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theme

STUDY OF THE WEST AVOIDANCE OF THE TOUGGOURT CITY OVER 25 KM

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<< قُلْ إِنَّ صَلاَتِي وَنُسُكِي وَمَحْيَايَ وَمَمَاتِي لِلّهِ رَبِّ الْعَالَمِينَ، لاَ شَرِيكَ لَهُ وَبِذَلِكَ أُمِرْتُ وَأَنَا أَوَّلُ الْمُسْلِمِينَ>>

- سورة الأنعام 162 و 163-

Dedication

To those who gave us life,

To dear mothers, for their love and protection.

To our fathers,

For their precious moral and material contribution.

To our sisters and brothers, to whom we wish all the happiness of the world.

To our dear friends for their presence and support.

To all those who are dear to us, we dedicate this humble memory, fruit of our labor.

Appreciation

I would like to thank first, my supervisor Mr. HACINI Slimane, for his patience, for his confidence, his remarks his advice, his availability and especially his kindness.

I would also like to thank the teachers of KASDI Merbah University who were always present and ready to help us and answer our questions.

I would also like to thank all person who participated in the development of this modest work.

Thank you, all of you.

Study of the west avoidance of the touggourt city over 25 km.

Resumé - L'histoire de la route est indubitablement liée au développement des pays et des civilisations.Les routes se multiplient et se diversifient avec l'expansion de l'urbanisation et des pays, et restent parmi les infrastructures les plus importantes par lesquelles se mesurent l'avancement et le développement des sociétés.

Touggourt est considéré comme un carrefour d'une grande importance économique, car c'est le point d'intersection entre deux routes nationales importantes, la route nationale n°03 qui relie le nord du pays à la région pétrolière au sud et la RN 16 qui relie l'est et Tunisie dans la même région.

Le passage de la route nationale n°03 au centre de la ville de Touggourt , notamment avec la présence de trafics lourds, a provoqué de gros embouteillages quotidiens ces dernières années, ce qui a conduit à la nécessité de construire une nouvelle route d'évitement ouest, en complément des autres routes de contournement nord et est qui ont été réalisées et les reliant entre elles. Le projet de recherche est une étude de l'evitement ouest de la ville de Touggourt sur une distance de 25 km avec une étude de tous le carrefour qui se situent sur cette route et a pu entrer et sortir de la ville dans de nombreux tronçons.

Mots clés :touggourt , route , evitement ..

دراسة الطريق الاجتنابي الغربي لمدينة تقرت على مدى 25 كم.

ملخص - لا شك أن تاريخ الطرق مرتبط بتطور البشرية والحضارات. تزداد الطرق وتتنوع مع توسع العمران والدول، وتبقى من أهم البنى التحتية التي يقاس من خلالها تقدم المجتمعات وتطورها.

تعتبر تقرت مفترق طرق ذو أهمية اقتصادية كبيرة، حيث أنها نقطة التقاطع بين طريقين وطنيين مهمين، الطريق الوطني رقم 03 الذي يربط شمال البلاد بمنطقة النفط جنوبا والطريق الوطني 16الذي يربط بين الشرق وتونس في نفس المنطقة.

تسبب مرور الطريق الوطني رقم 03 في وسط تقرت خاصة مع وجود الشاحنات الكبيرة في ازدحام يومي كبير في السنوات الأخيرة، مما أدى إلى ضرورة إنشاء طريق اجتنابي غربي جديد، تكملة للطريق الاجتنابي الشمالي والشرقي الآخر. الطرق التي تم استكمالها وربطها ببعضها البعض. دراسة الطريق الاجتنابي غرب تقرت ضمن مسافة 25 كم، وجميع مفترقات الطرق التي تقع على هذا. الطريق وتمكن من الدخول والخروج من المدينة في العديد من الأقسام هي موضوع هذه الدراسة.

الكلمات الدالة: تقرت ,الطريق , الاجتنابي.

Étude de l'évitement ouest de la ville de touggourt sur 25 km.

ABSTRACT - The history of the road is undoubtedly linked to the development of mankind and civilizations. The roads increase and diversify with the expansion of urbanization and countries, and remain among the most important infrastructures by which the advancement and development of societies are measured.

Touggourt is considered a crossroads of great economic importance, as it is the intersection point between two important national roads, the National Road No. 03 that connects the north of the country with the oil region in the south and RN 16 that connects the east and Tunisia in the same region.

The passage of National Road No. 03 in the center of Touggourt especially with the presence of large trucks has caused great daily congestion in recent years, which led to construct a new western bypass road, , as a complement to the other northern and eastern bypass roads that have been completed and linking them with each other. The study of bypass highway west of Touqgourt within a distance of 25 km, all the crossroads that fall on this road and was able to enter and exit the city in many sections is the theme of this study subject.

Key words : Touggourt, bypass , Road

❖ **Table of Contents:**

GENERAL PRESENTATION

1. INTRODUCTION :

In Algeria, road traffic has been changing rapidly in recent years. The existing road network which supports this traffic, a significant percentage of which is heavy goods vehicles, needs appropriate improvements to stem the phenomenon of congestion.

The achievement of road avoidance in the country's cities is a factor that directly affects the economic development of a region. The country is currently making a major investment in the modernization of transport infrastructure and the revival of this sector, which will allow the emancipation of many regions which have at the same time emerged from their geographical isolation.

The objective of these development measures is to ensure the safety and comfort of users while respecting the environment.

To achieve this objective, our project has taken an important place in the national project of modernization of road networks which consists in the realization of the study of the **west** avoidance of **the city of Touggourt over** 25 Km**,** proposed by DTP of the wilaya of Ouargla.

2. PURPOSEOF THE PROJECT

The aim of this project is to improve the traffic flow on this axis by removing all obstacles, also to provide it with a fast road link in line with future development.

3. LOCATION OF THE PROJECT:

This project entitled "Study of the west avoidance of the city of Touggourt over a length of 25 km from PK 543 to PK 532 "is located in the wilaya of Ouargla. The implementation of this project aims to network and densify the network, bring cities closer together and open up. It will be a plus for the regional economy as long as it has the best transport offer in these regions.

4. GENERAL ABOUT OURAGLA:

4.1.The general context:

OUARGLA Wilaya is located in the South East of Algeria 845 Km from the capital (Algiers), is one of the oldest Algerian cities.

The history of Ouargla dates back to the tenth century was marked by the arrival of Rustumides constituting the starting point of the great prosperity of the region of Ouargla. The tricks conquered the region in 1552.

The French occupation of the region took place at several stages where French sovereignty over the region was recognized by the Sultan of N'GOUSSA in 1849 under the pressure of the revolt of the tribes of Ouargla, it will not materialize until 1872.

The wilaya of Ouargla was regrouped after independence at the end of the 1970s.In recent years becomes the capital of the third largest wilaya of Algeria, on the other hand its proximity to Hassi Messaoud as a strategic oil point, Ouargla is known an economic and tourist evolution frequented .

4.2. Situation géographique :

The wilaya of OUARGLA is located in the south-east of Algeria, it extends over an area of 163,233 km2 grouping (21) communes and (10) daïras it is limited by:

1. To the north: wilaya of El oued and Djelfa.
2. To the south: wilaya of Illizi and Tamanrasset.
3. In the East: Tunisia.
4. To the west: wilaya of Ghardaïa.

FIG I-01: Ouargla wilaya place

4. 3. Population and activities:

The total population of the wilaya is estimated at 558,563 inhabitants (2008), or a density of 3.4 inhabitants per km².

- ✓ Labor force (2008): 156,686 inhabitants
- ✓ Employed population (2008): 121,602 inhabitants
- ✓ Distribution of the employed population:
  - Administration and services: 64,887.

- Agriculture: 20,113 - BTPH: 19,505
- Industry 17,097.

4. 4Airport infrastructure:

- - 3 Airports: Ain El Beida, Hassi Messaoud and Touggourt.

4.5 Basic infrastructure:

1. Rail network:

- Linear of 33 km

- Railway station in Touggourt

2. Road network:

The road network of the Wilaya is 1796 Km long without counting the tracks, the unclassified roads, and the urban roads.it is distributed as follows:

Designation	Length(km)
National roads	1484
Wilaya roads	363
Communal roads	232

Table I-01: Ouargla road network.

❖ **The road network of the wilaya:**

2-a)National roads:

Nomination	Limites		Length (km)	Link
	PK begg	PK end		
RN 03	510+000	914+000	404	Wilaya limit El Oued / Limite Wilaya Illizi
RN 16	587+000	633+000	46	El Oued /Touggourt
RN 49	070+000	234+000	164	Gardia / H. Messaoud
RN 53	0+000	222+000	222	Zemlet el Arbi / Limite Wilaya Iillizi
RN 534	0+000	328+000	328	H. Messaoud / El Borma
RN 56	0+000	008+000	68	Souare bresson / trios pitons

TOTAL (Km)	1484	

Table I.02: Ouargla National roads

2-b)The Paths of wilaya :

Nomination	Limites		Longueur (km)	Localisation
	PK début	PK fin		
CW 33	114+000	217+000	103	RN3 towards Guerara by Hadjira
CW 202	0+000	98+000	98	Ouargla /El Alia
CW 202	0+000	007+000	7	Debidibi –El Hadjira
CW 203	0+000	8+000	8	Ouargla / Ain Beida par Rouissant
CW 204	0+000	5+500	5.5	RN 49 /Sidi Khouiled
CW 205	0+000	7+500	7.5	RN 56 Hassi Ben Abdella
CW 206	0+00	12+000	12	City Center 2×7(m)
CW 305	0+000	9+000	9	RN 3 Sidi Slimane
CW 306	0+000	13+000	13	RN 3 Zaouia par Meggarine
CW 307	0+000	30+000	30	Al Alia Chegga
CW 308	0+000	6+000	6	RN 3 Temacine
CW 309	0+000	24+000	24	RN 3 Nezla by Blidet Amor and Temacine
TOTAL (Km)			**363**	

Table I- 03: Ouargla wilaya' roads

2-c) Communal paths:

The length of municipal roads is not well fixed to date given the delay recorded by some municipalities in the classification procedure. The total linear is 241 km of which 200.7 km classified according to data from the DTP of Ouargla. It is useless to give a general statement of these roads, we intervene only to the network of communal roads located in the study area.

2-d)The Local Road Network:

Commune	National roads		Wilaya road		Communal road	
	Destination	length	Destination	length	Destination	length
Touggourt Tebesbest Nesla Zaouia	RN3 RN 16 RN 3 RN 3	6.8 6 3.8 3	- - CW 309 CW 306	- - 6 8.5	- N.C Sidi Mehdi N.C	- 1.5 6.5 1.7
TOTAL (City of Touggourt)		19.6 Km		14.5 Km		9.7 Km

Table I -04 : Ouargla local roads

Local road network status:

The current state of the local network provides an acceptable level of service for uses:

- The RN 16 is in very good condition.
- The RN3 is in an average condition and requires reinforcement and especially the extramural section for the CW and municipal roads, the level of service is relatively less good.

5. CONCLUSION

Located on the doubling of the RN3, the road section will relieve the agglomeration of the capital of the flow of vehicles circulating in both directions and which cluttered the city. The commissioning of the bypass will certainly put an end to the bottleneck that has always marked the passage through the eastern crossroads, by ensuring a better flow of traffic from and to the city center. The new bypass will put an end to the problem of congestion at the entrance to the city, caused by the flow of large vehicles using the RN3 and, thus, save a lot of time for users of this section. The work to carry out the western bypass of the city of Touggourt is also part of the strengthening of the road network rehabilitation program conducted for several years with the objective of achieving a better fluidization of traffic and a better regulation of vehicles using the main penetrating of the wilaya.

1. INTRODUCTIN

The APS phase; the step that comes directly after the preliminary phase in the case where the latter is planned. It consists in studying more deeply the variants retained in the previous study or when it is not planned, to proceed to the study on the basis of major state plan, topographical and also geological map, thus making it possible to better understand the hazards, constraints and advantages related to the social-geographical situation of each variant.

A multicriteria study will have to be carried out for the choice of the variant to be retained, which will be based on a comparison plan according to all the following criteria:

- The constraints noticed on the site.
- The cost of the project.
- The difficulties found when choosing the roads. (Technical characteristics).
- Comparison of environmental impacts.

2. LOCATION OF THE CHOSEN ZONE:

Depending on the economic stakes and the development of the wilaya, the expansion of the development of the city of Touggourt having taken place towards the East, the possibilities of glimpses of possible corridors are limited.

Therefore, the positioning of this city in relation to the road network, obliges us to resort to the choice of a single corridor (see synoptic diagram figure No. 1).

Figure I -1- Synoptic diagram representing the selected spindle

2-1 Description of the corridor:

The chosen corridor passes on the north-west side of the city has a variant width between 400 m and 3000 m, it crosses the following obstacles:

- RN1b connecting Touggourt with Messaad (cross roads to be projected).
- 8-inch gas pipeline. (Protection of the pipeline to be planned)
- 20-inch gas pipeline. (Protection of the pipeline to be planned)
- The electrified railway line connecting Touggourt with Beskra.
- Line THT 220 KV (TGT - BISKRA).

2-2 The constraints of the study area:

i- Environnement géographique:

The relief is generally flat to slightly hilly, it is strongly cut by an important hydrographic network (Oued Righ) which requires in the construction phase a sanitation system.

ii-Surface water:

From a hydrogeological point of view (groundwater), the terrain encountered is not by nature favorable to water circulation at depth. These circulations therefore occur mainly on the surface, which can shelter water in areas that are highly dependent on rainfall.

iii-Natural environment:

The territory of the project extends over a series of environments that present an exceptional stake and a certain ecological interest. Indeed, the different oases and the fauna in particular the camels generate an interesting diversity of these environments (afforestation, lakes etc.).

iv- Human and urban environment:

- **Housing and urbanization:**

The city of Touggourt is a sector that knows a development of housing whose urban poles will be realized to the west north of this city (so near our corridor).

- **agriculture:**

In general, the area concerned by the project is a sandy area, it is characterized and is limited in particular by oases that occupy a large area.

2-3 Alternative layout:

In this phase Since the chosen corridor passes through a sandy area, we will study only one (01) variant in order to find the best solution adapted for the realization of our project (see synoptic diagram Figure N°2).

FIG I-02 synoptic east avoidance of Touggourt

1er VARIANTE:

The origin of the variant is the junction with the RN03 to the PK 543+820 north-west of the city, to shear it with 3 penetrators that connect with the RN03 creating four future spaces for the future extension of the city of Touggourt for about 8Km. It is a variant closer to the city and the shortest, it crosses a generally flat relief, finally joining the RN3 north east of the agglomeration of Touggourt at PK532+650.This variant has a length of about 17 km.

2-4 Main features of the chosen alternative:

The design of the project based on the chosen variant is based on the following concepts:

- Choice of a route tending to move as far away as possible from the dwellings.
- No special provisions against road noise.
- Absence of significant damaging impact on wild avifauna.
- Minimum impact on large landscapes.

3. OVERALL GEOMETRIC CHARACTERISTICS:

3-1 Plot Plan:

The geometrical characteristics adopted are intended to ensure relatively homogeneous conditions of comfort and safety adapted to category 2 and the base speeds of 100 km/h in an E1 environment.

Depending on the reference speed defined above, the characteristics of the plan plot are as follows:

Vitesse de référence	**100 Km/h**
Normes	**B40**
Rayon minimum absolu (RHm)	**450**
Rayon minimum normal (RHN)	**650**
Rayon au devers minimum (RHd)	**1600**
Rayon non déversé (RHnd)	**2200**

Table I-1 - geometric characteristic of the plan plot

3-2 longitudinal profile:

The longitudinal profile is composed of straight elements characterized by their slopes and parabolic connections characterized by their radii.

The rays in protruding angles intervene on the visibility and comfort (vertical acceleration), so it is always the first condition that is decisive. The rays at an angle are fixed mainly by conditions of comfort.

Depending on the defined reference speed, the longitudinal profile characteristics are as follows:

Rays in profiles in length	
Maximum gradient	**5 %**
Minimum gradient at zero slop	**0.5 %**
Protruding angle radius (m)	
Absolute minimum **Normal minimum**	**6 000** **12 000**
Reentrant angle radius (m)	
Absolute minimum **Normal minimum**	**3 000** **4 200**

Table I-2- longitudinal profile characteristics

3-4 Typical cross-profile:

A road project involves drawing a large number of cross-sectional profiles. To avoid deferring on each of them the general dimensions that are repeated and common constructive details, we first establish a single profile, called "profile-type", containing all the dimensions and all the layers of the superstructure, drainage system ...

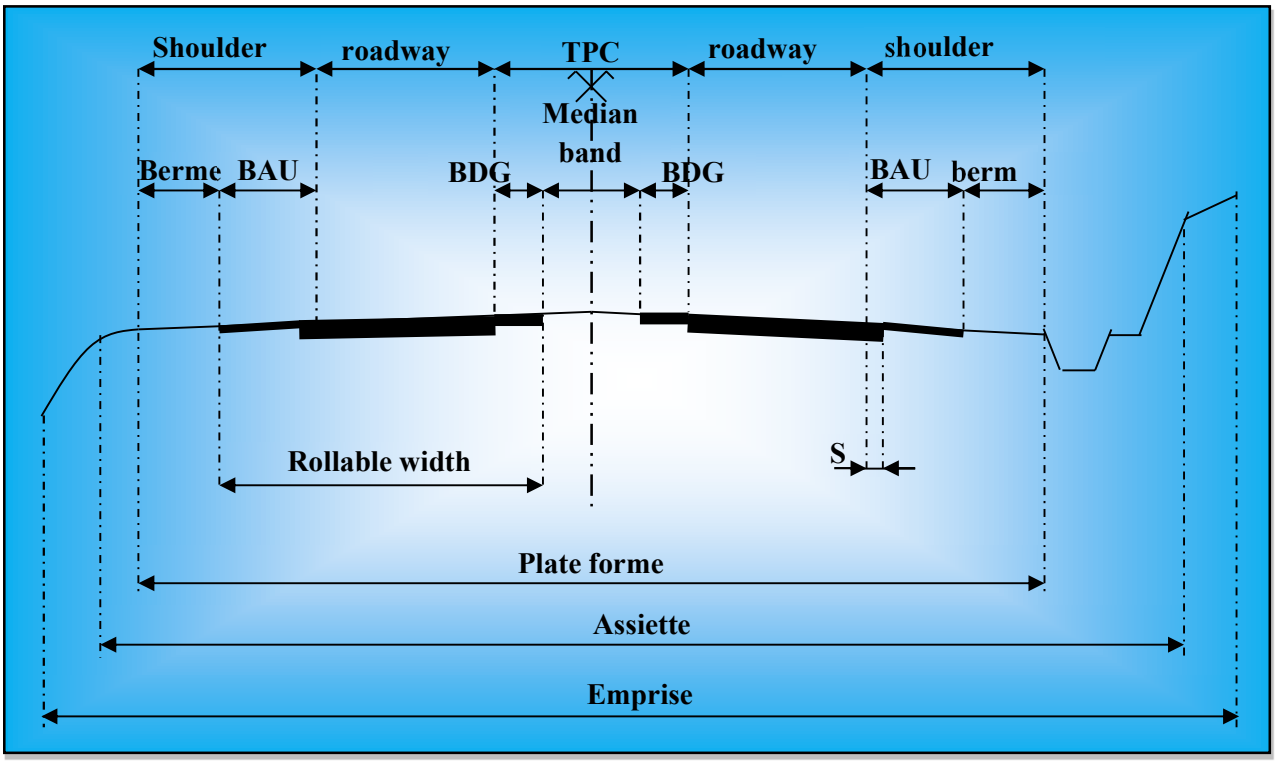


FIG -I-3- geometric characteristics of Typical cross-profile

1. INTRODUCTION:

The traffic study is an essential step in any reflection on a road project. This study will make it possible to determine the virulence of the traffic and its aggressiveness, and also the type of development to be carried out.

To solve most of the problems of road development or operation, it is insufficient to know the traffic at a given point on an existing road, it is often necessary to know the different traffic flows, their formations, their culmination, in other thermal baths to know the origin and destination of the different vehicles.

2. TRAFFIC ANALYSIS:

In order to determine at a given point and at a given moment the volume and nature of traffic, it is necessary to carry out a count that requires logistics and appropriate organization.

To obtain the traffic, a variety of processes can be used, which are:

- The general statics.
- On-road counting (manual and automatic).
- A traffic surveys.

3. DIFFERENT TYPES OF TRAFFIC:

There are four types of traffic:

3-A. Normal traffic:

This is existing traffic on the old development without taking into consideration the traffic of the new project.

3-B. Induced traffic:

This is traffic that results from the re-movement of people to other deviations.

3-C. Diverted traffic:

This is the traffic attracted to the new developed road. The diversion of traffic is only a transfer between the different means of reaching the same destination.

3-D. Total traffic:

This is the sum of annual traffic and diverted traffic.

4. Traffic presentation templates:

The first step in this type of study is the identification of the existing. This census will make it possible to prioritize the road network in relation to the functions it performs, and to highlight the difficulties in the flow of traffic and its consequences on human activity.

The various methods used to estimate traffic in the future are:

- Continuation of past developments.
- Correlation between traffic and economic parameters.
- Gravity model.
- Growth factor model.

4-A. Continuation of past developments:

The method consists of extrapolating globally over the coming years the evolution of traffic observed in the past. In general, an exponential growth model is established.

Traffic $\mathbf{T_n}$ in year **n** will be:

$$T_n = T_0 (1+ \tau)^n$$

Où :

$\mathbf{T_0}$: Is the inbound traffic for the origin.

$\boldsymbol{\tau}$: is the growth rate.

4-B. Correlation between traffic and economic parameters:

It consists in looking in the past for a correlation between the level of traffic on the one hand and certain macroeconomic indicators:

- Gross national product (GNP).
- Fuel products, on the other hand, if we think that this correlation will remain to be verified in the rate of growth of traffic, but this method requires the use of a simulation model, which is beyond the scope of our study.

4-C. Gravity model:

It is necessary for solving problems concerning current traffic in the near future, but it does not lend itself well to projection.

4-D. Growth factor model:

This type of model allows us to project an origin–destination matrix. The most widely used method is FRATAR, which takes into account the following factors:

- The motorization rate of light vehicles and their use.
- The number of jobs.
- The population of the area.
- This method requires accurate statistics and a thorough search of the area to be studied.

Remark:

For our case, we use the **"prolongation of past evolution"** method because of its simplicity and because it integrates all the economic variables of the region.

5. CALCULATION OF CAPACITY:

Road capacity is defined as the maximum number of vehicles that can reasonably pass over a given section of a lane in one direction (or two directions) with geometric and traffic characteristics over a specified period of time.

Capacity is expressed as an hourly flow rate.

5-A. Traffic over a given horizon:

Due to the annual growth in traffic.

$$TJMA_n = TJMA_0 (1+ \tau)$$

Such as:

$TJMA_n$: average daily traffic in year **n**.

