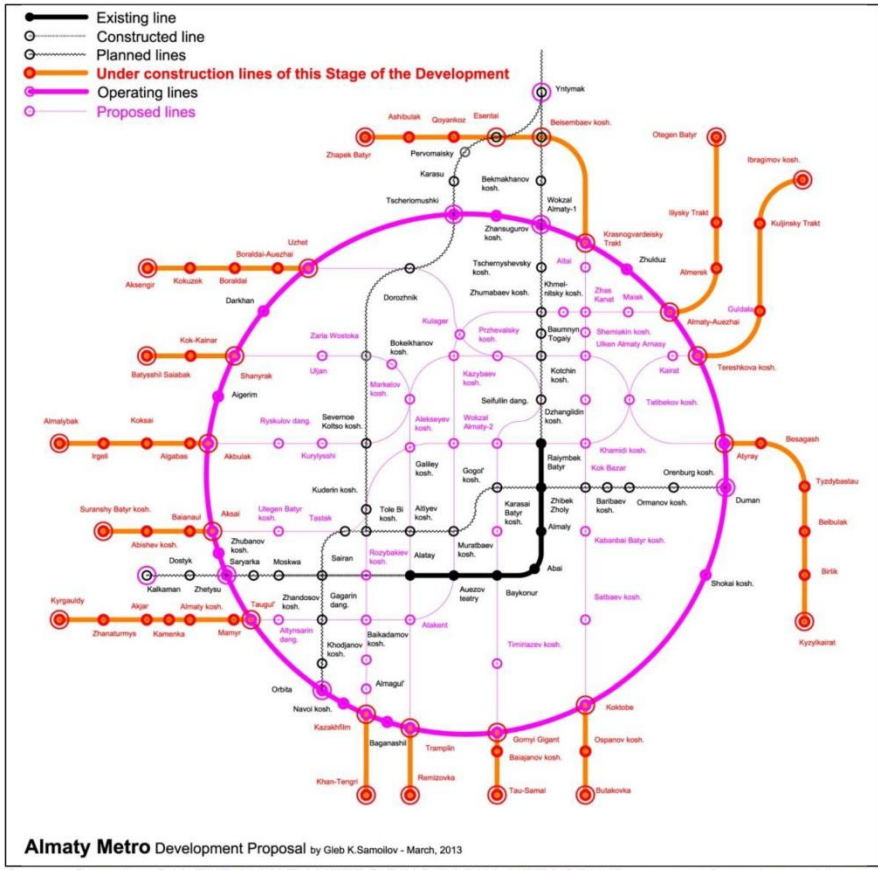
The proposed sequence of development is based on a system that consists of an existing line, the line being built and planned lines. The most appropriate plan of development is the Triad: **THE RING LINE – EXTERNAL RADIUS LINES, WHICH CONNECTED ONLY WITH THE RING LINE – COMBINING EXTERNAL RADIAL LINES INTO DIAMETRICAL LINES.** This method, for example, has been successfully implemented in the development of the Moscow Metro in Second half of 20 Century. The Almaty Metro development consists of five successive stages.

THE FIRST STAGE OF THE RING-RADIAL SCHEME DEVELOPMENT – the Ring line construction (26 new stations, 18 new interchange nodes). Under construction line of this Development Stage:

The Ring Line (26 new stations, 18 new interchange nodes).

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

32. The Second Stage of the Almaty Metro Ring-Radial scheme development



THE SECOND STAGE OF THE RING-RADIAL SCHEME DEVELOPMENT – Radial Lines construction (54 new stations, 15 operated interchange nodes). New thirteen Lines are arranged on the outer side of the Ring.

Under construction Lines of this Development Stage:

The 1st outer portion of Lines (4 new stations, 1 operated interchange node);

The 2nd outer portion of Lines (4 new stations, 1 operated interchange node);

The 3rd outer portion of Lines (7 new stations, 1 operated interchange node);

The 4th outer portion of Lines (4 new stations, 1 operated interchange node);

The 5th outer portion of Lines (5 new stations, 1 operated interchange node);

The 6th outer portion of Lines (6 new stations, 1 operated interchange node);

The 7th outer portion of Lines (3 new stations, 1 operated interchange node);

The 8th outer portion of Lines (2 new stations, 1 operated interchange node);

The 9th outer portion of Lines (5 new stations, 1 operated interchange node);

The 10th outer portion of Lines (3 new stations, 1 operated interchange node);

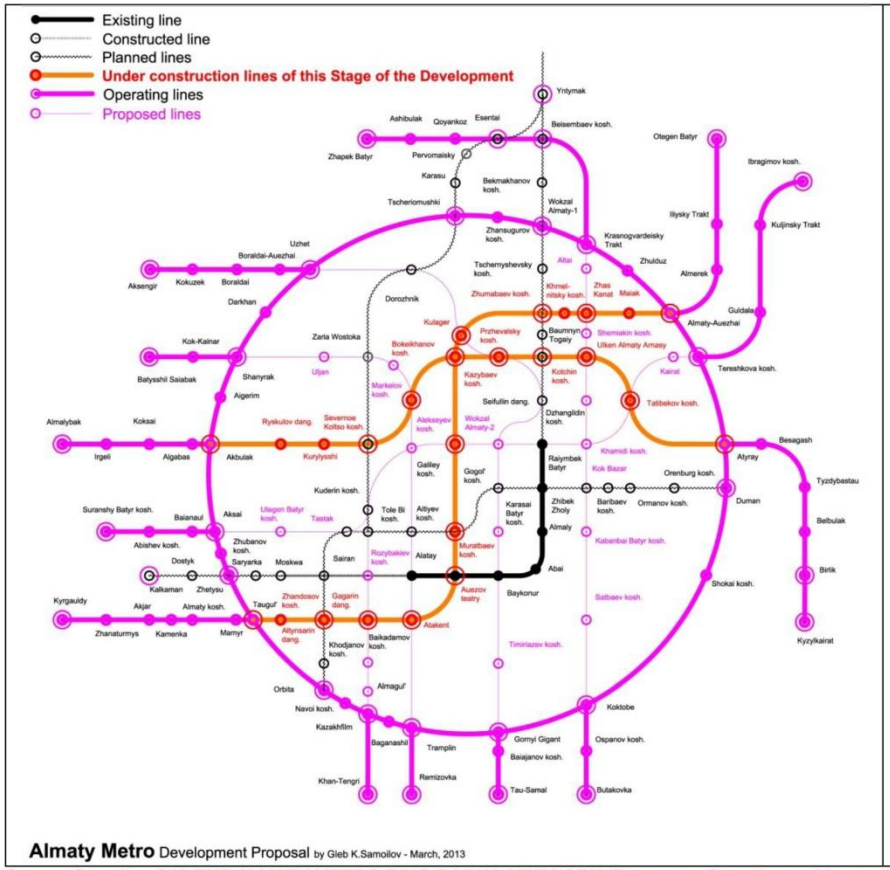
The 11th outer portion of Lines (6 new stations, 3 operated interchange nodes);

The 12th outer portion of Lines (3 new stations, 1 operated interchange node);

The 13th outer portion of Lines (2 new stations, 1 operated interchange node).