$TJMA_0$: average daily traffic in year **0**.

T : annual rate of increase.

n : number of years from the original year.

5-B. Actual traffic:

This is the traffic per vehicle unit, it is determined according to the type of road and the environment.

$$T_{eff} = [(1-Z) + PZ)]\ TJMA_n$$

Such as:

Z : the percentage of heavy goods vehicles.

P : coefficient of equivalence for heavy goods vehicles, it depends on the nature of the road.

The table below allows us to determine the coefficient of equivalence " **P** " for heavy goods vehicles depending on the environment and the characteristics of our road.

environment	E1	E2	E3
Road with good characteristics	2-3	4-6	8-12
Narrow road, or road with reduced visibility	3-6	6-11	16-24

Table II-01: Coefficient of equivalence "P"

- **Evaluation of the application:**

This is the number of vehicles likely to use the road in the horizon year.

$$Q = 0.12T_{eff} \quad \text{(UVP/h)}$$

- **Evaluation of the offer:**

This is the allowable flow that a road can sustain:

$$Q_{adm} = K_1 \, k_2 \, c_{Th}$$

Such as:

C_{th}: theoretical capacity.

K_1 : coefficient which depends on the environment.

K_2 : coefficient takes into account the environment and the category of the road.

Environnement	E1	E2	E3
K1	0.75	0.85	0.9 à 0.95

Table II-02: Coefficient "K1"

	Road category				
Environnement	C1	C2	C3	C4	C5
E1	1.00	1.00	1.00	1.00	1.00

E2	**0.99**	**0.99**	**0.99**	**0.98**	**0.98**
E3	**0.91**	**0.95**	**0.97**	**0.96**	**0.96**

Table II-03 : Coefficient « K2 »

	Theoretical capacity
Road 2 lanes of 3.5 m	**1500 à 2000 uvp/h**
Road of 3 lane of 3.5 m	**2400 to 3200 uvp/h**
Road of Separate Pavement	**1500 to 1800uvp/h**

Table II-04 : Theoretical capacity « C_{th} »

- **Calculation of the number of channels:**

Bidirectional pavement:

We compare Q to Q_{adm} for the various types of roads and we take the profile allowing to have:

$$Q \leq Q_{adm}$$

Unidirectional pavement:

The number of lanes per carriageway is the number closest to the "N" with:

$$N = \frac{s.Q}{Q_{adm}}$$

Such as:

S: coefficient of asymmetry, generally equal to 2/3.

Q_{adm}: eligible flow per channel.

6. Project data:

6-A. data on road networks:

1. **Traffic data:**

According to the results of the counts and forecasts, carried out by the specialized service of the **DTP** of Ouargla we have:

Traffic in the year 2017 Total $TJMA_{2017}$ =10929 v/d.

1. The percentage of heavy goods vehicles P_L= 44%.
2. Year of commissioning: 2019.
3. Annual growth rate of traffic: **τ**= 4%.
4. The service life: 15 years.

We have:

- ✓ P= 3 (Road with good characteristics, environment E_1)
- ✓ K_1=0.75 (environnement E_1) ; K_2=1 (environnement E_1, Category C_2)

- **Calcul de TJMA horizon :**

$TJMA_n = (1+ \tau)^n TJMA_{2017}$

$TJMA_{2019} = (1+ 0.04)^2 \times 10929$

$TJMA_{2019}$ =11821 v/j

$TJMA_{2034} = 11821 * (1+ 0.04)^{15}$

$TJMA_{2034}$= 19683v/j

- **Calculation of actual traffic**

P = 3 (route de bonnes caractéristiques, E_1)

$T_{eff\ 2034}= [(1- 0.44) +3\times0.44]\ 19683$

$T_{eff\ 2034}$=34854 uvp/j

- **Normal hourly peak flow:**

$Q_{2034} = (1/n)\ T_{eff} = 0.12\times T_{eff}$

$Q_{2034} = 0.12\times 34854$

Q_{2034} =5262uvp/h

- **Theoretical capacity:**

$$Q_{2034} < Q_{adm} \longrightarrow Q_{2034} < K_1 \times K_2 \times C_{th} \longrightarrow C_{th} > \frac{Q2034}{K1 \times K2}$$

So: C_{th}>5262 uvp/h.

- **Calculation of the eligible debit**

It is determined by the application of the following formula:

$Q_{adm} = K_1.K_2.C_{th}$

On trouve :

$C_{théo}$= 2000uvp/h/sens

So

$Q_{adm} = 0.75 \times 1 \times 2000$

Q_{adm}=1500uvp/h

- **Determination of number of channels**

$N = 2/3\ (Q/Q_{adm})$

$N = 2/3\ (4440/2000) = 1.48$

N = 2 voie /sens.

Résultat :

A cross profile in 2×2 lanes with a TPC of 3.00m and 1.80 m shoulder, the width of a track is 3.50m.

1. INTRODUCTION:

When developing any road project, the engineer must start by searching for the road corridor in the site concerned.

The plan path is a succession of lines connected by connections. It represents the projection of the road axis on a horizontal plane which can be a topographic map or a relief schematized by contour lines.

The characteristics of the components constituting the layout in plan shall ensure the conditions of comfort and stability and which are given directly in the road codes according to the basic speed and the friction of the surface provided by the rolling layer.

2. RULES TO BE RESPECTED IN THE TRACE IN PLAN:

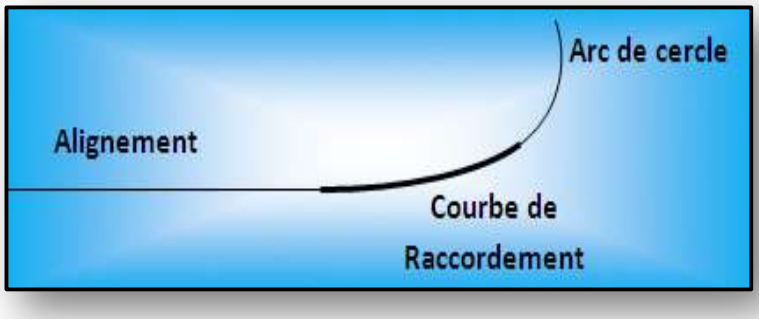
The standards required and used in our project are summarized in the B40, these standards must be respected in the design or in the realization. In the following, we will mention some requirements that we believe are relevant:

- ✓ All horizontal curves with a radius of less than RHnd (horizontal radius not spilled) shall be introduced with progressive connections.
- ✓ The adaptation of plan layouts to the natural terrain in order to avoid major earthworks.
- ✓ The connection of the new route to the existing road network.
- ✓ Avoid passing on agricultural land and forest areas.
- ✓ Avoid private property as much as possible.
- ✓ Avoid crossing the wads in order to avoid the maximum number of works of art and this for economic reasons.
- ✓ Avoid sites that are prone to geological problems.
- ✓ Limit the percentage length of alignments between 40% and 60% of the total plot length.

3. THE ELEMENTS OF THE TRACE IN PLAN:

The axis of the plan plot consists of a succession of alignments, connections and arcs of circles as it is schematically shown below:

3-1 The alignments:



There is a minimum alignment length $\mathbf{L_{min}}$ which will have to separate two circular curves of the same direction, this length will be taken equal to the distance traveled for 5 seconds at the maximum speed allowed by the greater radius of the two arcs of circles.

If this minimum length cannot be obtained, the two circular curves are connected by a C or O ve curve.

The maximum length $\mathbf{L_{Max.}}$ is taken equal to the distance travelled for 60 seconds.

$$\mathbf{L_{min}=5\ V}$$
$$\mathbf{L_{Max.}=60}$$

With V in (m/s).

3-2 Circle Arc:

Three elements intervene to limit the curve:

- Vehicle stability.
- The inscription of long vehicles in curves of small radius.
- Visibility in curved trenches.

I. Curve stability:

The vehicle undergoes curved instability due to the effect of centrifugal force, in order to reduce this effect, the roadway is tilted transversely inwards, to prevent the vehicles from sliding.

II. Absolute minimum horizontal radius:

$$RHN = \frac{(V_r + 20)^2}{127(f_t + d_{max})}$$

for each V_r ,we define a series of torque (R, d).

III. Rayon minimal normal:

$$RHm = \frac{V_r^2}{127(f_t + d_{max})}$$

The normal minimum radius (RHN) shall allow vehicles exceeding 20 km/h to be driven safely.

IV. Minimum cant radius:

This is the radius at the minimum cant, beyond which the carriageways are discharged inwards of the turn and such that the residual centrifugal acceleration at speed V_r would be equivalent to that experienced by the vehicle travelling at the same speed in right alignment.

Slop associated d_{min} = 2.5%.

$$RHd = \frac{{V_r}^2}{127 \times 2 \times d_{max}}$$

V. Minimum radius not spilled:

If the radius is very large, the road retains its profile in toit and the various is negative in one of the directions of traffic; the min radius which allows this arrangement is the min radius not spilled (RHnd).

$$RHnd = \frac{{V_r}^2}{127 \times 0.035}$$ For categories 1-2

$$RHnd = \frac{{V_r}^2}{127(f' - d_{min})}$$ For categories 3-4-5

with: f' = 0.07 cat 3

f'= 0.075 cat 4-5

VI. Rules for the use of rays in plan:

- ✓ There is no radius less than RHm, radius values ≥ to RHN are used as much as possible.
- ✓ The rays between RHm and RHd are discharged with a cant interpolated linearly in 1 /R rounded to 0.5% meadows.

- **If RHm < R < RHN :**

$$d = d_{max} + \left(\frac{1}{R} - \frac{1}{RHm}\right)\frac{d_{max} - d_{RHN}}{\frac{1}{RHm} - \frac{1}{RHN}}$$

- **If RHN < R< RHd :**

$$d = d_{min} + \left(\frac{1}{R} - \frac{1}{RHd}\right)\frac{d_{min} - d_{RHN}}{\frac{1}{RHd} - \frac{1}{RHN}}$$

- The rays between RHd and RHnd are in minimum cant $d_{min.}$
- Radii above RHnd can be discharged if there is no significant expense and in particular no disturbance on the drainage plane.
- RHm radius must be framed by RHn.

Remark:

We try to choose the largest possible rays by avoiding going below the recommended minimum radius.

VII. On width:

A long vehicle with 2 axles, running in a bend, sweeps in plan a strip of pavement wider than that which corresponds to the width of its own gauge.

In order to prevent part of its bodywork from encroaching on the adjacent lane, the track travelled by this vehicle shall be given a width over its normal alignment width.

$$S = \frac{L^2}{2R}$$

L : length of the vehicle (average value L = 10 m).
R : radius of the axis of the road.

3-3 Progressive connections "Spiral":

The passage from the right alignment to the circle cannot be done abruptly, but gradually (curve whose curvature increases linearly from R = ∞ to R = constant), to ensure:

- Transverse vehicle stability.
- Passenger comfort.
- The transition of the roadway
- The elegant, flexible, fluid, optically and aesthetically satisfying layout.

There are many connecting curves to ensure this comfort. But the spiral is the only curve that will be applied in road projects.

1. Expression of the spiral:

The curvature is linearly proportional to the curvilinear abscissa L (or length of the spiral).

$$K = C.L \;\; ; \;\; K = \frac{1}{R} \;\; L.R = \frac{1}{C}$$

we pose: $\frac{1}{C} = A^2 \Rightarrow$ **$A^2 = L.R$**

That is to say that for the parameter A chosen, the product of the length L and the radius R is constant.

2. Spiral elements:

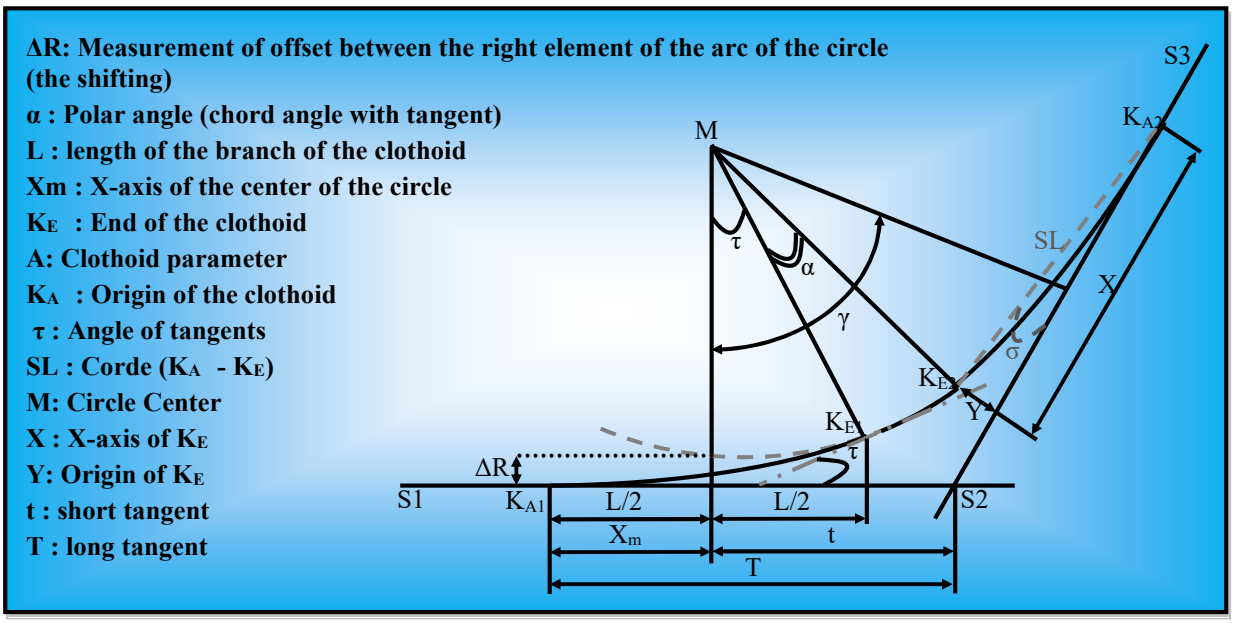


FIG III-01: Spiral elements

3. The connection conditions:

The progressive connection length shall be sufficient to ensure the following conditions:

❖ Optical condition:

This is a condition that ensures the user a satisfactory view of the road and its possible obstacles.

The orientation of the tangent must be greater than 3° to be perceptible to the eye.

$\tau \geq 3°$ soit $\tau \geq 1/18$ rad.

$\tau = L/2R > 1/18$ rad $\Rightarrow$ $L \geq R/9$ soit $A \geq R/3$.

$R/3 \leq A \leq R$

for **$R \leq 1500 \Rightarrow \Delta R = 1m$** (possibly 0.5m) Where from **$L = (24.R.\Delta R)^{1/2}$**

for **$1500 < R \leq 5000m$**, **$\tau = 3°$** so **$L = R/9$**

for **$R > 5000m \Rightarrow \Delta R$** limited to à **2.5m**

either **$L = 7{,}75\ (R)^{1/2}$**

1. Dynamic comfort condition:

This condition consists in limiting the travel time of a connection and the variation per unit of time of the transverse acceleration of a vehicle. The variation in the transverse acceleration is: ( ) The latter is limited to a fraction of the acceleration of gravity $Kg = g/0.2V\frac{V^2}{R} - g.\Delta d_B$

With a gravitation g = 9.8m/s we opt:

$$L \geq \frac{V_B^2}{18}\left(\frac{V_B^2}{127.R} - \Delta d\right)$$

V_B : basic speed (Km/h).

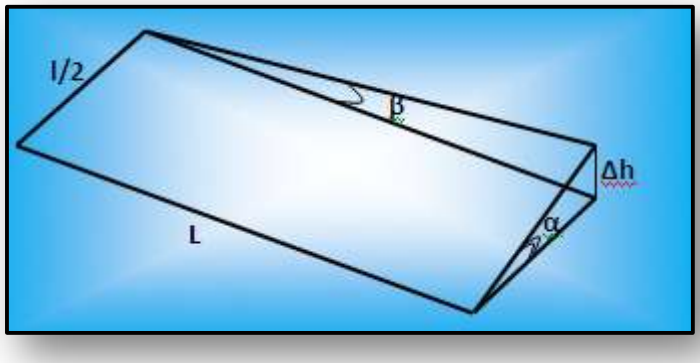
R: the radius (m).

Δd : the variation of various ($d = d\Delta_{final} - d_{init}$)(%).

2. Warping condition:

The outer half-carriageway at the C.R. turn is a left surface that gives a swinging movement to the vehicle the connection must ensure.

A satisfactory appearance in the areas of can't variation.



For this purpose, the relative slope of profile along the edge of the spilled carriageway and its axis in such a way is limited. $\Delta p \leq \frac{0.5}{V_B}$

We have:

$$L \geq l.\Delta d.V_B$$

l : largeur de chaussée

4. COMBINING TRACE ELEMENTS IN PLAN:

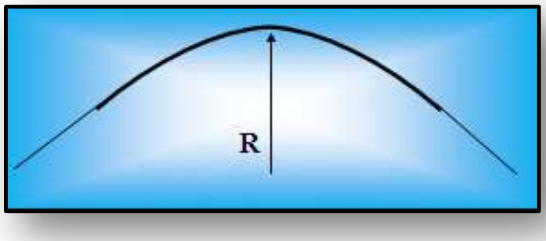
The combination of the plan plot elements gives several types of curves, we quote:

4. (a) S-curve:

A curve consisting of two spiral arcs, of opposite concavity tangential to their point of zero curvature and connecting two arcs of circle.

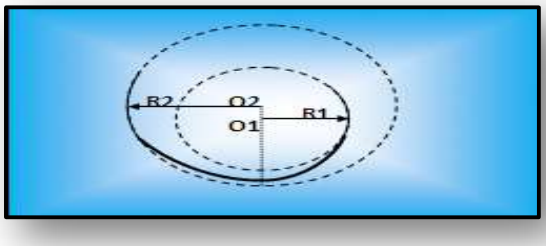
4. (b) Vertex curve:

A curve consisting of two spiral arcs, of the same concavity, tangent at a point of the same curvature and connecting two alignments.



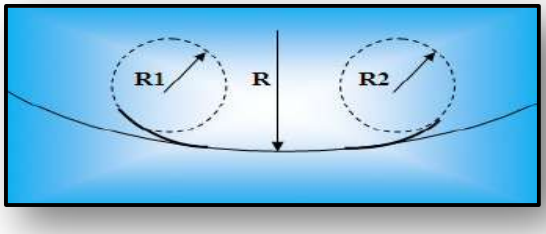
4. (c) Oval curve:

A spiral arc connecting two arcs of circles, one of which is interior to the other, without being concentric to it.



4. (d) C-curve:

A curve consisting of two spiral arcs, of the same concavity, tangent to a point of the same curvature and connecting two arcs of secant or outer circles to each other.



5. THE REFERENCE (BASIC) SPEED:

The reference speed (V_B)is the parameter that makes it possible to determine the minimum geometrical characteristics of the layout of the singular points for the comfort and safety of users, the reference speed should not vary appreciably between the different sections, a change in it should only be allowed in coincidence with a discontinuity perceptible to the user (crossing a city, modification of the relief, etc...).

1. Choice of reference speed:

The choice of reference speed depends on:

- The type of road.
- Importance and type of traffic.
- topography.
- Economic conditions of execution and operation.

2. Project Speed:

The project speed V_p is the highest theoretical speed that can be accepted at each point on the road, taking into account safety and comfort under normal conditions.

Normal conditions mean:

- Dry or slightly wet clean road, without snow or ice;
- Fluid traffic, with a flow rate below the permissible capacity;

vehicle in good working order and driver in good condition Normal.

6. FUNDAMENTAL PARAMETERS:

- **Our project category road is C2, in an environment E1, with a base speed V_B = 100 km/h.**

This data helps us to derive the following characteristics that are inspired by the B40 standards.

Paramètres	Symboles	Valeurs	Unités
Speed	**V_B**	**100**	**km/h**
Minimum length	**Lmin**	**139**	**m**
Maximum length	**Lmax**	**1667**	**m**

Devers minimal	**dmin**	**2.5**	**%**
Devers maximal	**dmax**	**7**	**%**
Reaction perception time	**t1**	**1.8**	**S**
Longitudinal friction	**f_L**	**0.36**	
Transverse friction	**f_t**	**0.11**	
Braking distance	**d0**	**111**	**m**
Stopping distance	**d1**	**161**	**m**
Minimum overtaking visibility	**dm**	**425**	**m**
distance	**dN**	**625**	**m**
Normal overtaking visibility distance	**dMd**	**300**	**m**
Overtaking manoeuvre visibility	**RHm**	**450 (7**	**m (%)**
distance	**RHN**	**%)**	**m (%)**
RHm	**RHd**	**650 (5**	**m (%)**
RHN	**RHnd**	**%)**	**m (%)**
RHd		**1600**	
RHnd		**(2.5 %)**	
		2200 (-	
		2.5 %)	

Table -III-1- Parameters of the plan route.

From all the above the elements used in our project are as follows:

❖ **The rays:**

Rayons (m)	**1000**	**900**	**6000**	**1500**	**750**	**2800**	**450**
Dévers associé (%)	**3.52**	**3.83**	**2.5**	**2.61**	**4.43**	**2.5**	**7**

Table III-2- Parameters of Rays and associated slope.

❖ **alignments (max and min):**

- L_{max} = **1621.369 m** < L_{max}(B40).
- L_{min} = **179.971 m** > L_{min}(B40).

The percentage of the length of alignments is 56% between 40% and 60% of the total plot length.

7. CHOICE OF GEOMETRIC ELEMENTS:

The general shape of our route composed of three sections, depending on the direction, the constraints to be crossed and the topography of the terrain, so we treated each one separately.

The results of the axis calculation are attached as an annex

1. INTRODUCTION :

The profile along a road is a continuous line obtained by the execution of a fictitious longitudinal section. So, it expresses the variation of the altitude of the road axis as a function of the curvilinear abscissa.

The main purpose of the longitudinal profile is to ensure continuity for the driver in the space of the road in order to allow him to predict the evolution of the route and a good perception of the singular points.

The longitudinal profile is always composed of elements of straight lines connected by parabolas.

2. RULES TO RESPECT IN THE DRAWING OF THE PROFILE ALONG:

In this paragraph we will quote the rules that must be taken into account except in exceptional cases when designing the profile in length. The development of the route will be based on the following rules:

1. Respect the values of the geometric parameters recommended by the regulations in force.
2. Avoid angles entering the cutting, because it is necessary to avoid stagnation of the waters and ensure their flow.
3. A longitudinal profile in light embankment is preferable to a longitudinal profile in light cutting, which complicates the evacuation of water and isolates the road from the landscape.
4. To ensure a good flow of water. The areas of the zero cant shall be placed in a slope of the profile in length.
5. Seeks a balance between the volume of the fill and the volumes of the cuttings.
6. Avoid excessive height in embankment.
7. Ensuring good coordination between the plan layout and the longitudinal profile, the combination of alignments and curves in longitudinal profile must obey certain rules in particular.

8. Avoid broken lines consisting of many segments of neighboring slopes, replace them with a single circle, or a combination of circles and arcs with progressive curvatures of very large radius.
9. Replace two neighboring circles of the same direction with a single circle.
10. Adapt the profile along to the main lines of the landscape.

3. COORDINATION OF THE ROUTE IN PLAN AND PROFILE IN LENGTH:

It should be pointed out, however, and now, that the profile study along the way from that of the plan route must not be separated. It must be ensured that the inflections in plan and in profile in length combine without causing disturbances to the safety or comfort of users.

And to ensure these last objectives we respect the following conditions:

- Associate a long concave profile, even slightly, with a plane radius involving a significant lateral clearance.
- Make the horizontal and vertical curves coincide, and then meet the condition: Vertical R> 6 $R_{horizontal}$ to avoid an inflection defect.
- To eliminate the loss of route to the extent that such a provision does not entail any appreciable cost, when it cannot be avoided, the carriageway is reappeared at a distance of at least 500 m, creating a loss of route that is sufficiently frank to prevent misleading perceptions.

4. SLOPES:

The construction of the longitudinal profile must take into account several constraints. The slope must be limited for reasons of safety (downhill braking!) and comfort (power of vehicles on the ramp).

In other words, the gradient is the tangent of the angle that the profile makes in length with the horizontal. It takes the name of slope for descents and ramp for climbs.

4.a) Minimum Declivity:

The stagnation of water on a roadway being very detrimental to its conversation and safety, so It is advisable to avoid slopes below 1% and especially that below 0.5%, to avoid stagnation of water.

4. b) Maximum Declivity:

It is advisable to avoid the maximum gradient which depends on:

- ✓ Adhesion condition.
- ✓ Minimum speed of PL.
- ✓ Economic condition.

The maximum slope of the project will be less than or equal to (i_{max} = 5%) in the crossing of the coast

Note:

According to the B-40, we have:

V_r Km/h	40	60	80	100	120	140
I_{max} %	8	7	6	5	4	4

Table IV -1- Variation of the maximum slope as a function of the base speed

5. CONNECTIONS IN PROFILE IN LENGTH:

Two gradients of opposite direction shall be connected in a longitudinal profile by a curve. The connection radius and the curve chosen must ensure the comfort of users and satisfactory visibility. There are two types of connections:

5.a) Convex connections (protruding angle):

The minimum permissible radii of the parabolic connections in protruding angles, are determined from the knowledge of the position of the human eye, the obstacles and the distances of stop and visibility.

Their design must meet the condition:

- Comfort condition.
- Visibility condition.

❖ **Comfort condition:**

When the longitudinal profile has a strong connection curvature, the vehicles are subjected to an unbearable vertical acceleration, that it is limited to "g / 40 (cat 1-2) and g / 30 (cat 3-4-5)", the connection radius to be retained will therefore be equal to:

$v^2 / R_v < g /40$ avec g = 10 m /s^2 et v = V/3.6.

OR : $R_v = 0{,}3\ V^2$ **(Cat 1-2)**

❖ **Visibility condition:**

An essential consideration for determining the profile in length is the achievement of satisfactory visibility.

It takes two vehicles travelling in opposite directions to be able to see at a distance twice the stopping distance at least.

The connection radius is given by the following formula:

$$R_V \geq \frac{d^2}{2(h_a + h_g + 2 \times \sqrt{h_a h_g})} \approx 0.27 d^2$$

D : Distance of visibility required (m)

h_a : Hauthor of the eye above the carriageway = 1.10 m

h_g: Hauthor of the obstacle =**1.20 m**

The rays ensuring these two conditions are given for the standards according to the basic speed and the category, for unidirectional choice and for a low speed Vr = 100Km/h and for category 2 on to:

Ray	Symbole	Valeur (m)
Min-absolu	R_{vm}	6000

Min- normal	**R_{vN}**	**12000**
Dépassement	**R_{vd}**	**20000**

Table IV-2 : Rays value.

5. (b) Concave connections (reentrant angle):

In the case of connection in low points, the visibility of the day is not decisive, rather it is during the night that it must be ensured that the headlights of the vehicle must illuminate a section long enough for the driver to perceive an obstacle, visibility is ensured for a radius satisfying the relationship:

$$R'_V = \frac{d_1^2}{(1.5 + 0.035 d_1)}$$

For a speed Vr = 100 km/h and category 2 we have the following table:

Rayon	Symbole	Valeur (m)
Min-absolu	**R'_{vm}**	**3000**
Min -normal	**R'_{vn}**	**4200**

Table IV-3 : Rays value.

6. PRACTICAL ETDERMINATION OF THE PROFILE AT LENGTH:

In project studies, the circle equation is assimilated:

$X^2 + Y^2 - 2RY = 0.$

To the equation of the parabola $X^2 - 2RY = 0$ $Y = X\rightarrow^2 /2R$

In practice, the connections are calculated as follows:

- ✓ Given the coordinates (x-coordinates, elevation) of points A, D.
- ✓ Given The slope P_1 of the line (AS).
- ✓ Given the slope P_2 of the line (DS).
- ✓ Given the radius R.

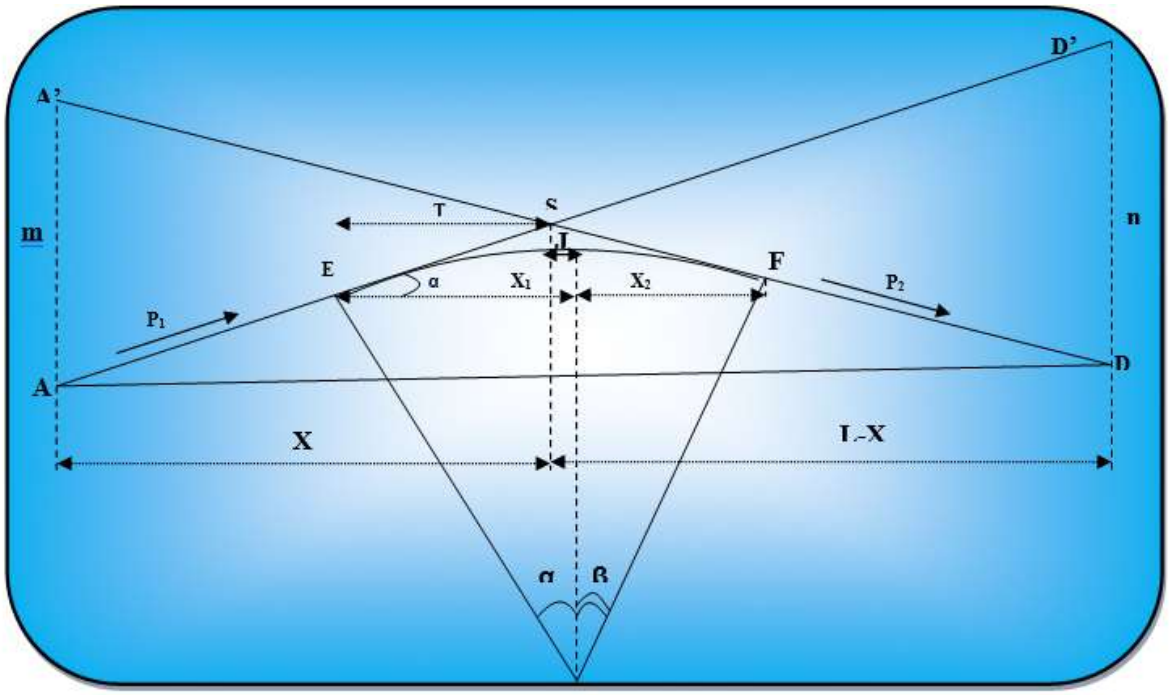


FIG IV-1 :length profil calcul

6. (a) Determination of the position of the meeting point(s):

$$Z_{A'} = Z_A + L.P_2 \quad , \quad m = Z_{A'} - Z_A$$

$$Z_{D'} = Z_D + L.P_1 \quad , \quad n = Z_{D'} - Z_D$$

The two triangles SAA' and SDD' are similar so:

$$\frac{m}{n} = \frac{x}{L-x} \Rightarrow x = \frac{mL}{m+n}$$

$$S \begin{cases} X_S = x + x_A \\ Z_S = P_1.x + z_A \end{cases}$$

6. b) Calculation of tangent:

$$T = \frac{R}{2}|P_1 - P_2|$$

We take (+) for ramps and (-) for slopes.

The tangent (T) is used to position the slopes of tangents B and C.

E $\begin{cases} X_E = x_S - T \\ ZE = Z_S - T.P1 \end{cases}$ F $\begin{cases} X_F = x_S + T \\ ZF = Z_S + T.P2 \end{cases}$

6.c) Horizontal projection of the connection length:

$$LR=2T$$

6. (d) Calculation of the arrow:

$$H = \frac{T^2}{2R}$$

6. (e) Calculation of the arrow and altitude of a current point M on the curve:

M $\begin{cases} H_M = \dfrac{X^2}{2R} \\ Z_M = Z_E + X.P_1 - \dfrac{X^2}{2R} \end{cases}$

6. (f) Calculation of the coordinates of the top of the curve:

the point J is the highest point on the horizontal tangent.

J $\begin{cases} X_J = X_E + R.P_1 \\ Z_J = Z_E + X_1.P_1 - \dfrac{X_1^2}{2R} \end{cases}$

Avec : $X_1 = R.P_1$
$X_2 = R.P_2$

In the case of slopes of the same direction the point is outside the project line and is of no interest. On the other hand, in the case of slopes in the opposite direction, the

knowledge of point (J) is interesting in particular for sanitation in the cutting zone, the sharing of runoff water is done from point J, i.e. the slopes of the descending ditches in the directions J worm A and D.

7. CHOICE OF GEOMETRIC ELEMENTS:

According to all that is precedes the elements used in our project are as follows:

- ✓ **Vertical rays**:

R_v Convex (m)	**20000**	**35000**	**30000**	**20000**	**25000**	**15000**
R_v Convex (m)	**25000**	**20000**	**25000**	**30000**	**25000**	**30000**

Table IV-04- Vertical Rays

- ✓ **Slope (max et min):**

$I_{max} = 0.50\ \% \ < \ I_{max}(B40)$.

$I_{min} = 0.90\% \ \geq \ I_{min}(B40)$.

1. DEFINITION:

Cross-section is a cross-section driven in a vertical plane perpendicular to the axis of the projected road. A road project involves the drawing of a large number of cross-sections, to avoid relating to each of their dimensions, a single profile called "typical cross-profile" is first established containing all the dimensions and all the constructive details (widths of the tracks, carriageways and other strips, slopes of the surfaces and embankments, dimensions of the layers of the superstructure, drainage system etc....).

2. ACROSS PROFILE ELEMENTS :

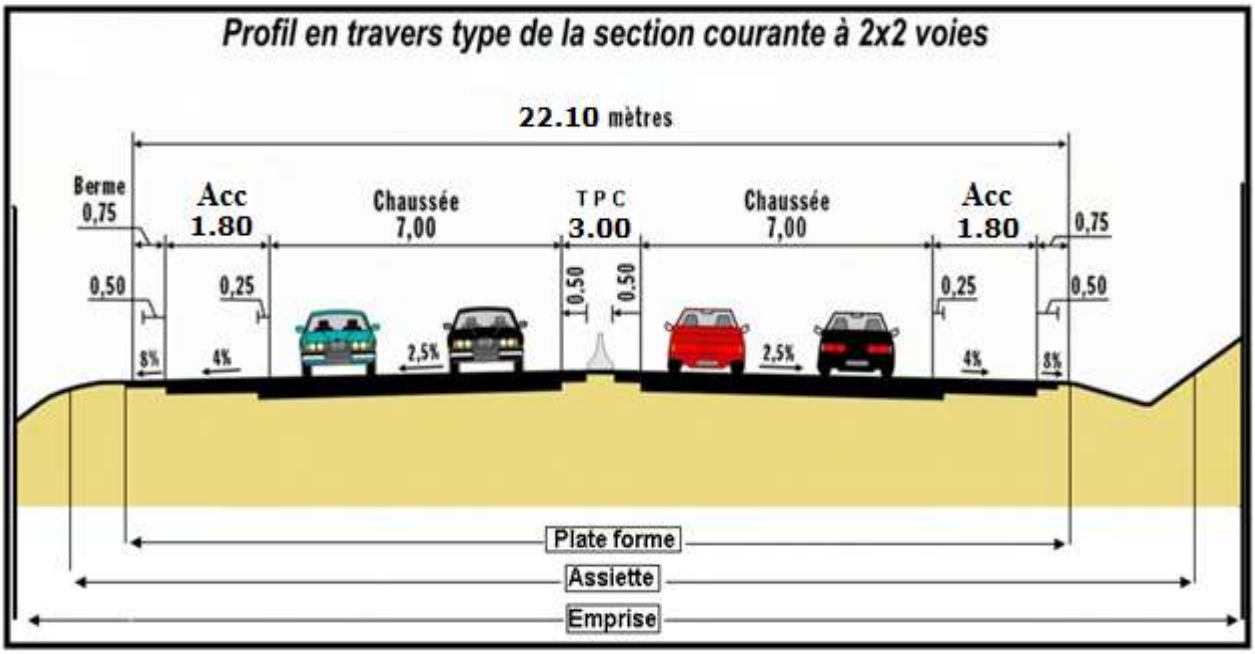


FIG V-1 :Cross section type.

- ✓ **Right-of-way:** part of the land that belongs to the community and is used for the road and its outbuildings.
- ✓ **The plate:** the surface of the land actually occupied by the road.
- ✓ **Platform:** the surface of the road that includes the roadway and shoulders.
- ✓ **Pavement:** the developed surface of the road on which the vehicles travel. It consists of one or more traffic lanes.
- ✓ **Shoulders:** lateral areas of the platform that border the roadway externally.

The shoulder consists of the berm and the emergency stop strip.

- ✓ **Emergency stop:** It facilitates the emergency stop outside the footwear of a vehicle, it is formed from the geometric edge of the roadway and it is coated.
- ✓ **La berm:** It participates in visual clearances and supports equipment (safety barriers, signage...). Its width depends entirely on the space necessary for the operation of the type of safety barrier to be put in place.
- ✓ **Central median (T.P.C):** It ensures the material separation of the two directions of circulation; its width is that of its constituents: the two skidded strips on the left and the median strip.
- ✓ **Surface or bearing layer**: The surface layer consisting of a material treated with hydrocarbon binder makes it possible to absorb the forces and shear caused by traffic and to ensure the waterproofing of the roadway.

This layer can be simple ie made in a single layer of a material, or multiple, ie made in several different materials.
In the latter case, the rolling layer is called the one which is indirect contact with the wheels; the other layers are called link layers.

- **Base coat**: The purpose of the base layer is to resist vertical forces and to distribute the resulting pressures in the field. It consists of an untreated material of good mechanical characteristics.
- **Foundation** layer: The foundation layer forms with the base layer the pavement body. Its role is identical to that of the base layer. But it consists of an untreated material of lower quality (tuff).
- **Underlay:** When the road body must be preserved against certain effects, an additional layer is interposed between it and the ground called underlay (anti-contaminant to prevent the rise of clay, draining to ensure the drainage of the foundation, or ant capillary to cut the capillary upwellings).
- **Shape** layer: The shape layer is the prepared ground surface on which the roadway is built. In some cases, it may be in its interest to replace the natural soil on a certain thickness by a better soil, selected for this purpose it thus constitutes a shape layer that improves the lift of the support by allowing, among other things, the circulation of construction equipment.
- **Sidewalks:** in built-up areas the shoulders are specially designed for pedestrian traffic, they take the name of sidewalk.
- **Benches:** when the edge of the shoulder of an embankment road is more than 1.00m above the natural ground, the risk of accident is reduced by establishing a levee called bench. Nowadays the benches are replaced by guardrails.
- **Descentes de l'eau :** Elles permettent l'évacuation des eaux de ruissellement le long des talus de remblai ou de déblai.

3. CLASSIFICATION OF THE CROSS-PROFILE:

There are two types of profiles:

1. Typical cross-profile.
2. Current cross-profile.

3.A. The cross-profile type:

The typical cross-profile is a basic piece drawn in projects of new roads or development of existing roads.

It contains all the constructive elements of the future road, in all situations (embankments, cuttings).

The application of the typical cross-section on the corresponding profile of the land while respecting the coast of the project allows the calculation of the front meter of the earthworks.

3.B. The current cross-profile:

The current cross-section is a basic piece drawn in projects at a regular distance (10, 15, 20.25m...). which are used to calculate cubature.

4. APPLICATION TO THE PROJECT:

After the traffic study, the typical cross-section chosen for avoidance will consist of a unidirectional carriage way.

The elements of the cross-type profile are as follows:

- ✓ Two carriageways of two lanes of 3.5m each: (2 x 3.5) x 2 = 14.00m.
- ✓ Un central median of 3 m : 3.00m.
- ✓ Shoulder of 1.80m : 2 x 1.8 = 3.60m.
- ✓ A berm of 0.75m for each side. : 2x 0.75= 1.50 m.

The width of the avoidance platform is 22. 1m.

1. INTRODUCTION:

The designer must define a geotechnical reconnaissance program after drawing its axis. This study will allow him to have lithological, hydrogeological and hydraulic descriptions of the region. A physico-mechanical interpretation will allow him to understand the geotechnical behavior of the support soil. The geotechnical study must first make it possible to locate the different layers and give the information of each layer and the mechanical and physical characteristics of this soil.

2. RECONNAISSANCE TESTS:

The laboratory tests are:

- Particle size analysis.
- Equivalent of sand.
- Atterberg boundaries.
- PROCTOR test.
- CBR test.
- Los Angeles trial.
- Essai Micro Deval.

The CBR index, derived from the C.B.R test, will make it possible to calculate the thickness of the pavement by the so-called C.B.R.

The tests will be carried out at different water contents compacting energies, in order to assess the stability of the soil to the accidents during earthworks, these tests will be preceded by PROCTOR test.

The classification of the soils encountered will be useful and will require the determination of the Atterberg limits.

3. IDENTIFICATION TESTING:

3.a) Particle size analyses: This is sieving (either by passing 2mm, or by passing 80µm) which allows for example to distinguish fine soils, sandy soils (rich in fines) and gravel

soils (poor in fines). The objective of this test is to determine the distribution of grain according to size or size.

The results of the particle size analysis are given in the form of a curve known as a particle size curve and constructed taking into account a graph this analysis is generally done by sieving.

3.b) Sand equivalent:

It is a test to measure the cleanliness of a sand. That is, determine the amount of impurity either from ultra-fine clay elements or silts.

3.c) Atterberg Boundaries:

Plasticity limit (Wp) and liquidity limit (WL), these conventional limits separate the three soil consistency states:

WP separates the solid state from the plastic state and WL separates the plastic state from the liquid state; soils with neighboring Atterberg boundaries, that is, soils with a low plasticity index value (IP = WL – WP), are therefore very sensitive to a small variation in their water content.

3.d) PROCTOR Test:

The PROCTOR test is a road test, it consists in studying the behaviour of a soil under the influence of compaction and a water content, it is therefore intended to determine an optimal water content in order to obtain a maximum dry density during a soil compaction, the resulting moisture content is referred to as “optimum PROCTOR”.

3.e) Test C.B.R (California Bearing Ratio):

The purpose of this test is to assess the load-bearing capacity of the soil by estimating its Punching, in order to be able to size the pavement and direct the works of earthworks.

The test consists in submitting samples of the same soil to the punching, the samples are compacted in molds with the optimum water content (modified PROCTOR) with three (3) energies of compaction 25 c/c; 55 c/c; 10 c/c and soaked for four (4) days.

It only concerns coherent soils.

3.f) Los Angeles Trial:

The purpose of this test is to measure the impact fragmentation resistance of road aggregates and their reciprocal friction resistance in the so-called “Los Angeles” machine. The higher the L.A, the harder the aggregate.

3.g) Micro Deval Test:

The purpose of the test is to assess the resistance to wear by reciprocal friction of the aggregates and their sensitivity to water, we shall speak of the humid micro-Dev.

4. LAND USE CONDITIONS FOR FILL:

The embankments must be made of material obtained from the spoil or from possible borrowings.

Fill materials shall be free from:

Stone size > 80mm.

Plastic materials IP > 20% or organic.

Gelling materials.

Avoid soils with high clay content.

The embankments will be adjusted and carefully compacted on the surface for which they will be executed.

The material of the embankments will be tinned in layers of 30cm thick on average before compaction. A layer shall not be placed and compacted until the previous layer has been received after verification of its compaction.

5. MEANS OF RECOGNITION:

The means of ground reconnaissance for the study of a road route are essentially:

- The study of existing archives and documents.
- The site visits.
- In-situ testing.
- Testing in the lab.

6. INTERPRETATION OF TEST RESULTS:

The samples collected were subjected to laboratory tests in order to determine and assess their geotechnical characteristics. The results obtained are recorded in the following table:

Puits		1	2	3	4	5	6	7	8
Position		0+300	1+700	4+100	7+400	9+900	12+800	14+970	16+90
Prof (m)		0,0 à 3,0							
Limites Atterberg	WL (%)	14	35	13	11	12	16	9	15
	IP (%)	-	-	-	-	-	-	-	-
Proctor	W_{opm}(%)	8	8	10	10	8	10	8	8
	D_{sm}(t/m)	1,77	1,79	1,77	1,76	1,74	1,80	1,70	1,77
CBR	Immédiat	32	38	35	34	31	45	37	36
	Imbibé	5	12	9	8	2	14	12	10
ES (%)		2	3	11	12	12	10	34	23
Granulm -étrie Tamisats (%)	10 mm	99	98	91	88	86	96	92	100
	2 mm	94	93	74	75	72	83	70	100
	0,2 mm	48	59	52	45	49	55	23	74
	0,08 mm	24	28	18	14	16	29	12	22
Chemica analysis	Sulf (%)	12	8	24	30	17	19	18	14
	Carb (%)	9	3	12	10	9	7	8	8
	Inso (%)	79	89	64	60	77	74	74	78

Table -VI-1: Results of laboratory tests.

6.a) Identification Tests:

i. Particle size analyses:

The particle size curves are spread out and continuous. They close a proportion of fine (80 microns) varying between 12% and 29%. The supporting soil is medium or silty sand mixed with gypsum formations.

ii. Atterberg boundaries:

The liquidity limits vary between 9% and 35% for the entire route, while the plasticity limits are not measurable for medium sand while silty sand varies between 6% and 12% indicating the presence of a medium plastic material. however, the silty sand area (referring to the plans of the long profile) will be filled in. This requires a selection of materials.

iii. Sand equivalence:

The results of this test gave us a polluted sand, due to the presence of silt. The values obtained vary between 2 and 34%.

iv. Material classification:

According to the RTR classification (Recommendation for Road Earthworks), the support soil materials belong to the following classes:

- Class A: main sub-class A2 (for silty sands).
- Class B: mainly subclass B5 (for medium sands).