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

33. The Third Stage of the Almaty Metro Ring-Radial scheme development



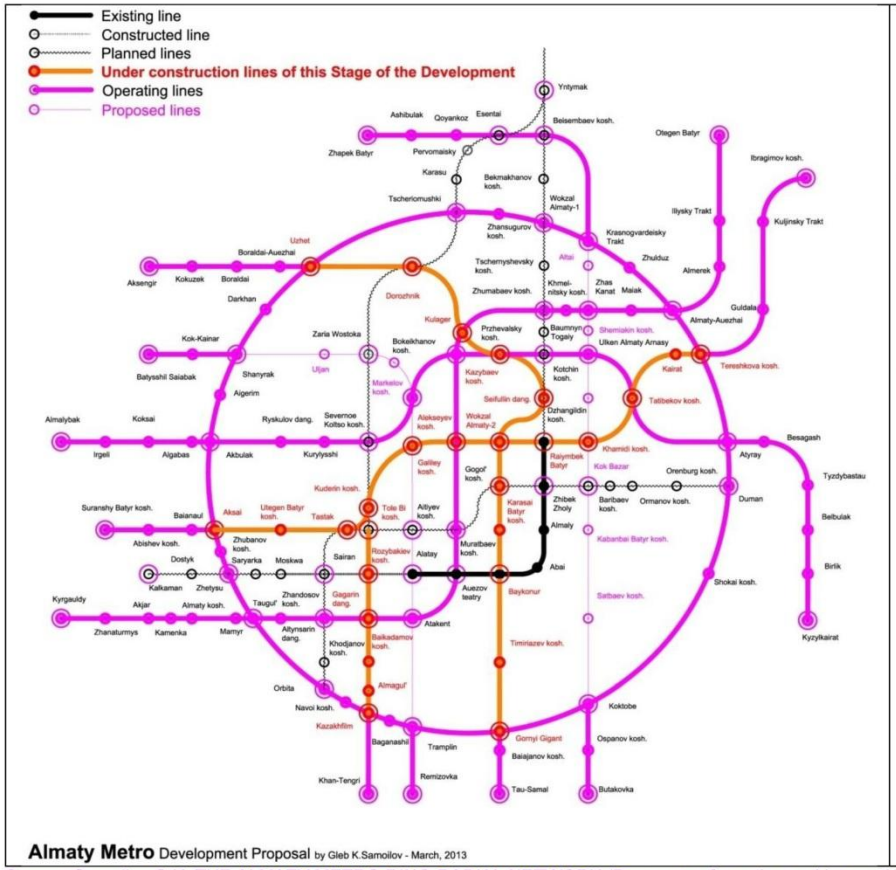
THE THIRD STAGE OF THE RING-RADIAL SCHEME DEVELOPMENT – the Radial lines construction (21 new stations, 4 operated stations, 6 operated interchange nodes, 10 new interchange nodes). New two (the 1st , the 2nd) lines are arranged on the inner side of the Ring. Under construction lines of this Development Stage:

The 1st inner portion of lines (13 new stations, 2 operated stations, 4 operated interchange nodes, 6 new interchange nodes);

The 2nd inner portion of lines (9 new stations, 2 operated stations, 2 operated interchange nodes, 5 new interchange nodes).

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

34. The Fourth Stage of the Almaty Metro Ring-Radial scheme development



THE FOURTH STAGE OF THE RING-RADIAL SCHEME DEVELOPMENT – the Radial lines construction (35 new stations, 6 operated stations, 13 operated interchange nodes, 3 new interchange nodes). New three (the 3rd, the 4th, 5th) lines are arranged on the inner side of the Ring. Under construction lines of this Development Stage:

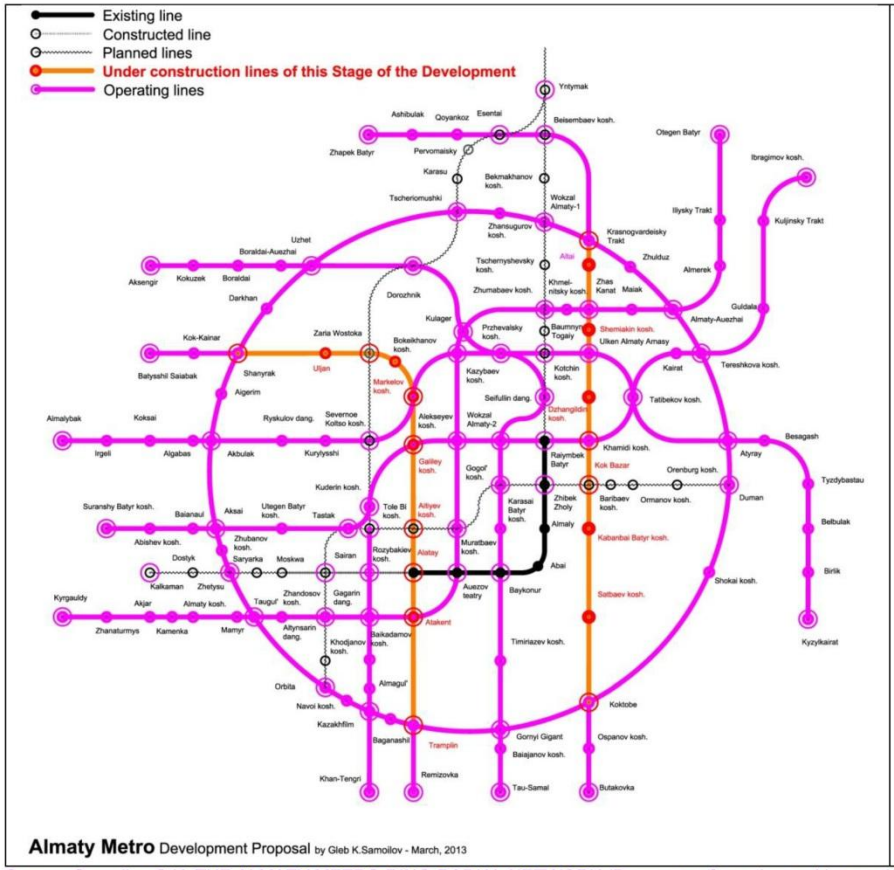
The 3rd inner portion of lines (10 new stations, 2 operated stations, 3 new interchange nodes, 6 operated interchange nodes);

The 4th inner portion of lines (9 new stations, 2 operated station, 1 new interchange node, 8 operated interchange nodes);

The 5th inner portion of lines (2 new stations, 2 operated stations, 4 operated interchange nodes).