Note:

According to the RTR classification class A corresponds to fine soils, class B has elements.

the difference between class A and B is in the percentage of fines of or differences in water sensitivity.

the main difference between Class B and C concerns large elements: presence of stones and blocks in Class C soils.

6.b) Mechanical Testing:

The mechanical tests were carried out on samples taken to identify the problem of load-bearing and strength of the material, because a pavement is essentially intended to support the mechanical actions of vehicles without significant deformation in the ground or at the level of the pavement body.

i. PROCTOR Test:

- Optimum water content varies from 8 to 10%.

- The optimum dry density obtained is in the range of 1.70 /1.89 t/m3 .

ii. PROCTOR MODIFIED Tests:

The test consists of punching soil samples previously compacted under Proctor conditions or possibly at different energies, into a standard mold (CBR mold) to determine its lift.

The immediate CBR indices found vary between 32 and when performing four (04) days soaked CBR tests, the values found vary between 2 and 14, This shows a drop in lift in the presence of water.

In this respect, the support soil is classified in lift class S2 with an index bearing CBR equal to 10.

1. INTRODUCTION:

The road network plays a vital role in the country's economy and the state of its infrastructure is therefore crucial. If the roads are not properly built or are not maintained in a timely manner they deteriorate, the size of the roadway depends on the road network management policy. This policy is defined by the owner according to the hierarchy of his road network.

The sizing is at the same time, choosing the necessary materials with the required characteristics, and determining the thicknesses of the different layers of the pavement structure.

2. PAVEMENT:

2.a) Definition:

Based on the execution of the earthworks, including the shape; the road begins to form on the ground as a platform with slopes similar to those of the project.

Subsequently, the roadway is intended to:

- Support the movement of vehicles of all kinds
- Transfer weight to foundation field.

In order to carry out its duty, that is to ensure rapid and comfortable circulation, the pavement must have a corresponding resistance and a constantly regular surface.

In the structural sense, the pavement is defined as a set of layers of material superimposed in order to allow the recovery of loads applied by traffic.

2.b) The different types of pavements:

Constructively, pavements can be grouped into three main categories:

- Flexible pavement.
- Semi-rigid pavement.
- Rigid pavement.

i. Flexible pavement:

Flexible pavements consisting of overlapping layers of materials not susceptible to noticeable tensile strength.

The upper layers are generally stronger and less deformable than the lower layers.

For a perfect assurance and an ideal comfort, the pavement generally requires for its construction, several layers executed in different materials, of a well-defined thickness, each having a role as well defined.

In principle a pavement can have in order the following 03 layers:

- **Running Surface:**

The surface layer constituting the screed (surface layer) protects the base layer by its hardness and impermeability and must at the same time ensure the roughness, safety and comfort of the users

- The running surface is in direct contact with the vehicle tires and the external loads. It takes the shear forces caused by the circulation.
- The binding layer plays a transient role with the stiffest lower layers.
- The thickness of the bearing layer in general varies between 6 and 8 cm.

- **Base Layer:**

The base layer plays an essential role, it exists in all pavements, it resists permanent deformation under the effect of traffic so lose ground, it takes up the vertical forces and divides the resulting normal stresses on the underlying layers.

The thickness of the base layer varies between 10 and 25 cm.

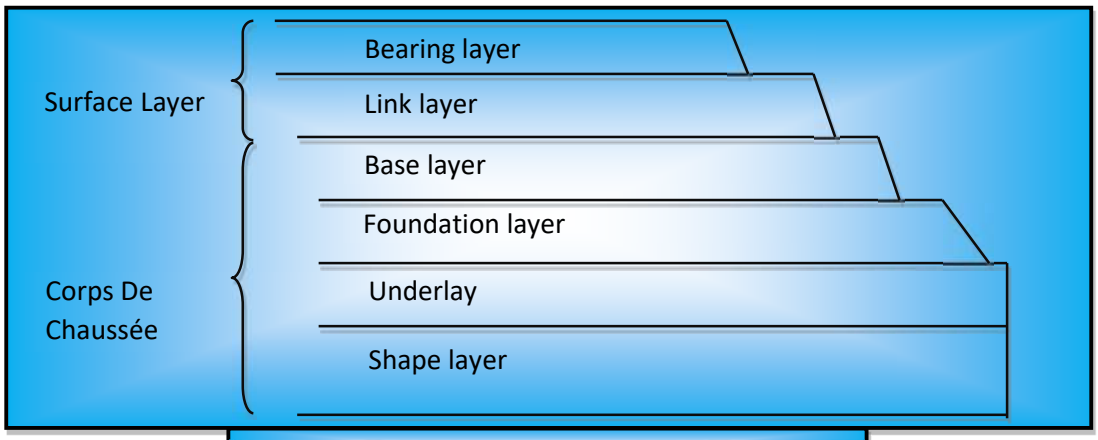
- **Foundation Layer:**

Completely made of untreated materials (in Algeria), it partly replaces the role of the support soil, allowing the homogenization of the constraints transmitted by the traffic. Ensure a good plain and good lift of the finished pavement, and also, it has the same role as that of the base layer.

- **Shape layer:**

The shape layer is a more or less complex structure that is used to adapt the random and dispersed characteristics of backfill or natural terrain materials to the mechanical, geometric and thermal characteristics required to optimize pavement layers.

The thickness of the shape layer is usually between 40 and 70 cm.



TableVII-1 -Typical cut of a soft pavement

ii. Semi-rigid pavement:

We can distinguish:

- Pavements with a base layer (sometimes a foundation layer) treated with a hydraulic binder (cement, aggregate, etc.). The road surface is made of hydrocarbon asphalt and is sometimes laid by means of a binding layer which is also made of strictly minimal asphalt must be 15 mm. This type of road surface currently exists only on an experimental basis in Algeria.
- Pavements with a base or foundation layer of gypsum sand.

iii. Rigid pavement: Consisting of concrete slabs (corresponding to the flexible pavement surface layer) which bend elastically under the loads transmit the forces at a distance and thus distribute them on a foundation layer which can be a severe mechanically stabilized, a severe treatment with hydrocarbon or hydraulic binders. This type of pavement is practically non-existent in Algeria.

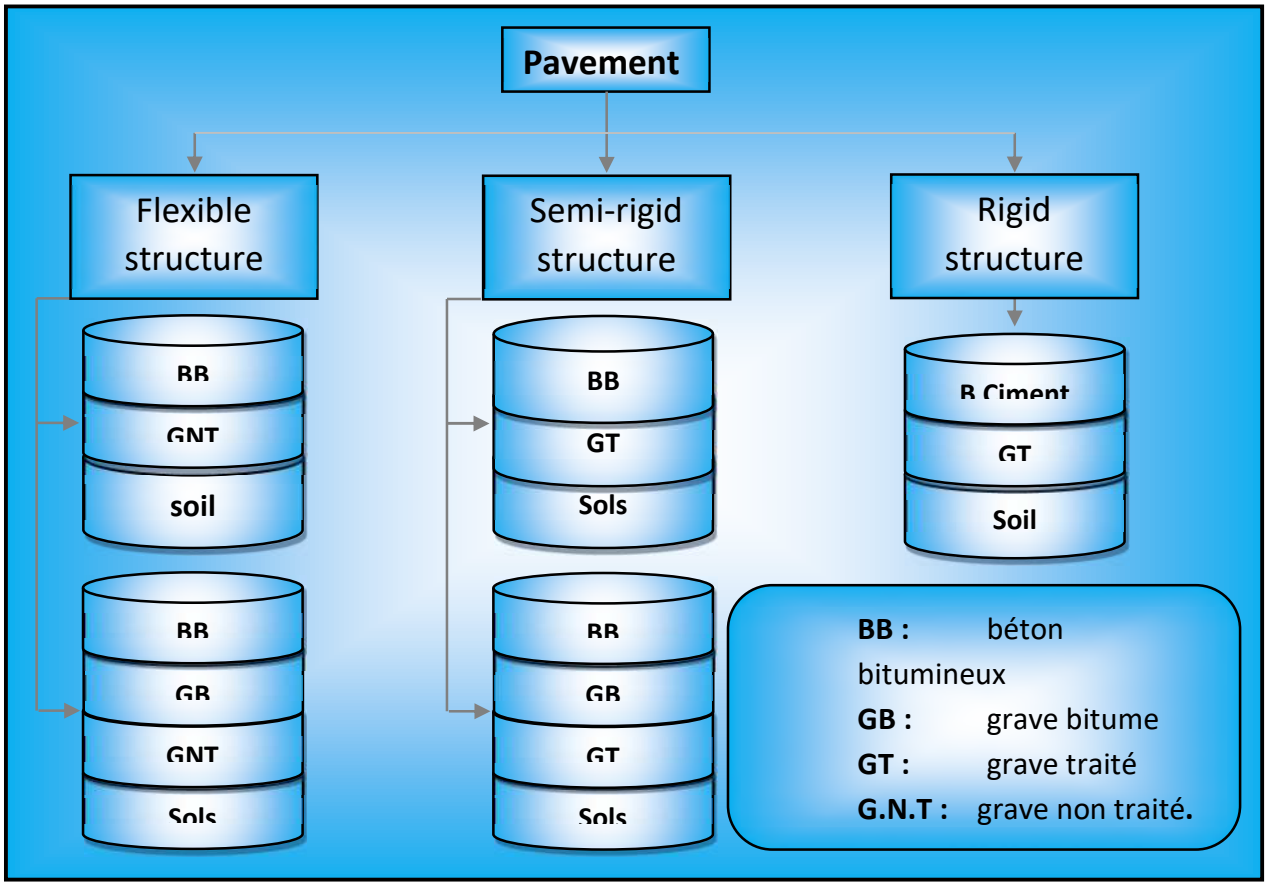


FIG VII-1 :Summary diagram

3. THE VARIOUS FACTORS DETERMINING THE DESIGN BASIS FOR THE ROADWAY:

The number of layers, their thicknesses and the materials of execution, are conditioned by several of the most important factors are:

3.a) Traffic:

Sizing traffic is mainly heavy goods vehicles (vehicles over 3.5 tonnes). it acts as an input parameter in the dimensioning of pavement structures and the choice of the intrinsic characteristics of materials for the manufacture of pavement materials.

It appeared necessary to characterize the traffic from two parameters: From truck traffic "T" to commissioning, the result of a study of traffic and counts on the existing tracks; Cumulative traffic over the period considered, which is given by:

$$N = T.A.C$$

$$C = [(1+\tau)^{p} - I\ ] / \tau$$

N : cumulative traffic.

A : overall aggressiveness factor of traffic.

C : rollup factor

τ: Growth rate of traffic.

p: number of years of service (service life) of the pavement.

3.b) Environment:

The climate and the environment have a considerable influence on the good resistance of the pavement in terms of stress and deformation resistance, thus the temperature variation is involved in the choice of the hydrocarbon binder, and also the precipitation related to the drainage conditions condition the water content of the soil support. Therefore, one of the parameters of essential importance in the sizing; the water content of the soils determines their properties, properties of the bituminous materials and conditions.

3.c) The Support Floor:

Pavement structures are based on a set known as “flat – pavement support form” which is natural terraced soil, which may be treated, topped if a form layer is required.

The platforms are defined from:

- The nature and state of the soil.
- The nature and thickness of the shape layer.

3.d) Materials:

The materials used must withstand repeated loads a very large number of times (the repeated passage of heavy vehicles).

4. THE MAIN METHODS OF DESIGN:

Two families of methods are distinguished:

Empirical methods derived from experimental pavement performance studies.

Rational methods, based on the theoretical study of pavement behavior.

For this we will review the most widely used empirical methods.

4.a) Method C.B.R (California – Bearing – Ratio):

This is a semi-empirical method based on a punch test on a support soil sample by compacting the specimens from (90° to 100°) of the modified Proctor optimum.

The determination of the total thickness of the roadway body to be used shall be made by applying the following formula:

$$e = \frac{100 + \sqrt{P}(75 + 50 \log \frac{N}{10})}{I_{CBR} + 5}$$

With:

e: equivalent thickness

I: CBR index (support soil)

n: refers to the daily number of trucks over 1500 kg empty

P: wheel load P = 6.5 t (axle 13 t)

Log: logarithm decimal

The equivalent thickness is given by the following relation:

$$e = c_1 \times e_1 + c_2 \times e_2 + c_3 \times e_3$$

Where:
c1, c2, c3: coefficients of equivalence.
e1, e2, e3: actual layer thicknesses.

Coefficient of Equivalency:

The table below shows the coefficients of equivalence for each material:

Matériaux utilises	Coefficient d'équivalence
Béton bitumineux ou enrobe dense	**2.00**
Grave ciment – grave laitier	**1.50**
Grave bitume	**1.20 à 1.70**
Grave concassée ou gravier	**1.00**
Grave roulée – grave sableuse T.V.O	**0.75**
Sable gypseux	**0.75**

Sable ciment	**1.00 à 1.20**
Sable	**0.50**
Tuf	**0.60**

Table VII-2 : the coefficients of equivalence for each material

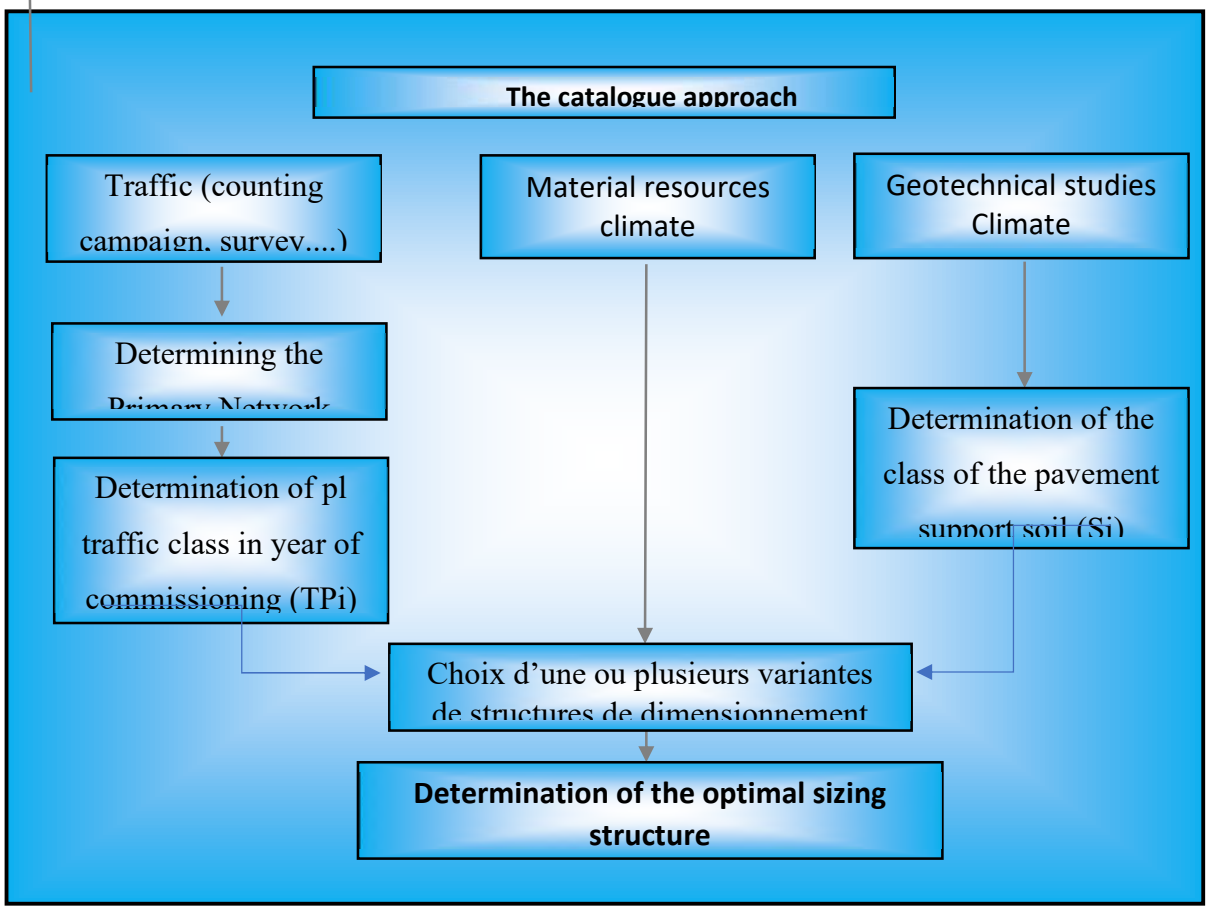
4.b) Design Catalogue Method for New Pavements:

The use of sizing catalogue uses the same parameters used in other pavement sizing methods: traffic, materials, ground support and environment.

These parameters are often input data for the sizing, depending on this we end up with the choice of a given pavement structure.

The New Pavement Sizing Catalogue Method is a rational method based on two approaches:

- Theoretical approach.
- Empirical approach.



5. Application to Project:

5.a) Method C.B.R:

❖ **Data from the study:**

- Counting year: 2017.
- TJMA2017=10929 v/d
- Commissioning: 2019
- Life span: 15 years
- Rate of increase: $\tau = 4\%$
- Percentage of heavy goods vehicles: Z = 44%
- ICBR=10% (soaked at 4 days).

❖ Determination of NPL2034:

$$\mathbf{TJMA}_{2019} = \text{TJMA}_{2017}\,(1+\boldsymbol{\tau})^{2}$$
$$= 10929\,(1+0.04)^{2}$$
$$= 11821 \text{ v/j}$$

$$\mathbf{N_{PL2034}} = \text{TJMA}_{2019} \times 0.5 \times \%PL \times (1+\tau)^{15}$$
$$= 11821 \times 0.5 \times 0.44 \times (1+0.04)^{15}$$
$$= 4683 \text{ PL/j/sens}$$

❖ **Determination of equivalent thickness:**

$$\mathbf{E_{équi} = [100 + \sqrt{P}\,(75 + 50\log_{10}(N/10))] / (ICBR + 5)}$$

$$\mathbf{E_{équi}} = [100 + \sqrt{\frac{13}{2}}\,(75 + 50\log_{10}(4683/10)] / (10+5)$$

$\mathbf{E_{équi}}$ =42cm

So, the equivalent thickness: $\mathbf{a_1.e_1 + a_2.e_2 + a_3.e_3} = 42\text{cm}$

Where: **ai**: equivalent coefficient of different materials.

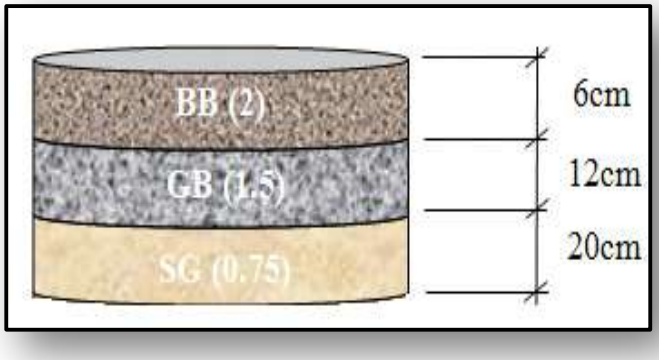
We assume :

Layer name	Matériaux	Coefficient equivalence	Layer thickness
bearing	BB	2	6
Base	GB	1,5	12
Fondation	SG	0,75	?

Table VII-3: Thickness of each layer

e_3 =42-(2x6+1,5x12)/0.75 =16 cm

So e_3=**20cm**



5.b) The Design Catalogue Method for New Pavements:

❖ **Data from the study:**

- Counting year: 2017.
- TJMA2017=10929 v/d
- Commissioning: 2019
- Life span: 15 years
- Percentage of heavy goods vehicles: Z = 44%
- Soaked CBR =10%. , Immediate CBR =32%.

Case 1: Soaked CBR =10%:

❖ **Determining the type of main networks:**

According to the catalogue the following main networks are classified:

Réseau principal	Trafic (véhicules/jour)
RP1	>1500
RP2	<1500

Table VII-4: Main Road Classification

TJMA2017=10929 v/d

(V/j) > 1500(V/j) ⟶ le principal est RP1

❖ **Determination of traffic class:**

Definition of heavy truck:

A Heavy-Duty Vehicle (HGV) is a vehicle that weighs more than 3.5 tonnes of total authorized laden weight.

- **$TJMA_{2019}$** =11821 v/j.
- **τ**= 4 %.
- **Z**=44%.
- **TPL**= 11821×0.44×0.5= 2600 PL/ j/sens.

❖ **Cross-traffic distribution:**

In the absence of precise information on the distribution of heavy goods vehicles on the various roads, the following value shall be adopted:

- 2 2-lane unidirectional pavement: 90% of LP traffic on the slow right lane.

TPL2019 = 2600* 0.9 = 2340 (PL/j/direction).

❖ **Determination of traffic class (TPLi):**

The traffic classes (TPLi) adopted in the design structure sheets are given, for each main network level, in number PL per day and per direction in the year of commissioning.

TPL_i	**TPL_3**	**TPL_4**	**TPL_5**	**TPL_6**	**TPL_7**
PL/j/sens	**150-300**	**300-600**	**600-1500**	**1500-3000**	**3000-6000**

Table VII-5 : TPLi Class for RP1

TPL= 2340 (PL/j/sens). La classe de trafic est TPL_6

❖ **Determination of Floor Lift-Pavement Support:**

- **Presentation of soil load-bearing classes:**

  The following table groups the soil load-bearing classes in order of S4 to S0. This classification will also be used for pavement support floors.

Portance (S_i)	CBR
S4	<5
S3	5-10
S2	10-25
S1	25-40
S0	>40

Table VII-6: CBR in terms of bearing capacity

- **Support floor load-bearing classes for sizing:**

For the dimensioning of structures, we distinguish 4 classes of support soils namely:

S3, S2, S1, S0. The values of the modules shown in the table below were calculated from the following empirical relationship:

$$\mathbf{E\ (MPA) = 5.CBR}$$

Classes de sol-support	S_3	S_2	S_1	S_0
Module (MPA)	25-50	50-125	125-200	>200

Table VII-7: Soil class support in terms of bearing capacity

E (MPA) = 5×10 = 50 (MPA) ⟶ S_2.

- **Choice of different layers constitutes of the pavement:**

As part of our project, we proposed the following structure:

- Bearing layer: BB.

- Base layer: GB.

- Foundation layer: SG.

➢ **Determination of the climatic zone:**

According to the map of the climatic zone of Algeria, our project is in climatic zone IV (<100 mm / year).