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

35. The Fifth Stage of the Almaty Metro Ring-Radial scheme development



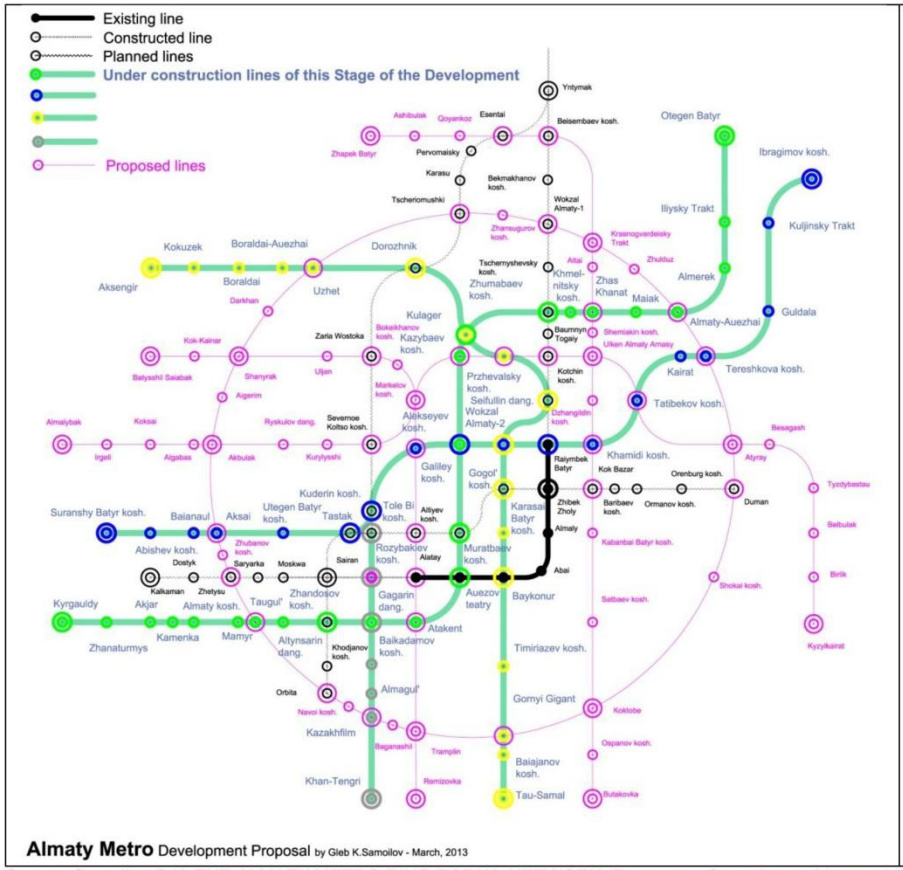
THE FIFTH STAGE OF THE RING-RADIAL SCHEME DEVELOPMENT - the Radial lines construction (19 new stations, 4 operated stations, 14 operated interchange nodes). New two (the 6th, the 7th) lines are arranged on the inner side of the Ring. Under construction lines of this Development Stage:

The 6th inner portion of lines (10 new stations, 2 operated stations, 8 operated interchange nodes);

The 7th inner portion of lines (9 new stations, 2 operated stations, 6 operated interchange nodes).

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

36. The First Alternative Stage of the Almaty Metro Ring-Radial scheme development



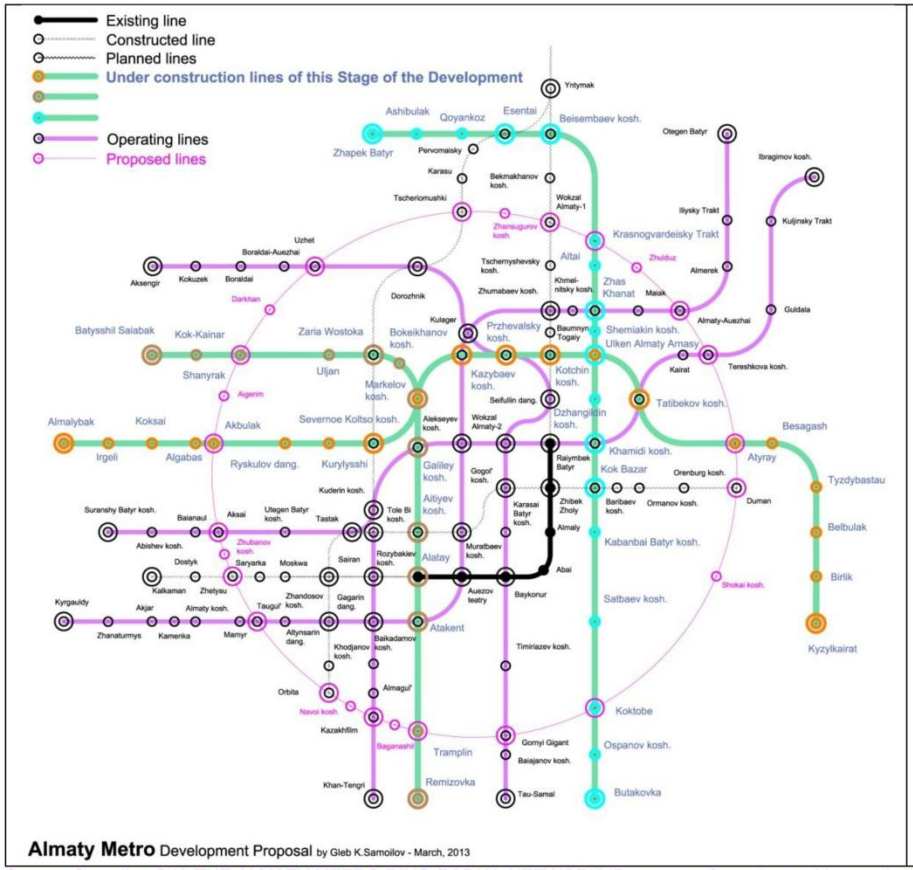
Formation of the Almaty Metro Ring-Radial network (after completion of the Constructed line and four planned lines) can be done not only with sections of lines (Five stages). **THE ALTERNATIVE – IS CONSTRUCTION OF LINE GROUPS (Three stages).**