➢ **Sizing choice:**

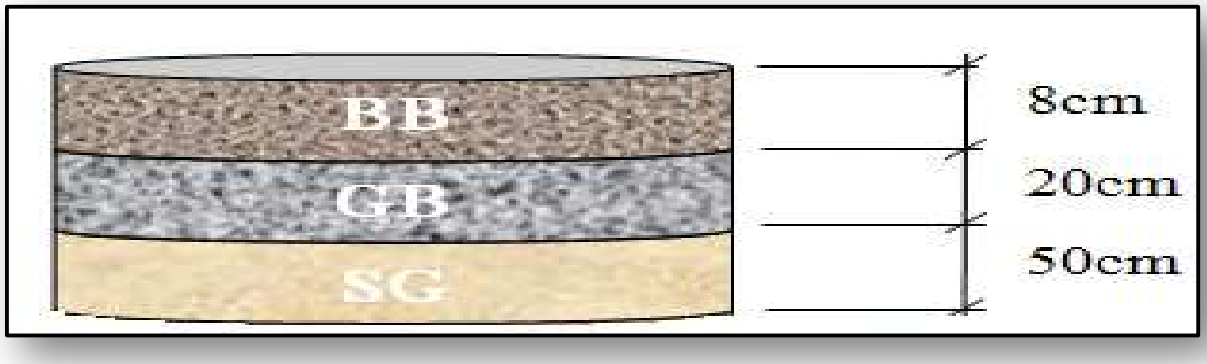
We are in the main network (RP1), climatic zone IV, lifespan of 20 years, rate of increase (4%), soil bearing capacity (S2) and a traffic class (TPL6).

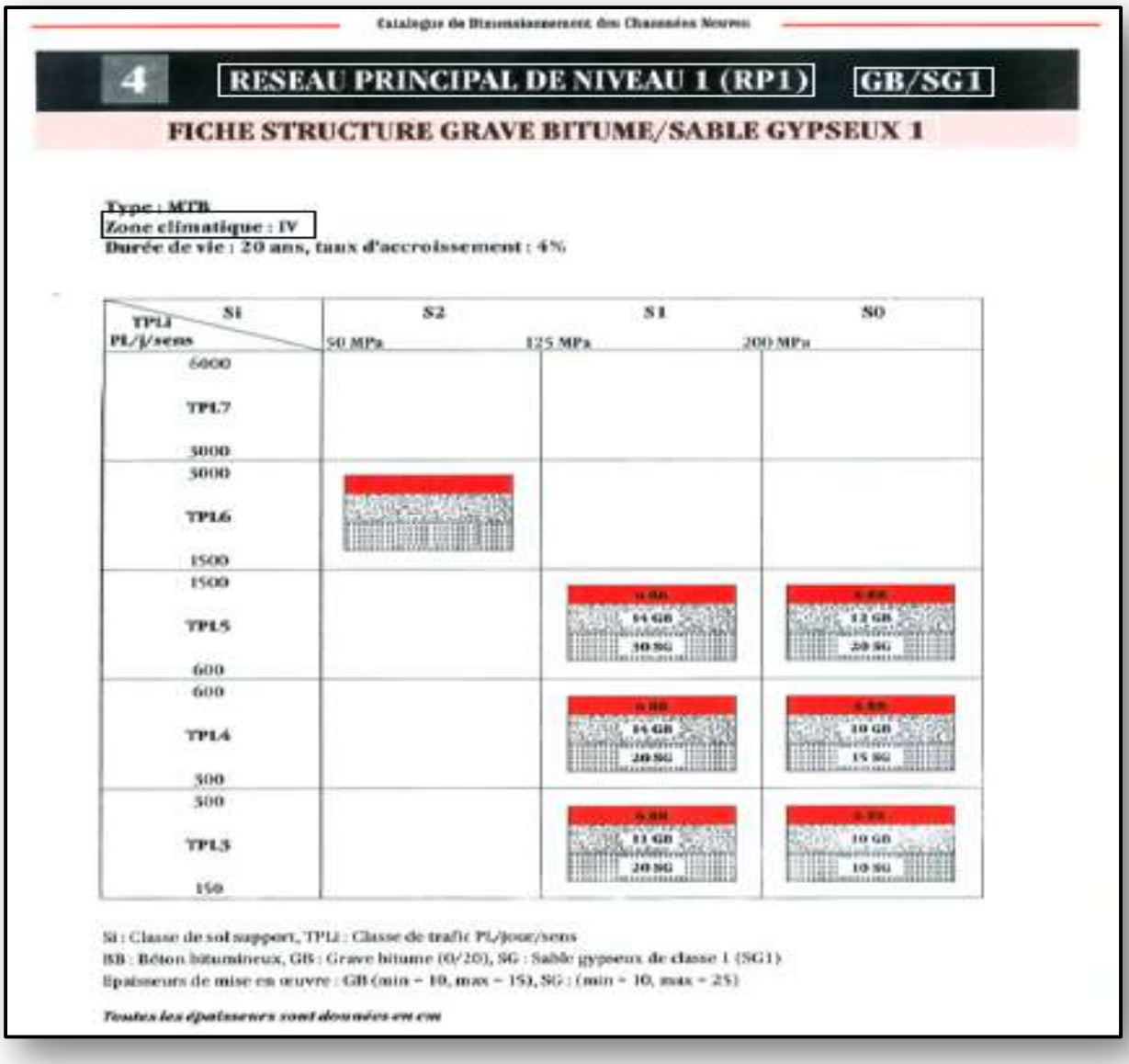
With all these data the Algerian catalog (booklet 3) we proposed the following structure:

- Wearing course: BB = 8 cm.

- Base layer: GB = 20 cm.

- Foundation layer: SG = 50 cm.





Catalogue de Dimensionnement des Chaussées Neuves

4 RESEAU PRINCIPAL DE NIVEAU 1 (RP1) GB/SG1

FICHE STRUCTURE GRAVE BITUME/SABLE GYPSEUX 1

Type : MTB
Zone climatique : IV
Durée de vie : 20 ans, taux d'accroissement : 4%

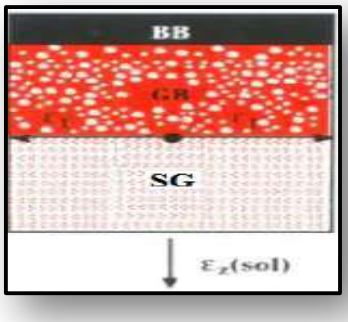
TPLi / PL/j/sens	S1	S2	S1	S0
		50 MPa	125 MPa	200 MPa
6000 TPL7 5000				
5000 TPL6 1500				
1500 TPL5 600			14 GB 30 SG	12 GB 20 SG
600 TPL4 300			14 GB 20 SG	10 GB 15 SG
300 TPL3 150			11 GB 20 SG	10 GB 10 SG

Si : Classe de sol support, TPLi : Classe de trafic PL/jour/sens
BB : Béton bitumineux, GB : Grave bitume (0/20), SG : Sable gypseux de classe 1 (SG1)
Epaisseurs de mise en œuvre : GB (min = 10, max = 15), SG : (min = 10, max = 25)

Toutes les épaisseurs sont données en cm

FIG VII-Principal level reseau -RP1

- **Fatigue verification of the structures and the deformation of the support soil:**



It will be necessary to verify that εt and εz calculated using Alize III, are lower than the calculated admissible values, that is to say respectively a εt, adm and εz, adm.

$$\varepsilon_{z.ad} = 22.10^{-3} \times TCEi^{-0.235}$$

$$\varepsilon_{t.ad} = \varepsilon_6(10°C\ ,\ 25Hz) \text{ x Kne x K}\theta \text{ x Kr x}$$

➢ **Calculation of the permissible deformation on the support ground:**

$\varepsilon_{z.ad} = 22.10^{-3} \times TCEi^{-0.235}$

$$TCEi = TPLi \times \frac{(1+i)^n - 1}{i} \times 365 \times A$$

Niveau de réseau principal (RPi)	Types de matériaux et structures	Valeurs de A
RP1	Chaussées à matériaux traités au bitume : GB/GB , GB/Tuf , GB/SG...	0 ,6
	Chaussées à matériaux traités aux liants hydrauliques : GL/GL , BCg/GC	1

- Aggressiveness coefficient: A = 0.6

So **TCEi** = 1.16 × 10^{-6} **Equivalent 13-ton axles**

$\varepsilon_{z.ad} = 22.10^{-3} \times (1{,}16.10^{7})^{-0.235} = 481 \times 10^{-6}$

➢ **Calculation of the admissible strain εt.ad at the base of GB:**

Tableau 8 : Choix des températures équivalentes

	Zone climatique		
Température équivalente θeq (°C)	I et II	III	IV
	20	25	30

Tableau 13 : Performances mécaniques des matériaux bitumineux

Matériau (MTB)	E (30°C,10Hz) (Mpa)	E(25°, 10Hz) (Mpa)	E(20°, 10Hz) (Mpa)	E(10°,10Hz) (Mpa)	ε_6(10°, 25Hz) (10^{-6})	-1/b	SN	Sh (cm)	υ	kc Calage
BB	2500	3500	4000	-	-	-	-	-	0,35	-
GB	3500	5500	7000	12500	100	6,84	0,45	3	0,35	1,3

$$\mathbf{Kne} = \left(\frac{TCEi}{10^6}\right)^b = \left(\frac{1.16x\ 10^7}{10^6}\right)^{-0.146} = 0.70$$

$$\mathbf{K\theta} = \left(\frac{E(10°C\ ,10Hz)}{E(\theta eq,10Hz)}\right)^{0.5} = \left(\frac{12500}{3500}\right)^{0.5} = 1.89$$

Kr = 10-tbδ , avec r= 5%, Or t = -1.645

b= - 0.146

$$\delta = \sqrt{\left(SN^2 + \left(\frac{c}{b} \times Sh\right)^2\right)}$$

$$= \sqrt{\left(0.45^2 + \left(\frac{0.02}{-0.146} \times 3\right)^2\right)} = 0.61$$

Donc: **Kr** $=10^{-0.146} = 0.71$

$$\varepsilon_{t.ad} = 100.10^{-6} \times 0.70 \times 1.89 \times 0.71 \times 1.3 = 122.10^{-6}$$

Calculation results by Alize III:

	Thinkness (cm)	Module (Mpa)	Coef de poisson ν
Couche de roulement	**6 BB**	**2500**	**0.35**
Couche de base	**20GB**	**3500**	**0.35**
Couche de fondation 2	**25SG**	**200**	**0.25**
Couche de fondation 1	**25 SG**	**100**	**0.25**
Soil support	**Soil**	**50**	**0.35**

Table VII - - results of AlLIZE III.

EVITENENT DE LA VILLE DE TOUGGOURT
POSITION DE LA VALEUR MAXIMALE POUR UN JUMELAGE
A SOUS UNE ROUE SIMPLE
B SOUS UNE DES ROUES DU JUMELAGE
C AU CENTRE DU JUMELAGE
A= 12.500 D= 37.500 Q= 6.620
NOMBRE DE COUCHES 5

Z		EPSILONT	SIGMAT	EPSILONZ	SIGMAZ
.00		.145E-03B	.877E+01B	-.101E-03C	.662E+01A
	E= 25000.				
	NU= .35				
	H1= 8.00				
8.00		.365E-04C	.370E+01B	-.448E-04C	.552E+01B
	COLLE				
8.00		.365E-04C	.399E+01B	-.506E-04C	.552E+01B
	E= 35000.				
	NU= .35				
	H2= 20.00				
28.00		-.110E-03C	-.586E+01C	.122E-03B	.526E+00B
	COLLE				
28.00		-.110E-03C	-.140E+00C	.289E-03B	.526E+00B
	E= 2000.				
	NU= .25				
	H3= 25.00				
53.00		-.122E-03C	-.237E+00C	.174E-03C	.236E+00C
	COLLE				
53.00		-.122E-03C	-.791E-01C	.272E-03C	.236E+00C
	E= 1000.				
	NU= .25				
	H4= 25.00				
78.00		-.115E-03C	-.105E+00C	.189E-03C	.139E+00C
	COLLE				
78.00		-.115E-03C	-.120E-01C	.292E-03C	.139E+00C
	E= 500.				
	NU= .35				
	H5=INFINI				

D	53.26MM/100	R*D	
R	534.62M	28472.73M*MM/100	

MODULES ET CONTRAINTES EN BARS

	Défotmations admissibles	Défotmations calculées
ε_z sol support	481.10^{-6}	292.10^{-6}
ε_t à la base de GB	122.10^{-6}	110.10^{-6}

Table VII - - Deformations

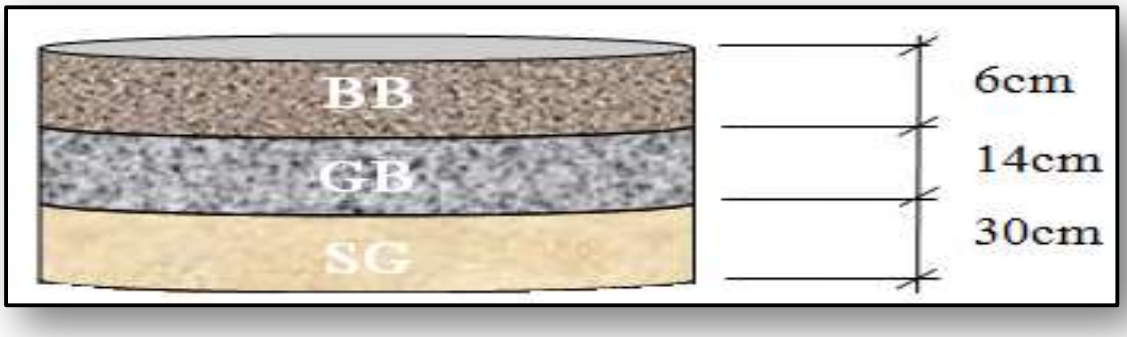
So, the **structure 8BB + 20GB + 50 SG** is ***therefore*** verified, because:

$$\varepsilon_t < \varepsilon_{t.ad} \text{ et } \varepsilon_z < \varepsilon_{z.ad}$$

Case 2: Immediate CBR = 32%:

Given that we are in a region where the rainfall is low, not to say rare (calculated intensity It = 14.27 mm / hour for a daily precipitation of 12 mm) and it is quite fair and rational to use the index CBR soaked at 24 hours (according to the Algerian standard), faced with the unavailability of this element, we propose to use the immediate CBR index (ICBR = 32).

That is to say, the use of a class (S1) ground support load-bearing capacity, which gives us, according to the method of the new pavement sizing catalog, the following structure: 6BB + 14GB + 30 SG.



VI.5.c) Summary:

In view of the above, and given the disparity of the two methods, we have attempted to find a median method which verifies both the CBR method as used to date in the region, and the body sizing catalog method of pavement however with use of the immediate CBR index instead of CBR imbibe, the pavement body thus obtained, see summary table (BB = 6cm, GB = 14cm and SG = 30cm), seems to us to be quite appropriate in relation to the minimum thicknesses required for better implementation.

Summary of pavement body thicknesses according to the different methods:

METHODE		
CBR	**Catalogue de Dimensionnement des Chaussées Neuves**	
CBR $_{imbibe}$ =10%	**Cas 1 : CBR $_{imbibe}$ =10%**	**Cas 2: CBR $_{immédiat}$ =32%**
6BB + 12GB + 20 SG	**8BB+20GB+50SG**	**6BB+14GB+30SG**

1. INTRODUCTION :

Land movements refer to all earthworks, and their primary objective is to modify the shape of the natural terrain so that it is available to receive works in general.

These actions are necessary and frequently observed on longitudinal sections and cross sections.

Changing the shape of the natural terrain involves two actions, the first is adding soil (fill) and the second is removing soil (cut).

The calculation of the volumes of cuttings and embankments is called earthworks cubature.

2. DEFINITION :

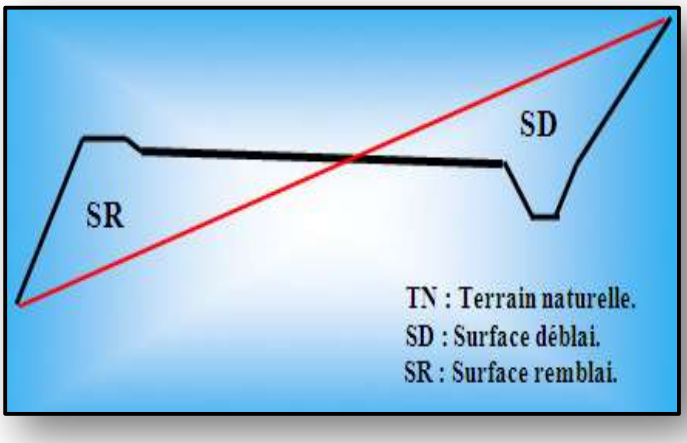
Cubature is defined by the number of cuttings and fill cubes in the project in order to obtain a uniform surface that is appreciably closer to and under adjacent to the red line of our project.

The longitudinal profile and the cross section must have a certain number of points close enough so that the lines join these different points as little as possible from the line of the land it represents.

3. METHOD OF CALCULATING CUBATURE:

The cubature are the calculations made to have the volumes of the existing earthworks in our project. Cubatures are tedious, but there are several methods of calculating cubature which simplifies the calculation.

The work consists of calculating the areas SD and SR for each cross section, then we subtract them to find the section for our project.

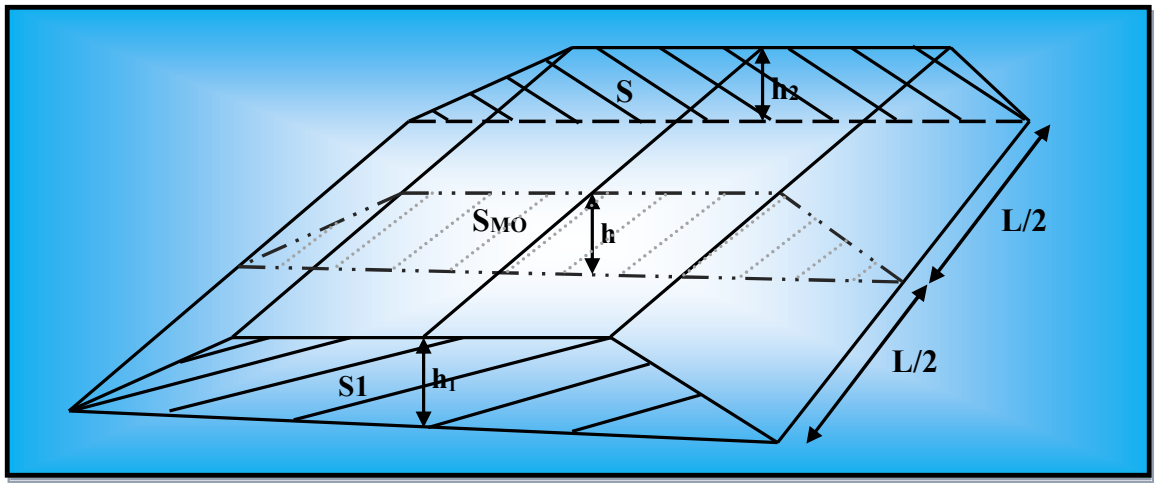


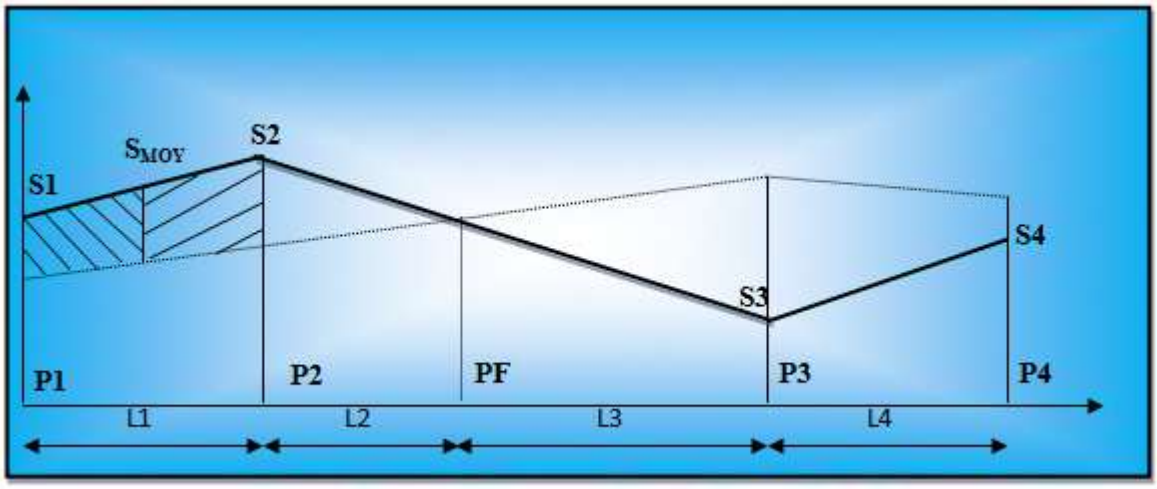
The SARRAUS method is used, it is a simple method which is summed up in the calculation of the volumes of the sections included between two successive cross sections.

Formula of Mr SARRAUS:

This "three-level formula" method consists in calculating the volume of cut or fill of the sections between two successive cross sections.

$$\mathbf{V = \frac{L}{6}(S_1 + S_2 + 4 \times S_{MOY})}$$





- ✓ **PF** : profil fictitious, zero surface.
- ✓ Si : cross sectional area Pi.
- ✓ Li: distance between these two profiles.
- ✓ SMOY: intermediate surface (parallel surface and halfway Li).

To avoid very long calculations, this formula is simplified by considering the two expressions SMOY and ((S1 + S2)) / 2 as very close.

So the volumes will be: $\mathbf{V_i = \frac{L_i}{2} \times (S_i + S_{i+1})}$

$V_1 = \frac{L_1}{2} \times (S_1 + S_2)$ between P1 et P2

$V_2 = \frac{L_2}{2} \times (S_2 + 0)$ between P2 et PF

$V_3 = \frac{L_3}{2} \times (0 + S_3)$ between PF et P3

$V_4 = \frac{L_4}{2} \times (S_3 + S_4)$ between P3 et P4

By adding members to member these expressions, we have the total volume of earthworks:

$$V = \frac{L_1}{2} S_1 + \frac{L_1 + L_2}{2} S_2 + \frac{L_2 + L_3}{2} \times 0 + \frac{L_3 + L_4}{2} S_3 + \frac{L_4}{2} S_4$$

4. CALCULATION OF EARTHWORK CUBATURES:

The calculation is attached in The Anexe.

1. INTRODUCTION :

The sanitation of traffic routes includes all the devices to be planned and carried out to collect and evacuate all surface water and groundwater, i.e.:

1. The drying of the circulation surface by transverse and longitudinal slopes, by ditches, gutters, cuvettes, channels, gondolas, etc....
2. Drainage: buried works collecting and discharging groundwater (draining trenches and draining pipes).
3. Pipes: all structures intended for the flow of surface water (pipes, chamber, chimneys, bags, ...)