ON THE FIRST (**ALTERNATIVE**) STAGE may construct four radial lines (the Green Radial Line, the Blue Radial Line, the Yellow Radial Line, the Grey Radial Line):

- **the Proposed Radial GREEN Line (24 stations, 12 interchange nodes);**
- **the Proposed Radial BLUE Line (18 stations, 10 interchange nodes);**
- **the Proposed Radial YELLOW Line (17 stations, 9 interchange nodes);**
- **the Proposed Radial GREY Line (5 stations, 4 interchange nodes).**

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

37. The Second Alternative Stage of the Almaty Metro Ring-Radial scheme development

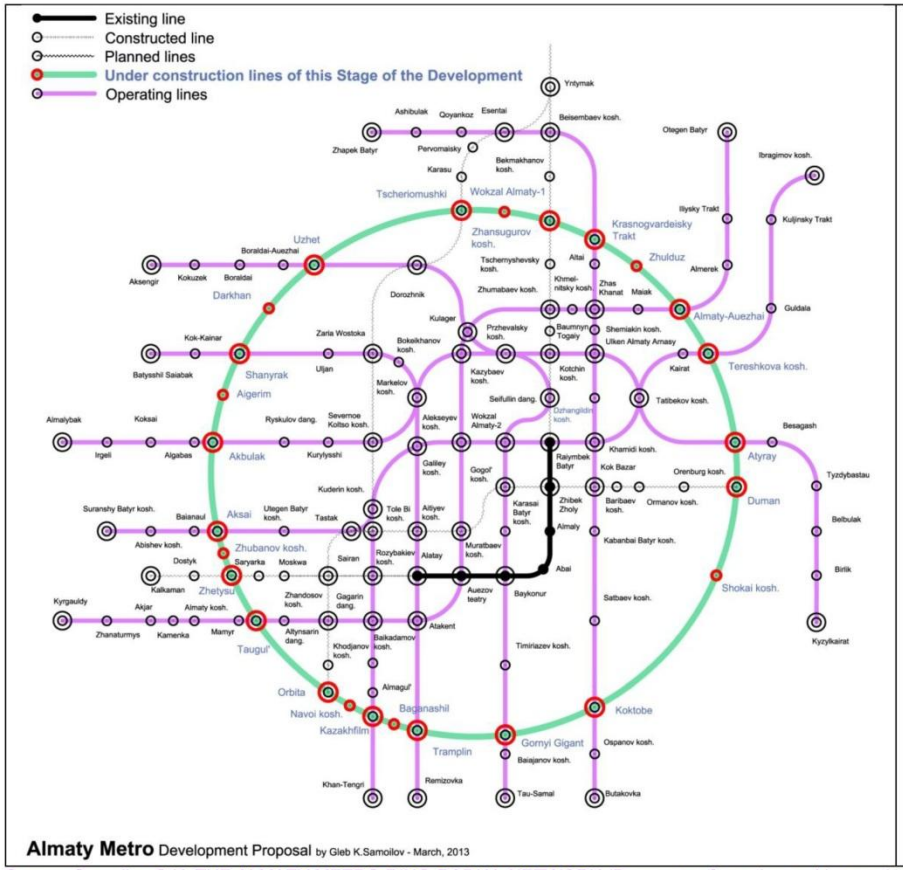


ON THE SECOND (**ALTERNATIVE**) STAGE may construct three radial lines (the Orange Radial Line, the Brown Radial Line, the Celadon Radial Line):

- **the Proposed Radial ORANGE Line (20 stations, 9 interchange nodes)**;
- **the Proposed Radial BROWN Line (13 stations, 8 interchange nodes)**;
- **the Proposed Radial CELADON Line (18 stations, 8 interchange nodes)**.

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

38. The Third Alternative Stage of the Almaty Metro Ring-Radial scheme development

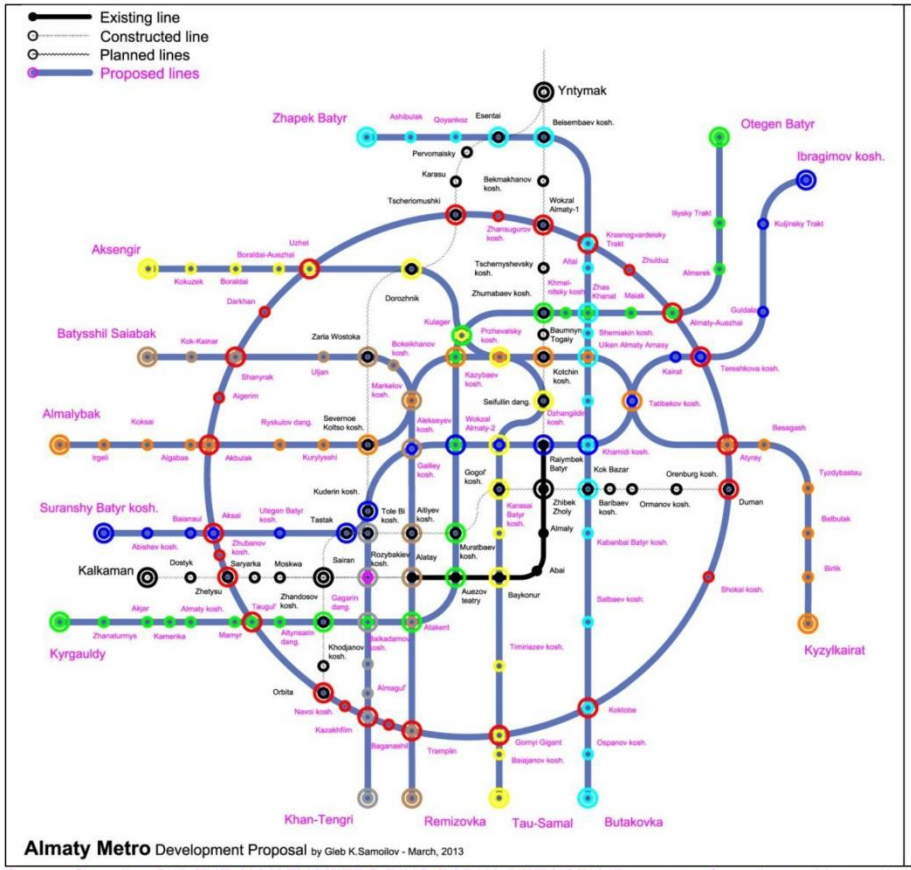


ON THE THIRD (**ALTERNATIVE**) STAGE may construct the Ring line (the Red Ring Line):