2. OBJECTIVE OF SANITATION :

Road sanitation must meet the following objectives:

1. Ensure the rapid evacuation of water falling and flowing directly onto the road surface (danger of aquaplaning).
2. The maintenance of good condition of viability.
3. Reduced maintenance costs.
4. Avoid erosion problems.
5. Ensure the evacuation of seepage water through the body of the roadway. (Danger of softening of the underlying ground and freezing effect).
6. Evacuation of water seeping into the ground by lover of the platform (danger of diminishing the importance of the platform and the freezing effect).

3. Ground water drainage :

3. (a) Need for groundwater drainage:

Groundwater includes, on the one hand, groundwater and, on the other hand, seepage water. Their effects are harmful if these waters soggy the continental shelf, which can lead to a considerable decrease in soil lift.

Care must therefore be taken to avoid:

- ✓ Stagnation on the bottom shape of the seepage water through the pavement.

- ✓ The upwelling of water from the water table or its capillary fringe to the level of the foundation.

3.b) Protection against the water table:

The construction of a pavement changes the water content of the underlying soil, as the pavement reduces infiltration and evaporation.

If the water table is close to the surface, the water content of the soil tends towards a state of equilibrium on which the final lift depends.

When the latter is low, it will be possible to:

- ✓ Size the carriageway accordingly.
- ✓ Increase the lift characteristics of the soil by lowering the water table or by putting the roadway in fill.

The choice of one or the other of these three solutions depends on:

- ✓ soil drainage possibilities (coefficient of permeability).
- ✓ the importance of freezing problems of their respective costs.

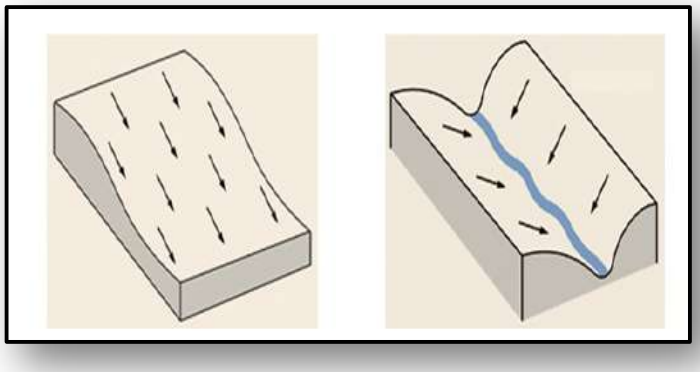
It is not necessary, in general, to ensure the deep drainage of a large area because a good levelling and a properly designed surface drainage network are sufficient to guarantee acceptable behavior of the shoulders.

4. SOME DEFINITIONS :

It is a geographical area that is limited by the ridge lines or meeting lines of the slopes upwards, where the total area of the area likely to supply rainwater, in a natural way, a pipe at a point consider.

- **watershed:**

It is a geographical area that is limited by the ridge lines or meeting lines of the slopes upwards, where the total area of the area likely to supply



rainwater, in a natural way, a pipe at a point consider.

- **Main collector (pipeline):**

Main pipe harvesting water from other pipes, called collectors.

Secondary, collecting surface or groundwater directly.

The collectors are constituted by buried pipes aligned, between the manholes with a diameter and a constant slope.

- **Visiting room (fireplace):**

Works placed on the pipes to allow control and cleaning.

The visiting chambers are to be expected at changes in size, direction or longitudinal slope of the pipeline, as well as at places where two collectors meet.

To facilitate the maintenance of the pipes, the distance between two consecutive chambers should not exceed 80-100m.

- **Bags:**

Work placed on the pipes to allow the introduction of surface water. The bags are frequently equipped with a dump, intended to retain solid waste that can be carried by surface water.

- **Wolf's mouth, introduction grid and mouth:**

Constructive devices for the flow of surface water into the bags.

- **Ridge ditches:**

Tool built to prevent erosion of the land or wells.

- **Downhill:**

Drains the water collected on the ridge ditches.

The look:

It consists of a vertical well, equipped with a cast-or-concrete buffer, whose role is to provide the network with the functions of connecting the pipes, ventilation and maintenance among others and also to resist rolling loads and earth thrusts.

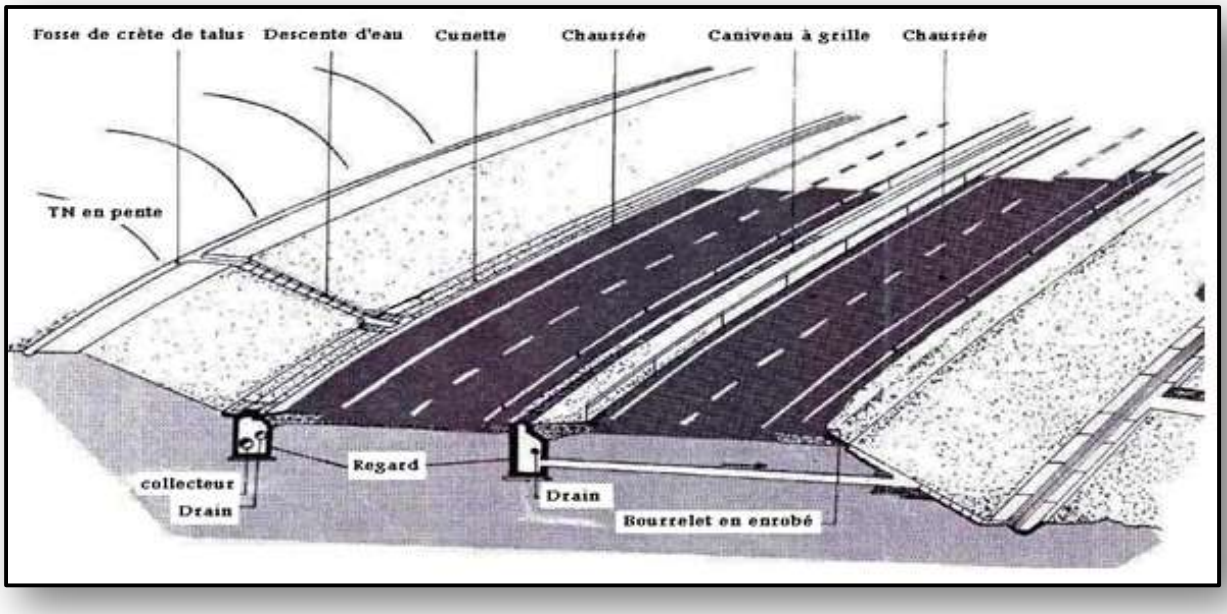


FIG VIII-profile section with sanitation

5. SIZING OF SEWERAGE NETWORK TO BE PROJECTED:

To evaluate the order of magnitude of the maximum flow of runoff water likely to be collected by ditches or by an outlet, one can use the method called the Rational method, the principle of which we recall very briefly: **Qa =Qs**

Qa : inflow from the watershed(m^3/s).

Qs : flow rate at saturation point (m^3/s).

5.a) Inflow rates:

The flow rate is calculated by applying the Rational method:

Qa = K.C.I.A

with:

K : coefficient which allows the conversion of the units (mm/h to l/s).

I : average intensity of the rain of fixed frequency for a duration equal to the concentration time (mm/h).

C : runoff coefficient.

A: watershed area (m2).

Important note:

According to **SETRA:** this formula is empirical and was made for the following units:

- **Qa in (m^3/s) valid for: i in (mm /h); A in ($km^{2)}$; K= 0.278**
- **Qa in (L/s) valid for: i in (mm/h); A en (ha) ; K= 2.78**

❖ **Runoff coefficient 'C':**

It is the ratio of volume of water that flows on this surface to the volume of water falls on it. It can be chosen according to the following table:

Type of pavement	C	Valeurs prises
Pavement asphalt pavement	0.80 à 0.95	0.95
Shoulder (slightly permeable soil)	0.15 à 0.40	0.40
embankment	0.10 à 0.30	0.30
Natural terrain	0.05 à 0.20	0.20

Table VIII-1: Runoff coefficient 'C'

❖ **Precipitation calculation:**

Precipitation Pj (%) is obtained by the following formula:

$$P_J(10\%) = \frac{P_J}{\sqrt{C_V^2 + 1}} e^{u\sqrt{\ln(C_V^2+1)}}$$

with

Pj : average daily rain (mm).

Cv : climatic coefficient of variation.

U : Gauss variation, given by the table above.

The reference rain for the calculation of the dimensioning of the structures corresponds to a duration of rain t minute and a return period of 10 years, 50 years, 100 years. Let be the following table which gives the variable values of the Gaussian as a function of frequency:

Frequency (%)	**50**	**20**	**10**	**5**	**2**	**1**
Return period (years)	**2**	**5**	**10**	**20**	**50**	**100**
Gauss variable (U)	**0**	**0.841**	**1.282**	**1.645**	**2.057**	**2.327**

Table VIII-2: The values of as a function of frequency

- Nozzles and ditches will be sized for a 10-year return period.
- Culverts (sculots) will be sized for a 50-year return period.
- The bridges dimensioned for a return period of 100 years.

❖ **Determination of intensity:**

Calculation of the frequency of shower:

It is determined by the following formula:

$$P_t\ (\%) == P_j\ (10\%)\ (t_c/24)^b$$

P_t : height of rain of duration t (mm).

b: the climatic exponent of the region.

t_c : concentration time.

The concentration time:

The duration t of the downpour which produces the maximum flow Q being taken equal to the concentration time.

Depending on the characteristics of the drained basin; The concentration time is estimated respectively according to Ventura, Passini, Giandoth, as follows:

1) When: A < 5 km²:

$$t_c = 0.127\sqrt{\frac{A}{P}}$$

. When: 5km² ≤ A < 25 km²:

$$t_c = 0.108\frac{\sqrt[3]{A.L}}{\sqrt{P}}$$

When: 25 km² ≤ A < 200 km²:

$$T_C = \frac{4\sqrt{A} + 1.5L}{0.8\sqrt{H}}$$

1. Tc : Concentration time (hour).
2. A: Catchment area (km²).
3. L : Watershed length (km).
4. P : Average slope of the catchment area (m.p.m).

- H: The difference

The intensity of the shower for a return period of 10 years and for a time of concentration of t_c:

$$I_t = I\,(t_c/24)^{b-1}$$

with: **I=Pj (%) / t**

5.b) saturation rate:

The saturation rate is given by the **MANNING STRICKLER** formula:

$$Q_s = S.\,K.R^{2/3}.j^{1/2}$$

such:

S: wet section.

K : STRICKLER coefficient which depends on the nature of the walls of the structure

with:

1. **K=30:** Earthen wall.
2. **K = 70:** Concrete wall (sculots).
3. **K = 80:** Concrete wall (prefabricated nozzles).

R : hydraulic radius (m).

J : longitudinal slope of the ditch.

6. APPLICATION TO THE PROJECT:

The hydrological data for the study area (the Touggourt region) are as follows:

1. Average rainfall of 24h :P 24 = Pj = 9.81 mm
2. The coefficient of variation of the region considered Cv = 0.20
3. The climatic exponent of region b = 0.27
4. concentration time tc == 0.25 hours.

6.a) calculation of daily precipitation:

In general, for the main roads, we take into account the frequency decnale (10 years), so the Gauss variable U = 1.28 (Table 1), Pj = 9.81 mm and Cv = 0.20

Therefore: **P_j (10%)= 12.4mm**

6.b) downpour frequency Pt (10%):

For a duration of t = 15 minutes, it is determined by the formula:

$$P_t = P_j\,(10\%)\,(t_c/24)^b$$

AN : $P_t\,(10\%) = 12.4\,(0.25/24)^{0.27}$ ⟶ Pt (10%) = 3.61mm.

6.c) The intensity of the shower It :

For a period of 24 hours: $I_t = I\,(t_c/24)^{\beta}$

β =b-1=0.27-1= -0.73

t_c= 0.25 h

I=P_j (%) / t = 12.4/24 =0.51mm/hour.

So: the intensity of the rain is :

$I_t = I\,(0.25/24)^{b-1} = 0.51 \times (0.25/24)^{-0.73}$ =14.27 mm / hour.

Table VIII-3

6.d) Dimensioning of the DRAINAGE network:

➢ Ditch sizing:

In our project the flow of apport is reported by the roadway, the shoulder and the embankment. The watershed area: we consider the presence of the three elements (pavement, shoulder, embankment), the 100m section we calculate the flow reported by each element of the road and the total flow.

So : $\mathbf{Q_a = Q_c + Q_A + Q_t}$

with :

$Q_c = K.I.C_c.A_c$

$Q_A = K.I.C_A.A_A$

$Q_t = K.I.C_t.A_t$

The calculation results are given in the following table:

Filler surface	Surface (km^2)	Coef 'C'	Intensité (mm/h)	Débit (m^3/s)	Total (m^3/s)
roadway	**0.0007**	**0,95**	**14.27**	**0.0095**	**0.0595**
shoulder	**0.00018**	**0.4**	**14.27**	**0.001**	
embankment	**0.0114**	**0.3**	**14.27**	**0.049**	

Table VIII- 3 : Ditch sizing.

The dimensions of the ditch are obtained according to the formula if below:

$\mathbf{Q_{a\ max}} = Q_s = K .Sm. J^{1/2} .R^{2/3}$

$\mathbf{Q_{a\ max}} = 0.0165\ m^3/s.$

Knowing that $Q_a = Q_c$ (chaussée) + Q_A (shoulder) + Q_t (embankment).

K : (roughness coefficient) for our case: **K= 30** earthen works.

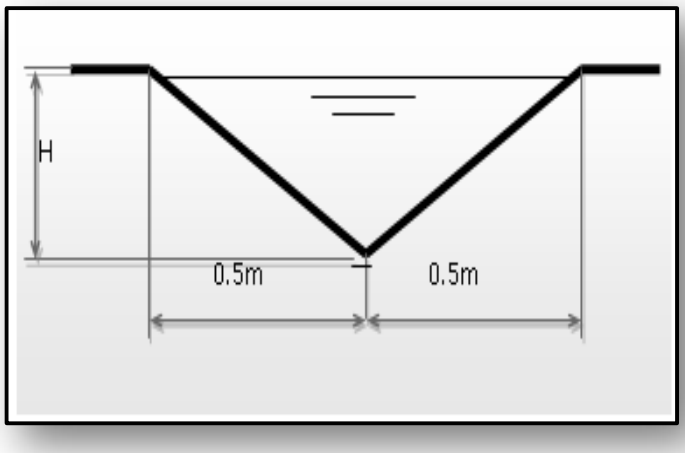
J : longitudinal slope of the ditch.

The wet surface:

$S_m = 0.5 \times H = \frac{1}{2} H.$

The wet perimeter:

$$P_m = 2\sqrt{H^2 + \frac{1}{2}^2}$$



The hydraulic radius:

$$RH = \frac{H}{4\sqrt{H^2+\frac{1}{2}^2}}$$

$$Q_a = Q_s = K_{st}.J^{1/2}.S.RH^{2/3}$$

$$= K_{st}.J^{1/2}.\frac{1}{2}H.\left[\frac{H}{4\sqrt{H^2+\frac{1}{2}^2}}\right]^{2/3}$$

$$H = 2QS/Kst.\, j^{1/2}\left[\frac{4\sqrt{H^2+\frac{1}{4}}}{H}\right]^{2/3}$$

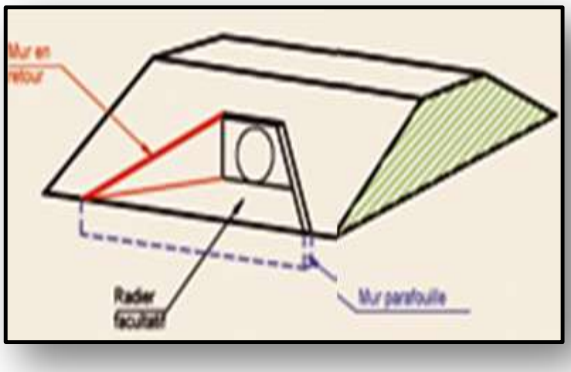
According to an iterative calculation we find the height H = 0.5m.

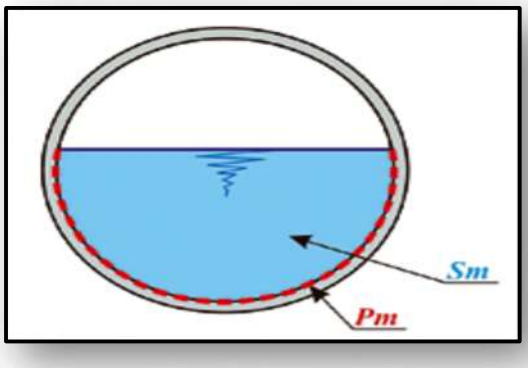
NB: Given the climate that characterizes the region of Ouargla (dry climate and almost zero rainfall), and the slopes of the longitudinal profile not exceeding 3%, it is recommended to provide earth ditches of triangular shape at the level of the sections in cuttings.

- **Sizing of current structures:**

After the site trip, it was noticed that the flow of flows was very small (climatic zone V), however only nozzles were made, except for a single flow at PK 9 + 062 that must be made a sculot at Oued Righ (Q_a= 3.23m^3/ s), in order to ensure judicious drainage along the entire route.

Case of a nozzle:





To size the nozzles, has two parameters to consider, Q and I.

For the flow rate Q, it is calculated by the formula: **Q = k . C.I.A.**

I : is the radiant slope which is imposed by the slope of the cross profile which takes at most a value of 4% (Manning Strickler) and this to avoid the slippage of the ducts under the effect of the high loads. With a fill ratio (ρ=0.5).

According to the formula of MANNING STICKLER we have:

$$D = 2 \times \left(\frac{2^{\frac{2}{3}} \times Q}{\pi \times K\text{st} \, I^{0.5}} \right)^{\frac{3}{8}}$$

I : radiant slope = 2%

Q : flow rate according to the rational method (flow 1) = 0.67 m^3/s.

K: coefficient of MANNING = 80.

D ≅ ϕ 600 mm

NB: For our project the implementation of nozzles is summarized in the summary table below.

Case of a sculot:

The scuppers consist of two vertical walls on the right foot on which rests a slab. Straight feet are laid on a foundation or radiate.

The cross-section of the scups can have various shapes, the most used in Algeria are rectangular in shape.

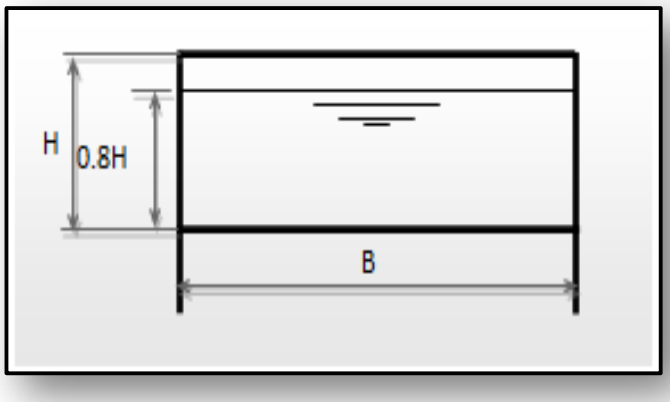
- **Searches for the dimensions of the scuppers:**

The sizing of the scuppers is according to the maximum flow of runoff water collected. The concentration time ($t_{c)\ is}$during.

In our project, the scuppers are made of reinforced concrete which gives us a coefficient of roughness K_{st}= 70.

The wet surface:

$$S_m = 0.8H \times B$$



The wet perimeter:

$$P_m = 1.6H + B$$

The hydraulic radius:

$$RH = \frac{0.8H \times B}{1.6H + B}$$

$$Q_a = Q_s = K_{st}.J^{1/2}.S.RH^{2/3}$$

$$\boldsymbol{H = \frac{1}{0.8B}\left(\frac{Q_a}{K_{st}.J^{1/2}}\right)^{3/5}(1.6H + B)^{2/5}}$$

And by iterative calculation we draw the value of H which verifies this inequality.

We fix B = 6m and we find: H = 2.5m.

6(e) Summary table of current works:

DESIGNATION	PROPOSED WORK
E1 (1 + 650)	**Buse ø 600 mm**
E2 (4 + 630)	**Buse ø 600 mm**
E3 (6 + 450)	**Buse ø 600 mm**
E4 (9 + 062)	**Dalt 2×3×2.5**

Table VII-4: Summary of current works.

1. INTRODUCTION

The crossroads is an important part of a road. Efficiency, speed, safety, operating cost and capacity depend on it. The level junction is the place of the intersection of two or more roads at the same level.

Intersections are classified into four types:

- Three-branched crossroads.
- Multi-branched crossroads.
- Round point.
- Four-branched crossroads.

2. DATA USEFUL FOR THE DEVELOPMENT OF A CROSSROADS

The choice of a crossroads layout must be based on a number of essential data concerning:

- The value of traffic flow on the different branches and the intensity of the movements turning their foreseeable evolution in the future.
- The types and causes of accidents observed in the case of the construction of an existing junction.
- Unladen approach speeds.
- The characteristics of adjacent sections and neighboring intersections.
- Respect for the homogeneity of the route.
- The surface neutralized by the development.
- The topographical condition.

3. GENERAL PRINCIPLES FOR THE DEVELOPMENT OF A CROSSROADS

- Shears must produce this at an angle of 90 ±20 in order to obtain better visibility condition and the preaching of speeds on the transverse axis, also have a minimum width traversed.
- Slow down non-priority currents using geometric characteristics.
- Group access points to the main road.
- Ensure good crossroads visibility.

- Take particular care of horizontal and vertical signs.
- Avoid, if possible, intersections with two-tone lights

4. VISIBILITY

In the development of a junction, it must be ensured the best possible visibility conditions, the unladen approach speed replaces the base speed when approaching the junctions.

In case of insufficient visibility, it is necessary to provide:

- Appropriate signs and signals, the purpose of which is either to impose a speed reduction or to change the priority regimes.
- Reinforce by suitable geometric arrangements (inflection of the layouts in plan, separator island or outlet of non-priority roads.

5. CHOICE OF DEVELOPMENT:

A simultaneous analysis of all the criteria (cost, economic evaluation of benefits, safety, special conditions linked to the context of the development, etc.) should make it possible to determine the most suitable development.

It is possible to diagram the roundabout and the uneven intersection in terms of TJMA.

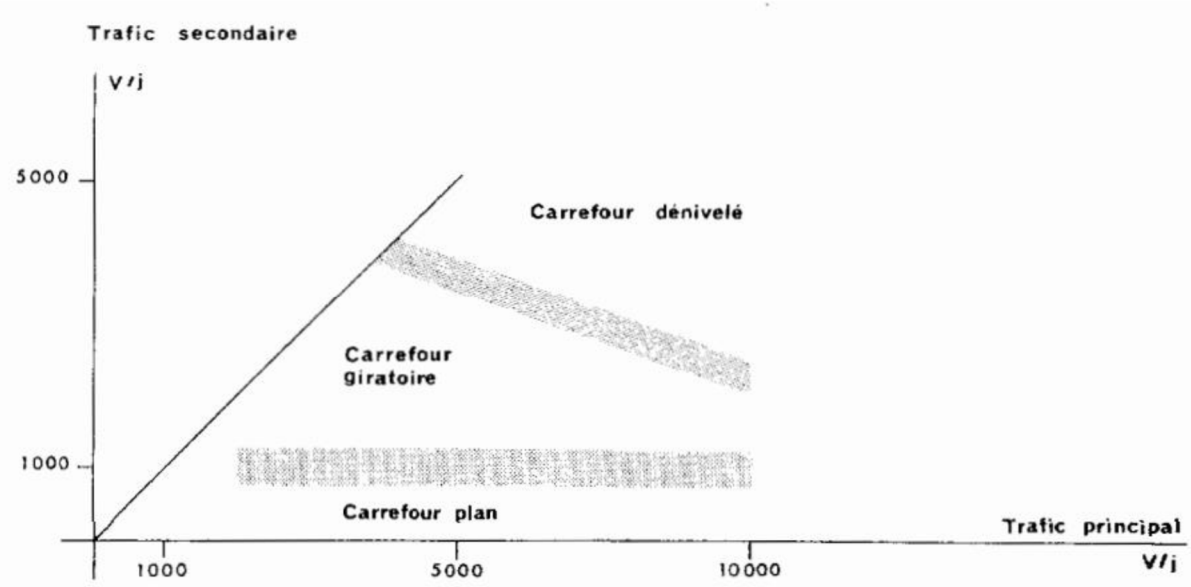


FIG IX -01 :- Design of the intersection according to the JMLT

6. ROUNDABOUT:

A roundabout is actually a small one-way street with two ends joining (this forms a circle). Vehicles coming from the other arteries that lead into this street are therefore obliged to follow a mandatory direction (the left in Algeria) and to indicate their will to leave this street by activating the turn signals while giving priority to possible pedestrians of the passages reserved for the approach of a roundabout (sign at 50 m), it is also necessary to give the passage to pedestrians of the reserved crossings and it may be necessary to give the passage to users already on the ring (in this case, there is a yield-the-passage on the access road), taking into account the conventional direction of rotation. This direction was chosen to limit the size of the crossroads, by allowing an insertion of the tracks without widening them too much.

The speed to be applied is that in force in the area encountered as for a conventional turn (in general 50 km/h maximum, the roundabouts are massive in built-up areas).

However, to be able to follow the curves of a medium-sized roundabout, it is better to approach it at 30 km/h, but nothing prevents on a roundabout of very large diameter to go to 40 km/h if the curvature and visibility allow it.

7. THE ADVANTAGES AND INCONVENIENTS OF THE CARREFOUR GYRATORY

7.1. The advantages:

- The adaptation to traffic is automatic, by the priority given to vehicles already inserted.
- Speed is limited by infrastructure, and road safety is therefore improved.
- A form that identifies a place and characterizes space.
- Reduction of nuisances
- Facilitate the integration of many of the branches.
- Regulatory and operational economy.

7.2. The disadvantages:

- Significant right-of-way consumption.
- Maintenance of the central island.

- Lack of proper care for pedestrians.
- Lack of traffic regulation (non-compliance with the priority regime).

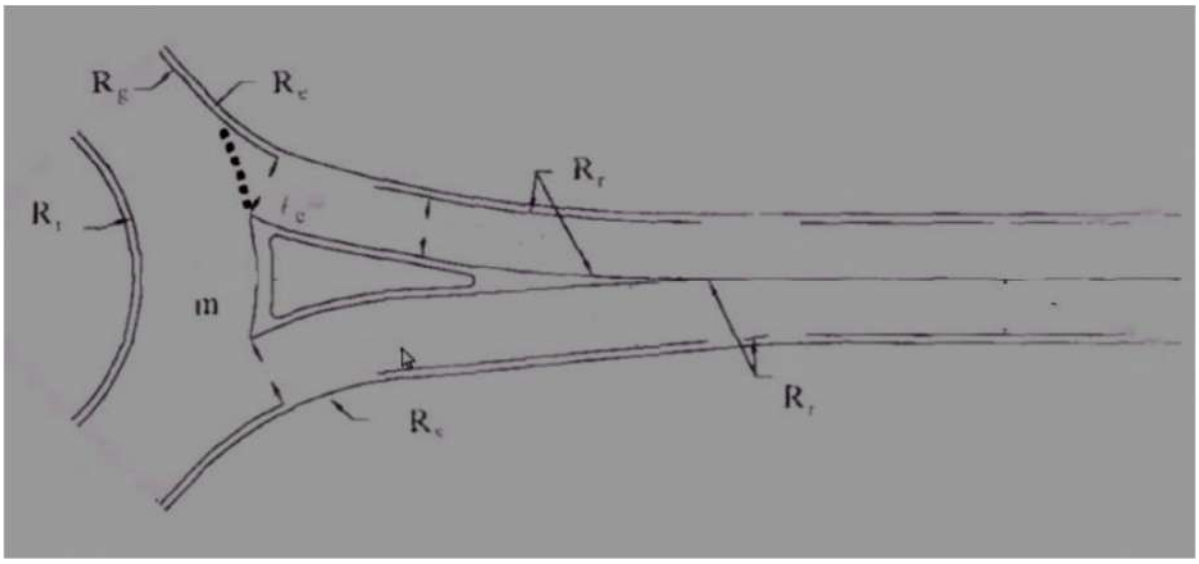


FIG IX :02 - Construction parameter of separator islands

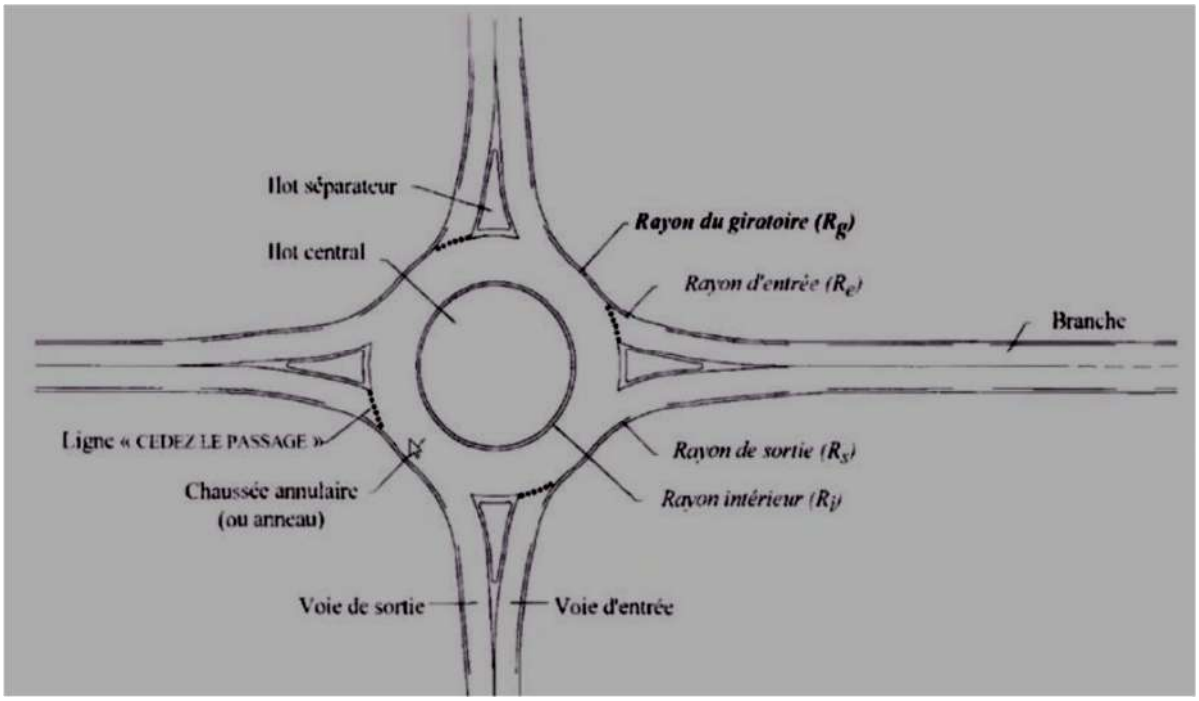


FIG IX-03- Construction parameter of the input and exit channels

Crossroads parameter	Current value
Roundabout (Rg)	25
Ring width (la)	9
Inner radius (Ri)	14-16
Input radius (Re)	15-25
Width of incoming voice (le)	7
Output radius (Rs)	20
Width of the outgoing voice (ls)	7
Connection radius (Rr)	80

Table IX-01- Input and output channel construction parameter

8. APPLICATION AU PROJET

The traffic of the road of the RN03 is 11821 v/d, by the projection of the traffic on table IX.1, we adopted a roundabout.

N	PK	Statuts	Related	With
1	542+390	Development of the crossroads	Pénétrante 03	RN3
2	543+820	Development of the crossroads	RN3	Evitement Ouest
3	416+450	Development of the crossroads	RN1B Messaad	Evitement Ouest
4	8+925	Development of the crossroads	Pénétrante 2	Evitement Ouest
5	11+400	Development of the crossroads	Pénétrante 1	Evitement Ouest
6	528+665	Adaptation of the development of the crossroads	RN3	Evitement Ouest
7	531+705	Development of the crossroads	Pénétrante 01	RN03
8	536+320	Development of the crossroads	Pénétrante 02	RN03
9	5+700	Development of the crossroads	Pénétrante 03	Evitement Ouest

Table IX -02 represents the different gyratory

Roundabout at the beginning of the project:

At intersection RN03 (Pk543+820) towards Ouargla with the Ouest bypass, the East bypass of the city of Touggourt and the road to the city center of Touggourt. This crossroads contains 04 separatorislands.

Concerning the rays of connections, the radius of central median is R =14m. The connecting radius for incoming vehicles is R =25 m. The connection radius for outgoing vehicles is R=30m.

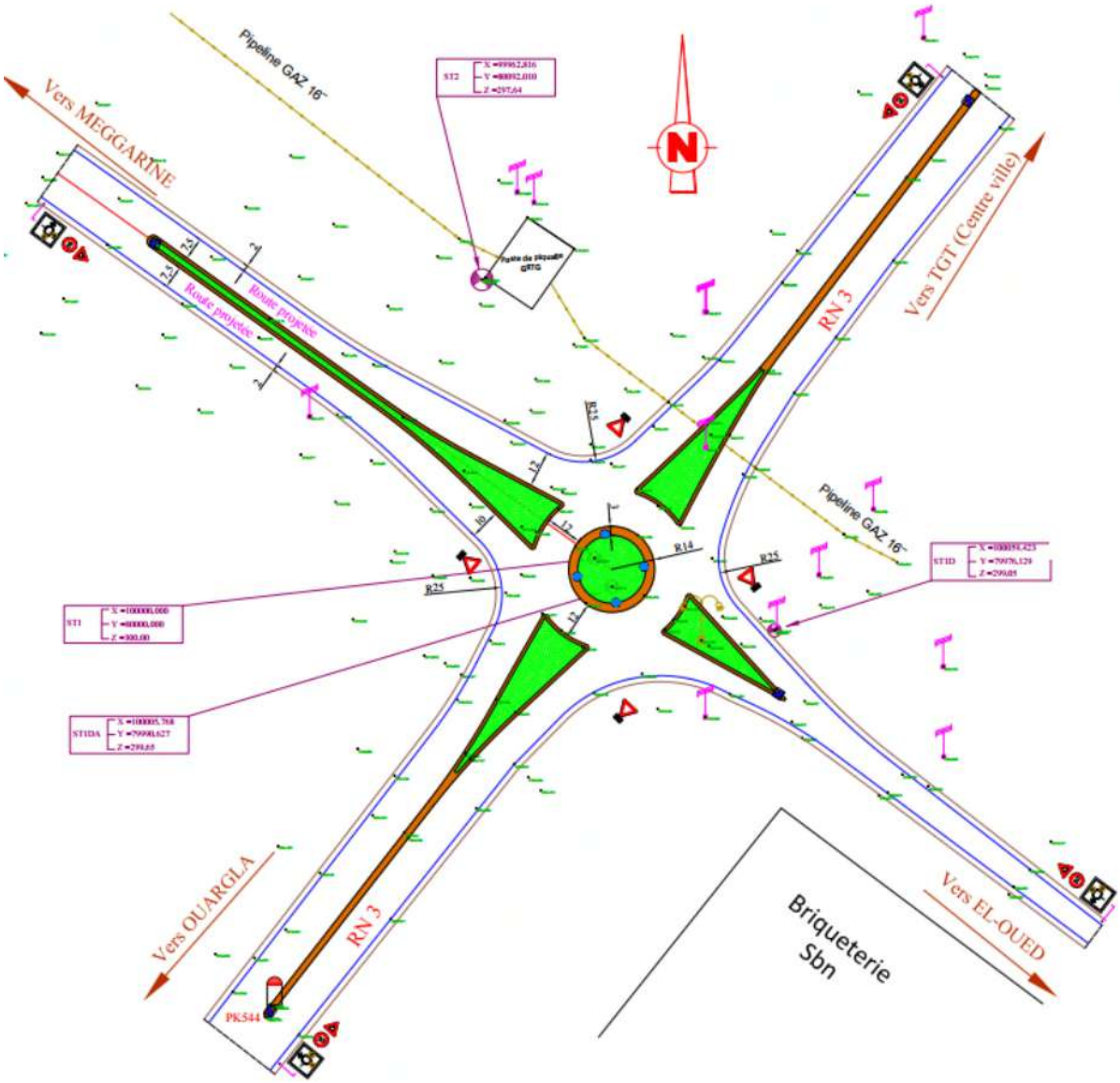


FIG IX-04: Development of the roundabout RN 03 -PK 543+820

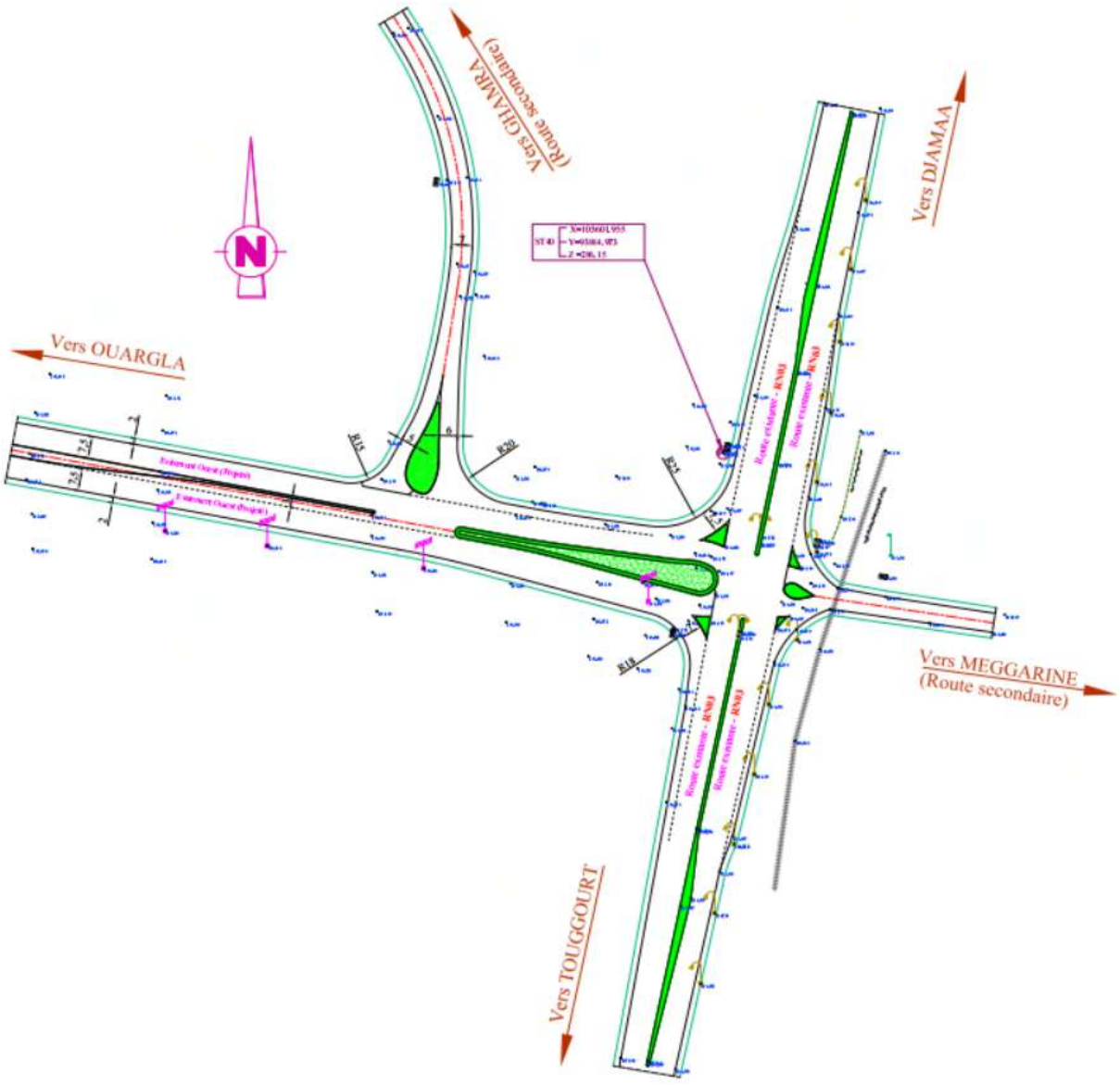


Figure-IX-05. -Development of the Carrefour RN 03 -PK 543+820Adaptation of the development of the crossroads RN 3 (MEGGARINE-GHAMRA) With the west siding.

The other junctions are attached in the annexes.

PART[1]: SIGNAGE

1. INTRODUCTION

The role played by road signs in the safety and operation of infrastructure no longer has to be demonstrated.

It is still the main news medium for a long time to come, between the road manager and the police authority on the one hand, and road users on the other.

Visibility, legibility, uniformity, homogeneity, simplicity, continuity of the directions indicated, consistency with traffic rules and with the geometry of the road constitute the main principles of signs and signals.

They are intangible so that the user can always understand it.

2. RESTRAINT SYSTEMS:

Restraint systems should only be installed if the risk in their absence justifies it, as they themselves constitute obstacles.

There are two categories of restraint systems:

1. Flexible devices that deform under the effect of impact (case of metal slides).
2. Rigid devices (case of adherent concrete slides and heavy barriers made of adherent concrete).

For our case, rigid guardrails are provided for along the route, they are implanted on the OTT and in the presence of a 3m TPC it is necessary to adopt a restraint system consisting of a concrete slide.

There must be paved and protected sections in the TPC that will be used in the event of an emergency or accident, to allow civil defense elements to evacuate the injured to the nearest hospital.

3. SIGNAGE:

The importance of signage was stated at the beginning of the chapter (in the introduction to the chapter).

It is reconfirmed that road signs play a key role in that they allow traffic to develop in very good conditions (speed, safety).

It must be uniform, continuous and homogeneous so as not to tire the user's attention by the misuse of signals.

4. THE TYPES OF SIGNAGE:

There are two families of signaling:

- ❖ Horizontal signage.
- ❖ Vertical signage.

4.a) Horizontal signs:

They include only the markings on the pavement; It is divided into two types:

- ❖ **Longitudinal lines:**

They are used to delimit the traffic routes, we find:

- **The solid lines:**

These linens are used to indicate the sections of road where overtaking is prohibited, in particular because the visibility is insufficient.

- **Discontinuous lines:**

Are of type T1, T2 or T3 (warning line, bank line). see the sub table:

- **Modulation of discontinuous lines:**

They are based on a Periodic length of 13 m. their characteristics are given by the following table:

Type de modulation	Longueur du trait (m)	Intervalle entre trait (m)	Rapport Plein/ vide
T_1	3.00	10.00	˜ 1/3
T_2	3.00	3.5	˜ 1
T_3	3.00	1.33	˜ 3

Table X-01 : discontinuous lines characteristics

- **Markings on pavement:**

▪ **Mixed lines:**

Are continuous lines doubled by discontinuous lines of the type T1 in the general case.

❖ **Transverse lines:**

They are used for marking, we distinguish:

▪ **Stop line:**

It is a continuous line that obliges users to make a stop.

❖ **Other signage:**

▪ **The drawdown arrows:**

These slightly curved arrows signal to users that they must use the track on the side they indicate.

▪ **The selection arrows:**

These arrows in the middle of a lane signal to users, especially near intersections, that they must follow the direction indicated.

▪ **Line width:**

The width of the lines is set to a different unit width "U" depending on the type of road:

1. U=7.5cmur motorways and urban expressways.

2. U=6cm on urban roads and lanes.
3. U=5cm on other roads.

For our case the width of the lines is set to a U = 7.5cm.

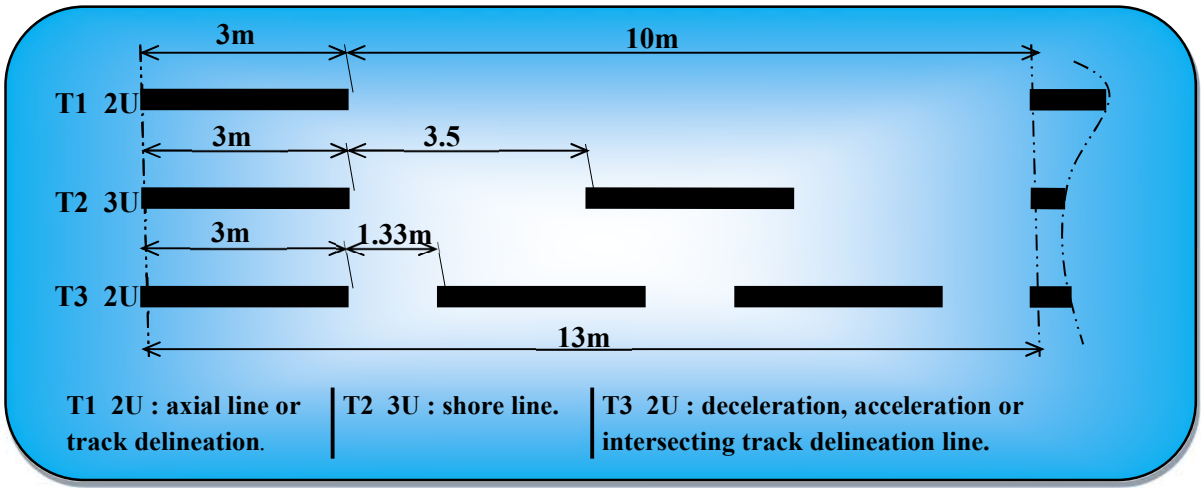


Fig X-01- modulation ypes
Reference road signs (art-144)

4.b) Vertical signs and signals:

It is done using signs that convey a visual message through their location, type, color and shape.

❖ Advanced signaling:

Signal A24 is placed at a distance of 150m from the intersection.