- **the Proposed Ring RED Line (26 stations, 18 interchange nodes)**.

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

39. The Form of the Almaty Metro developed Radial-Ring system

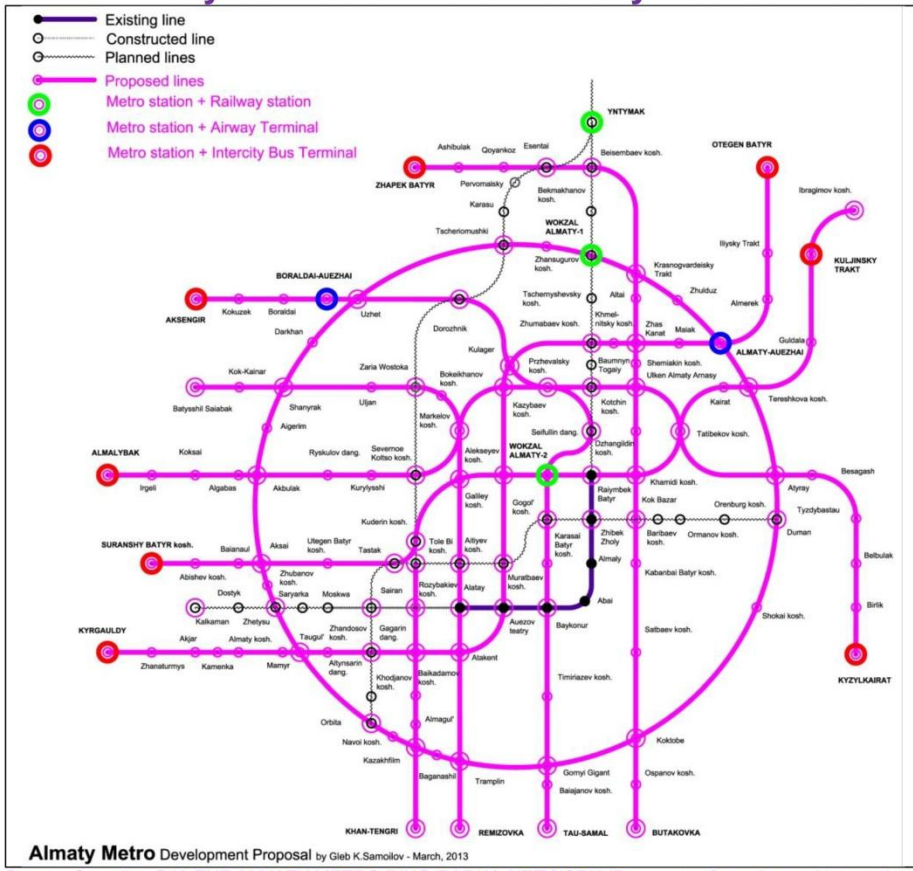


The finished form of the developed Radial-Ring system of Almaty Metro is a convenient off-street Passenger transport network with 188 stations and 55 interchange nodes on 10 lines.

The result is easily accessible in all areas of passenger traffic, and numerous interchange nodes will give the opportunity to choose the best route. This will create a system of sustainable off-street traffic. Well-functioning system of integrated public transport will significantly reduce the number of cars on streets of the city by reducing the number of buses, and by providing a convenient alternative to personal vehicles.

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

40. Integrated points of the Almaty Metro Developed network with the Airway service, the Railway service and the Intercity Bus service

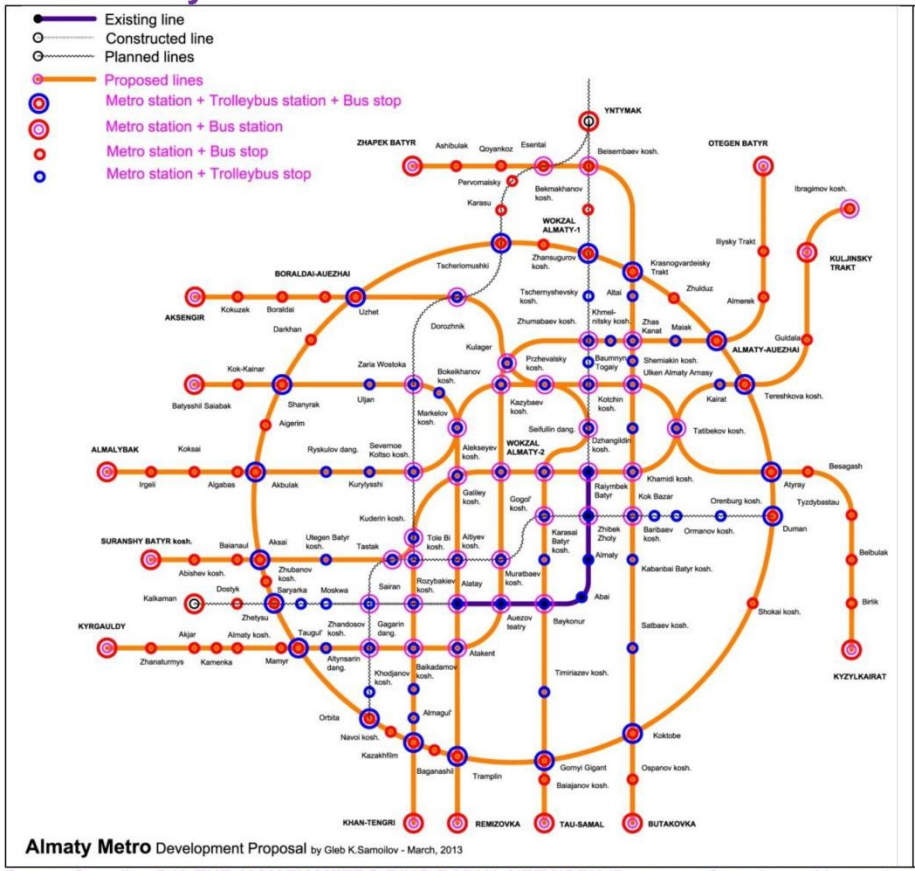


Almaty International and Long distance Domestic Passenger Transport consists of the Airway service, the Railway service and the Bus service. The proposed Developed Radial-Ring network of the Almaty Metro is integrated with different types of external transport:

- **the RAILWAY SERVICE** – new Metro stations at existing Railway stations "Almaty-1" (the Planned line / the Proposed Ring line “Red”), "Almaty-2" (the Proposed Radial line “Blue” / the Proposed Radial line “Green”), the new Metro station with the new High-speed Railway Station "Yntymak" (planned lines);
- **the AIRWAY SERVICE** – new Metro stations at the existing Airway terminals “Almaty Airport" (the Proposed Ring line “Red” / the Proposed Radial line “Green”) and "Boraldai Airport" (the Proposed Radial line “Yellow”);
- **the INTERCITY BUS SERVICE** – new metro stations at new bus stations on the Big Almaty Ring Road: "Kyrgauldy" (the Proposed Radial line “Green”), "Suranshy Batyr koshesi" (the Proposed Radial line “Blue”), "Almalybak" (the Proposed Radial line “Orange”), "Aksengir" (the Proposed Radial line “Yellow”), "Zhapek Batyr" (the Proposed Radial line “Celadon”), "Otegen Batyr" (the Proposed Radial line “Green”), "Kuljinsky Trakt" (the Proposed Radial line “Blue”), "Kyzylkairat " (the Proposed Radial line “Orange”).

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

41. Integrated points of the Almaty Metro Developed network with the Bus service and the Trolleybus service

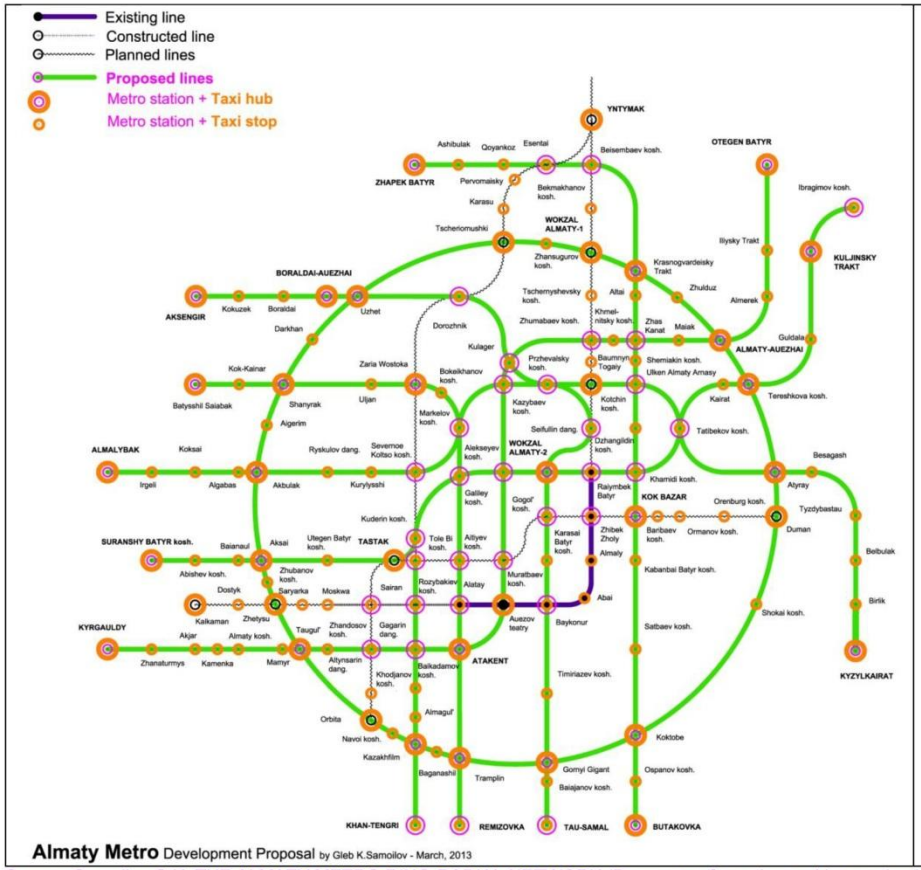


The Integration Concept of inner-city on-street passenger transport on the basis of the Metro: the Bus service from outside the Ring Line and the Trolleybus service inside the Ring Line. Bus stations are located at the ending stations of radial lines. Trolleybus stations are located at the interchange nodes of the Ring Line. The proposed Developed Radial-Ring network of the Almaty Metro is integrated with Bus- and Trolleybus services:

- **the BUS SERVICE AT METRO STATIONS OUTSIDE THE RING LINE** – 15 Bus stations at ending stations, 32 Bus stops are located on other stations (the Ring line and outer portions of radial lines);
- **the BUS SERVICE AT METRO STATIONS ON THE RING LINE** – 26 Bus stops are located on all stations of the Proposed Ring Line "Red";
- **the TROLLEYBUS SERVICE AT METRO STATIONS ON THE RING LINE** – 18 Trolleybus stations are located on all interchange nodes of the Proposed Ring Line "Red";
- **the TROLLEYBUS SERVICE AT METRO STATIONS INSIDE THE RING LINE** – 61 Trolleybus stops are located on all stations inside of the Proposed Ring Line "Red".

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

42. Integrated points of the Almaty Metro Developed network with the Taxi-service

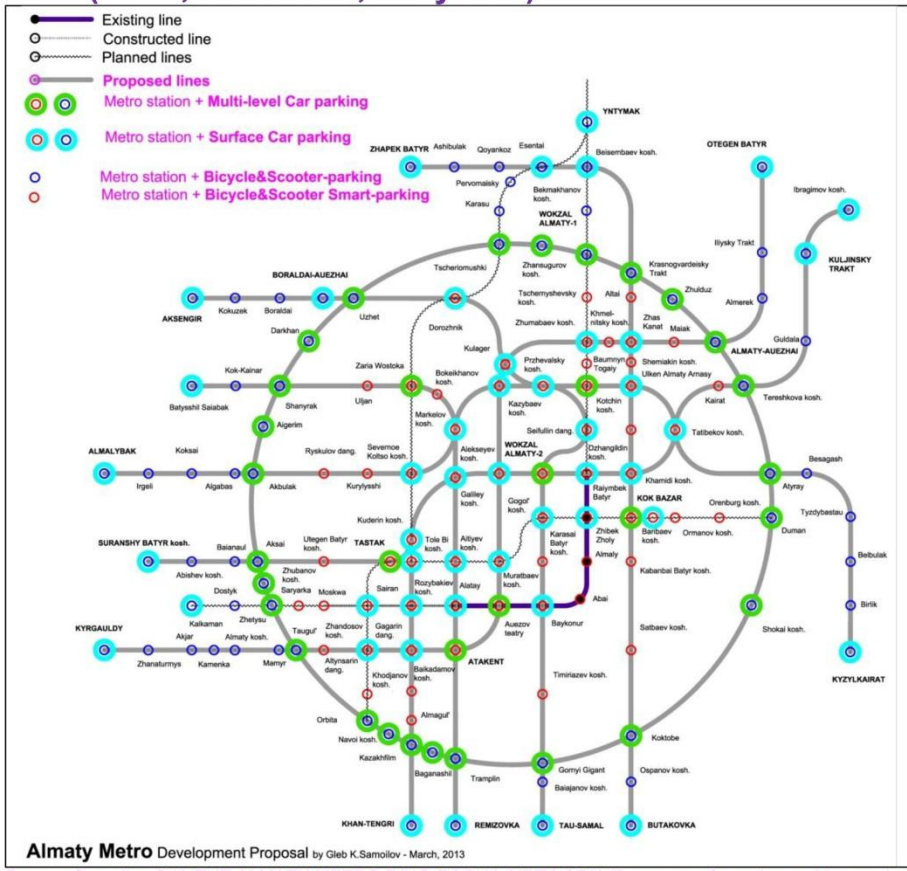


The proposed Developed Radial-Ring network of the Almaty Metro is integrated with Taxi-service – the Taxi Hub and the Taxi Stop. Taxi hubs: Intercity bus stations, the High-speed Railway station, the Domestic Airport, the Western Cemetery, the Express-bus stop (to the Sport Complex "Medeu-Shymbulak"), all interchange nodes of the Ring Line (including the Railway Station and the International Airport), Railway Station, major transportation nodes, sports and entertainment complexes, shopping malls) – 38 points. Taxi stops at all other Metro stations – 96 points.

- **the TAXI SERVICE AT METRO STATIONS OUTSIDE THE RING LINE** – 13 taxi hubs, 34 taxi stops.
- **the TAXI SERVICE AT METRO STATIONS ON THE RING LINE** – 18 taxi hubs, 8 taxi stops.
- **the TAXI SERVICE AT METRO STATIONS INSIDE THE RING LINE** – 7 taxi hubs: 55 taxi stops.

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

43. Integrated points of the Almaty Metro Developed network with the Private transport (Cars, Scooters, Bicycles)



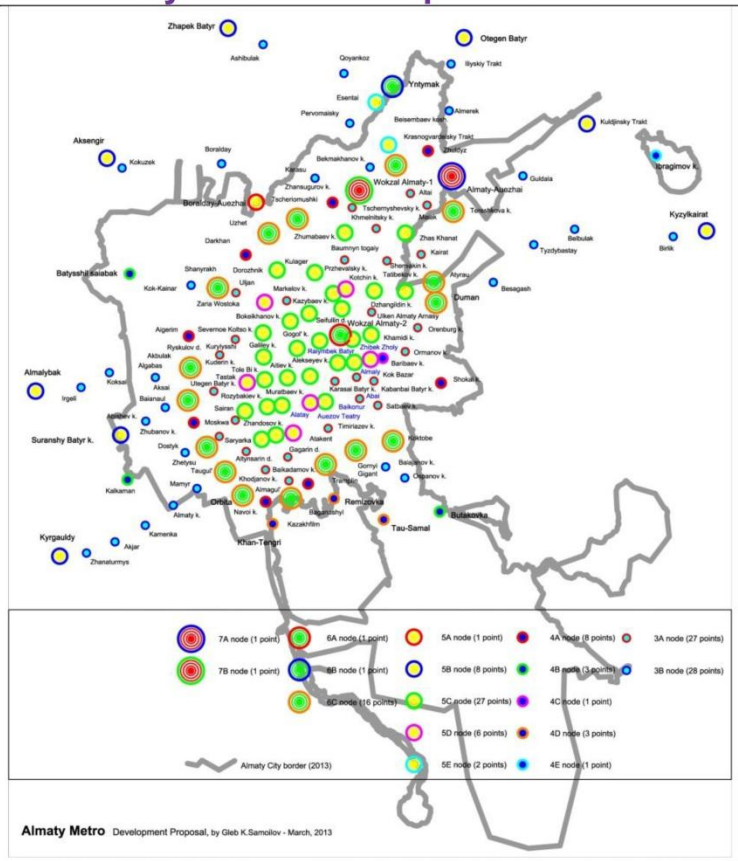
Developed network of parking at Metro stations serves as the Park-and-Ride. This reduces the time required to travel as well as advanced Metro network allows faster and easier to navigate within the network. This has implications for episodic and periodic movements of the pendulum. In this case the Central part of the movement is on the Metro, with subsequent lease or personal use of a Scooter or a Bicycle, and on the periphery – in his or leased vehicle (a Car, a Scooter, a Motorcycle, a Bicycle).

For cross-cutting (diametrical or chord) movement has developed the Value System of Rental Vehicles. In this case the Central part of the movement is on the Metro, and on the periphery (to the Metro station or from the Metro station) – on his or leased vehicle (the Car, the Scooter, the Motorcycle, the Bicycle). The proposed Radial-Ring network of the Almaty Metro is integrated with Private transport (Cars, Scooters, Bicycles):

- **the SERVICE FOR PRIVATE TRANSPORT AT METRO STATIONS OUTSIDE THE RING LINE** – 19 Surface car parkingssed, 46 Bicycle&Scooter parkings.
- **the SERVICE FOR PRIVATE TRANSPORT AT METRO STATIONS ON THE RING LINE** – 26 Multi-level car parkings and Bicycle&Scooter parkings.
- **the SERVICE FOR PRIVATE TRANSPORT AT METRO STATIONS INSIDE THE RING LINE** – 7 Multi-level parkings, 28 Surface car parkings, 62 Bicycle&Scooter Smart parkings.

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

44. Different modes of the Public and the Private Transport integration nodes with the Almaty Metro Developed Network

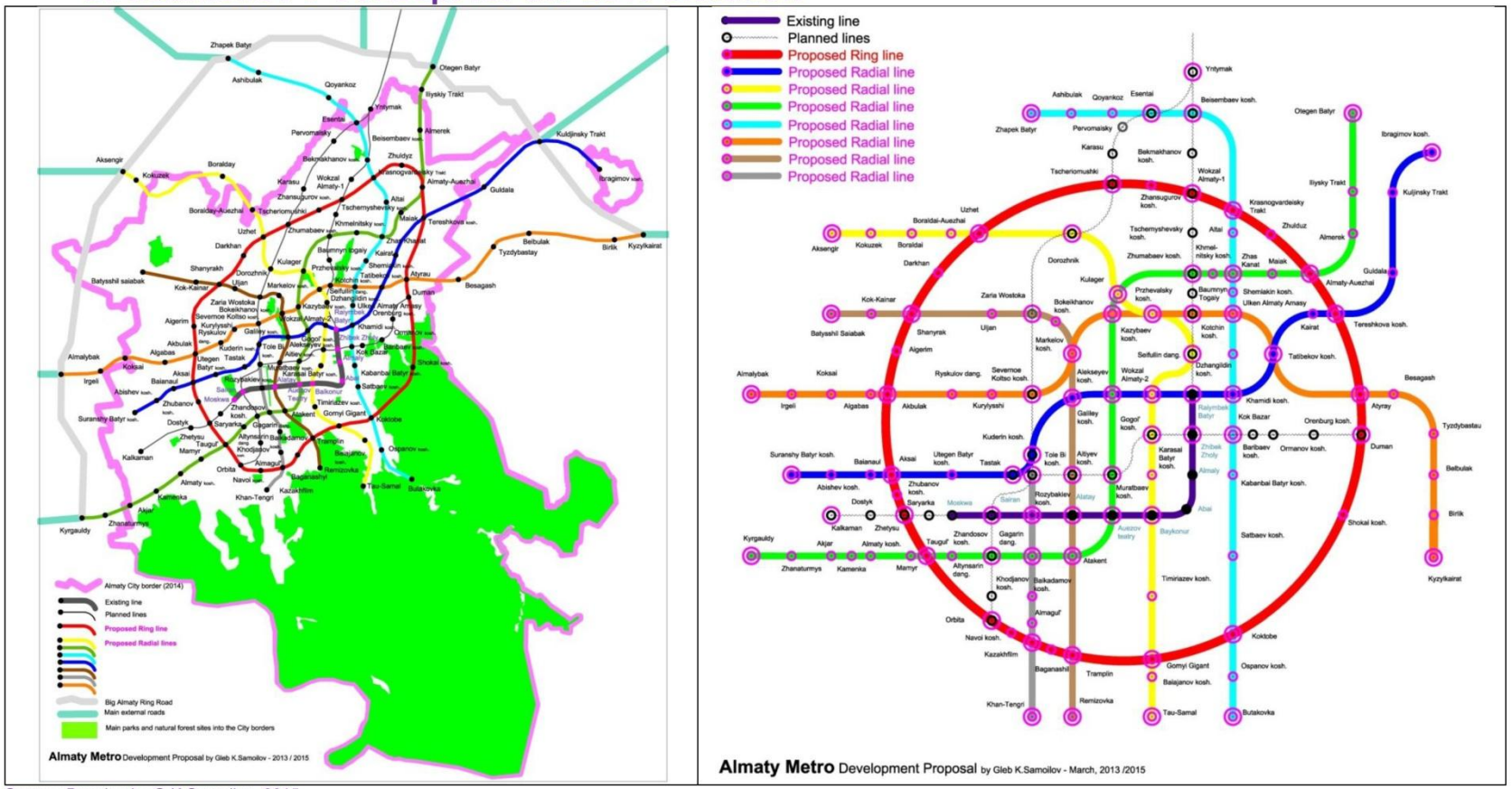


The Integrated system of Public and Private Transport includes the following types of contacts on Metro stations: The METRO INTERCHANGE NODE + The AIRWAY SERVICE + The RAILWAY SERVICE + The INTERCITY BUS SERVICE + The BUS STATION + The BUS STOP + The TROLLEYBUS STATION + The TROLLEYBUS STOP + The TAXI-HUB + The TAXI-STOP + The MULTI-LEVEL CAR PARKING + The SURFACE CAR PARKING + The BICYCLE & SCOOTER SMART-PARKING + The BICYCLE & SCOOTER-PARKING. There are: Integration of Airway-, Railway- and Intercity Bus services; Integration of Bus and Trolleybus services; Integration of Taxi-service; Integration of Private transport (Cars, Scooters, Bicycles).

Different combinations of contacts form five types (17 sub-types) of integration nodes: 7 contacts (A, B), 6 contacts (A, B, C), 5 contacts (A, B, C, D, E), 4 contacts (A, B, C, D, E), 3 contacts (A, B).

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

45. The Almaty Metro developed network (the Map and the Scheme): Interpretation of the G.K.Samoilov's Concept for the 2016 situation



Source: Drawing by G.K.Samoilov, 2015

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< http://slideplayer.com/user/slides/ > , < http://slideplayer.com/slide/10546761/ >, < http://uslide.ru/ekologiya/33851-te-developed-ringradial-netork-of-te-almaty-metro-.html >, < http://ppt4web.ru/ehkologija/te-developed-ringradial-netork-of-te-almaty-metro-as-an-aspect-of-te-smog-reduction-over-te-city-pptpresentation-by-gleb-ksamoilov-almaty-p.html >, < http://bigslide.ru/ekologiya/24783-te-developed-ringradial-netork-of-te-almaty-metro-.html >

Source: Samoilov G.K. THE ALMATY METRO RING-RADIAL NETWORK (Prospects of creation and integration in the Urban Public Transport system). – London / Almaty, 2014. - ISBN 978-601-06-2758-1

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Source: G.K.Samoilov (the Photo 2015)

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