The B3 signal accompanied in all cases by an additional panel (model G5) is installed on the priority road.

❖ Position signaling:

The B2 "mandatory stop" sign is placed on the road or users must mark the stop.

❖ **Directional signs:**

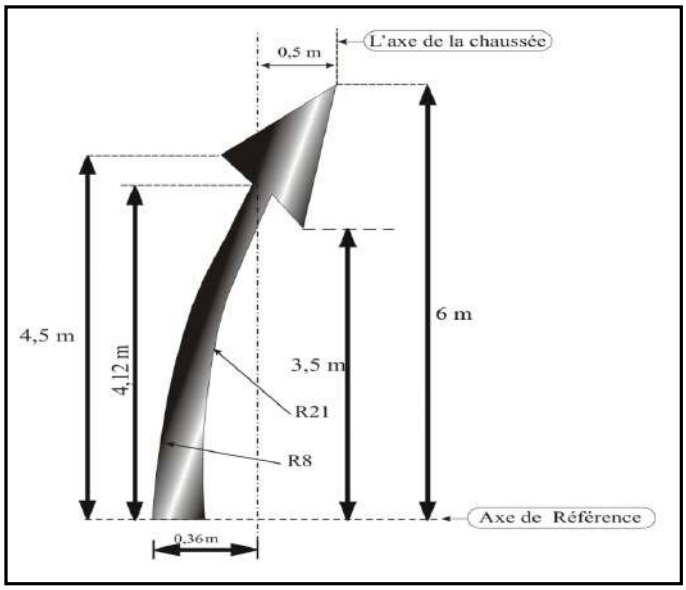
The purpose of this sign is to allow users to follow the road or the route they have fixed themselves, these signs have the shape of a rectangle terminated by an arrowhead of angle at the top equal to 75 °.

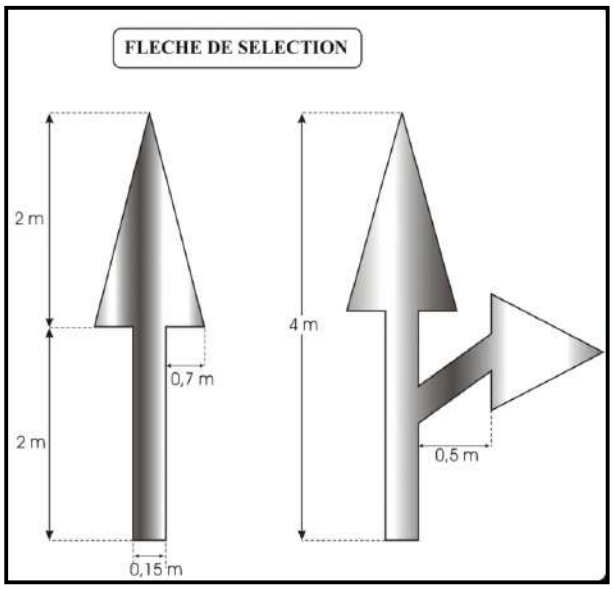
5. APPLICATION TO THE PROJECT:

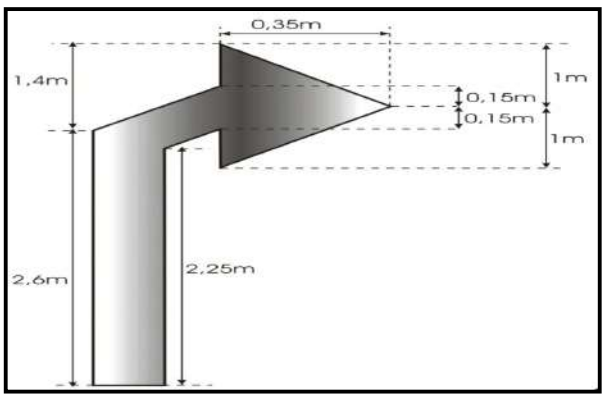
The different types of road signs used for our study are as follows:

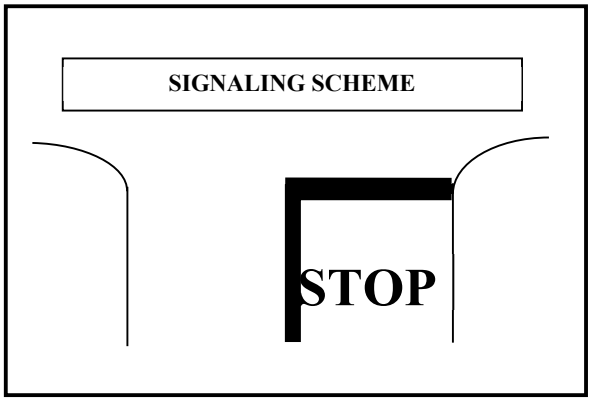
1. Danger warning signs (type A).
2. Priority prohibition signs (type B).
3. Intersection or restriction signs (type C).
4. Mandatory signs (type D).
5. Road identification signs (Type E).

Example Horizontal signs:





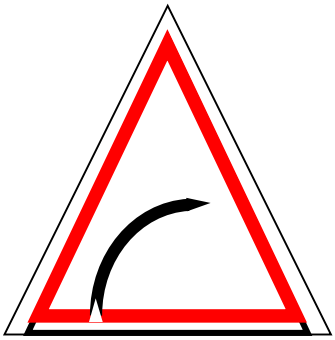




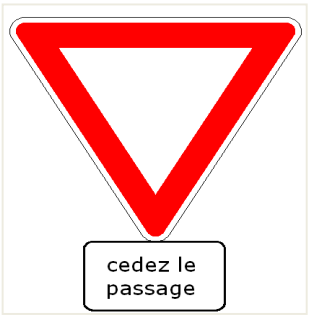
Exemple Des signalisations verticales :

Type A:

A1a

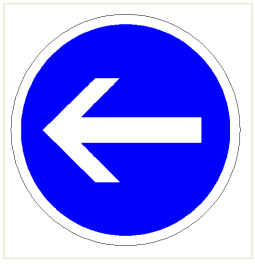


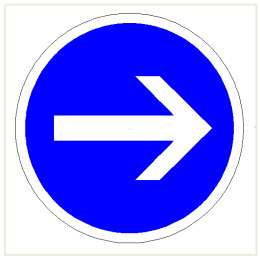
A23

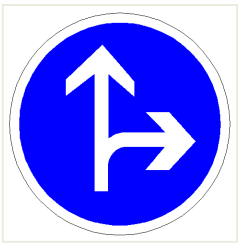


Type B :

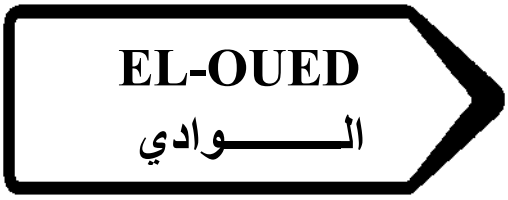
Type C :







Type D :



Type E :

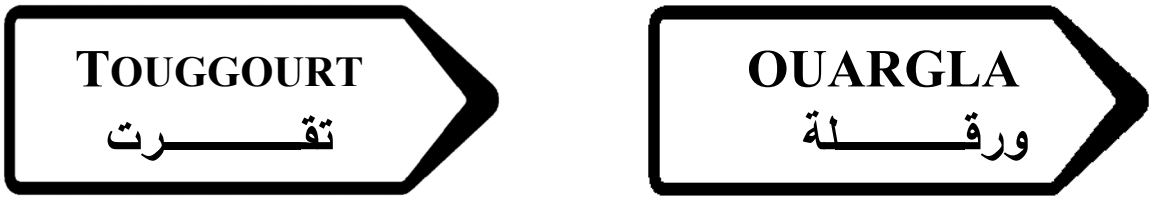


FIG X-02: Signaling device along the route in one direction

PART[2:] LIGHTING

1. INTRODUCTION:

In a constantly increasing traffic, public lighting and night signs on the roads play an undeniable role in terms of safety. Their goals are to allow users of the track to circulate at night with as high safety and comfort as possible.

2. LIGHTING CATEGORIES:

There are four categories of public lighting:

- General lighting of a road or motorway, category A.
- Urban lighting (arterial and distribution roads), category B.
- Illumination of the circle lanes, category C.
- Lighting of a singular point (crossroads, bend...) located on an unlit route, category D.

3. PARAMETERS OF THE INSTALLATION OF LUMINAIRES:

- The spacing (e) between luminaires: which varies according to the type of track.
- The height (h) of the luminaire: it is generally of the order of 8 to and sometimes for large widths of pavements.10 m12 m
- The width (l) of the carriageway.
- The cantilever (p) of the fireplace relative to the support.

- The inclination, or not, of the luminous focus, and its overhang (s) in relation to the edge of the roadway.

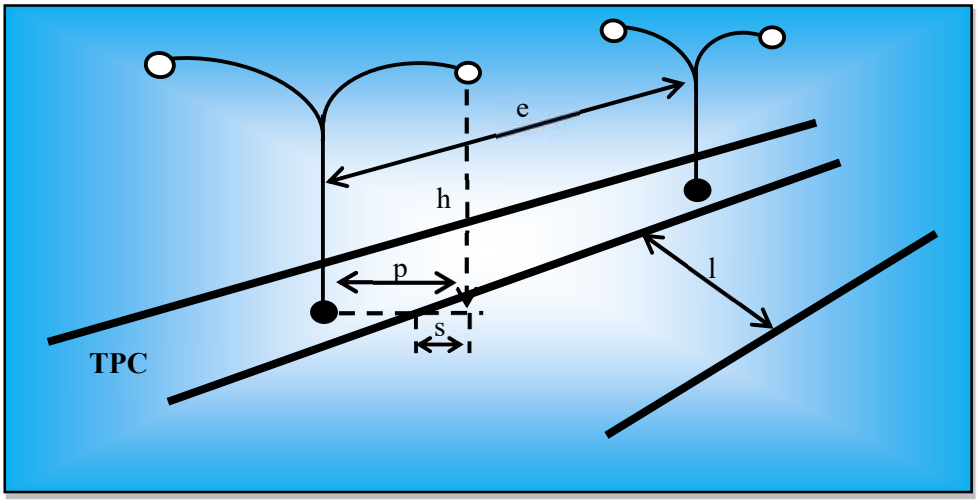


FIG X -01: Parameters of the implantation of Light fixtures.

4. xi. 4. Application to the project:

Track lighting (along the road):

The edge of the TPC must be perfectly visible, light devices are adopted for this purpose. Secondly, the fireplaces must be sufficiently close together so that the illuminance beaches connect seamlessly. The height of the fireplaces is generally from 8 to 12m, so the spacing of the supports varies from 20 to 30 m so as to have a balanced level of lighting for both directions of our road (The avoidance of Touggourt)

note:

Two fireplaces carried by the same support each illuminating a half roadway, spaced 30m apart.

GENERAL CONCLUSION

The economic recovery program, which aims to ensure the sustainable development of the country, gives an important place and great interest to the field of public works, by focusing on the improvement and development of infrastructures quality, which make it possible to offer the best services for road user sand which meet the supply and demand of transport.

Knowing full well that our country suffers enormously from the problems of traffic, our project comes to give a new lease of life to our economy, by carrying out a second avoidance of the city of Touggourt.

For our study we rigorously applied all the standards, guidelines and recommendations related to the road domain to counteract the constraints encountered on the ground. Furthermore, the primary concern that guided our modest work was, firstly, taking into account the comfort and safety of road users and, secondly, the economy and the environmental aspect linked to the impact of the construction of this road.

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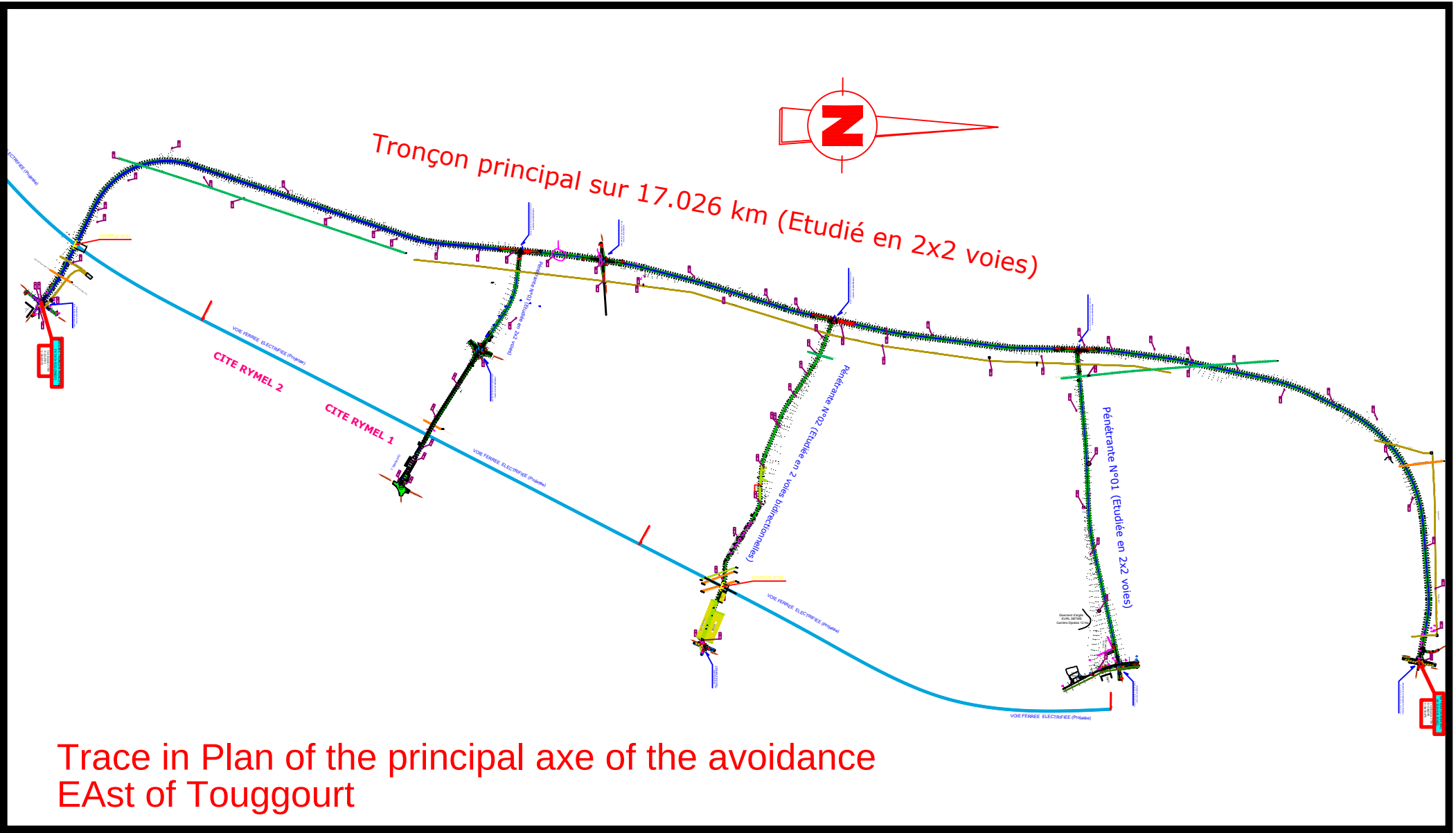
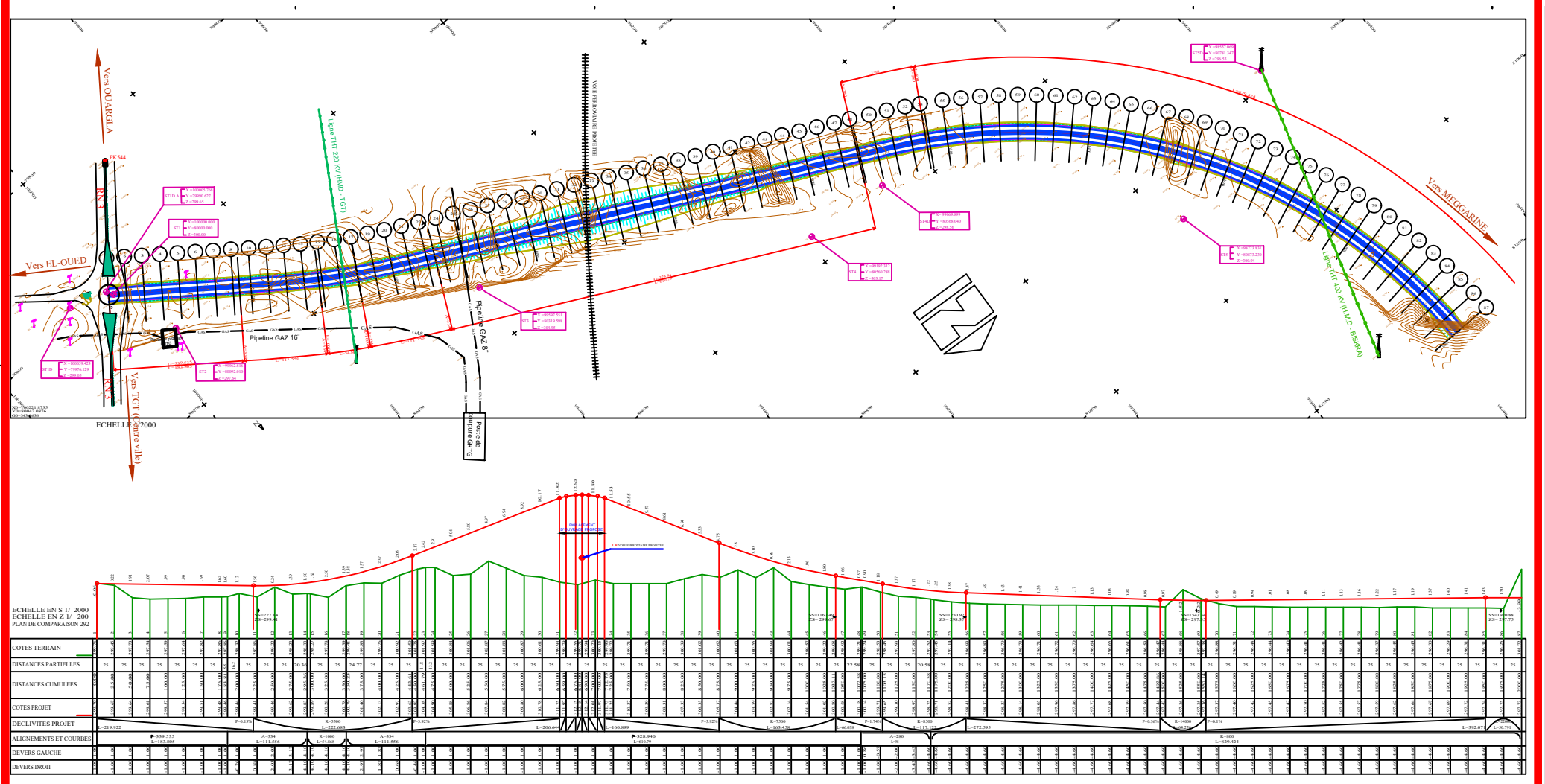
- (SETRA, 2021)

Annex 01



Trace in Plan of the principal axe of the avoidance EAst of Touggourt



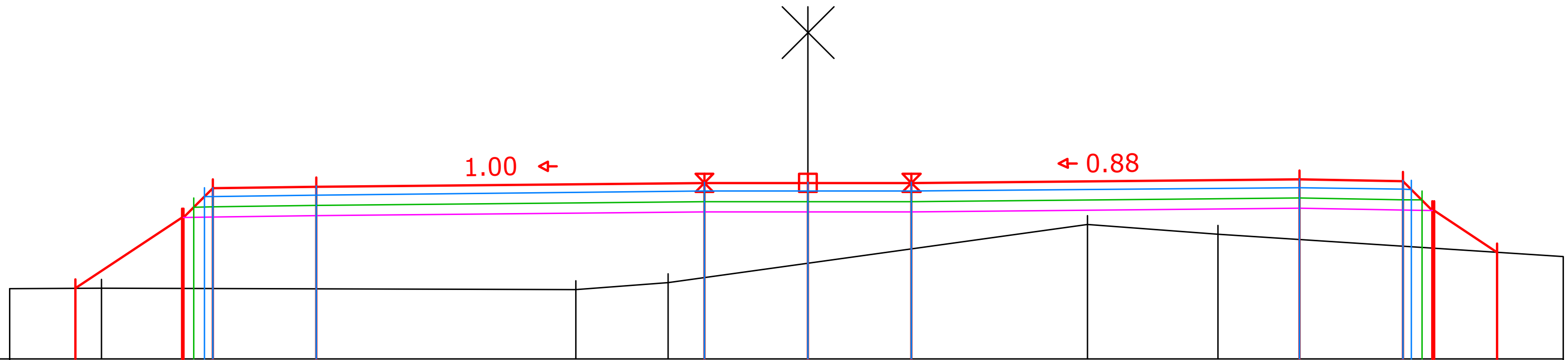
Plan and longitudinal profile. : profil 1 to profil 78

PROFIL 11 Cross section

ETUDE EVITEMENT
OUEST AXE PRINC

S = 225.000
ZTN = 297.855
ZPRO= 299.412

ECHS=1/ 200
ECHZ=1/ 200
PC = 296.0



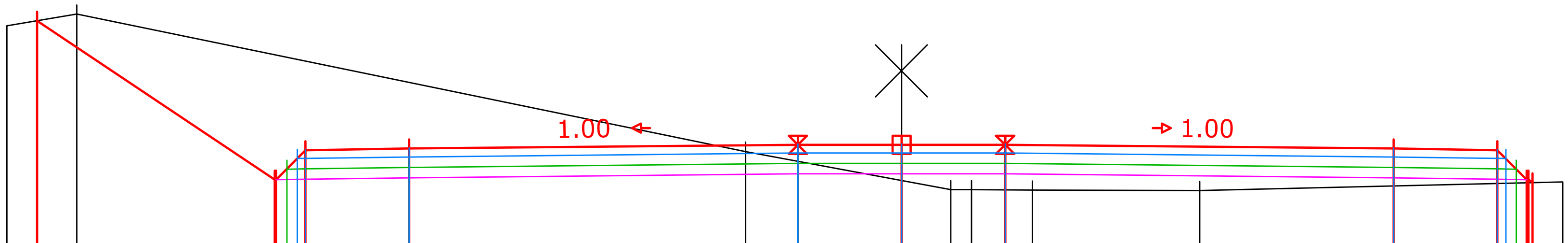
TERRAIN	DISTANCES	-15.43		-13.65					-4.48	-2.70				5.40	7.92						14.59
TERRAIN	COTES	297.36		297.37					297.34	297.48				298.61	298.42						297.98
PROJET	DISTANCES		-14.15		-12.10	-12.07	-11.50	-9.50			-2.00	0.00	2.00			9.50	11.50	12.07	12.10	13.32	
PROJET	COTES		297.37		298.74	298.74	299.31	299.34			299.41	299.41	299.41			299.48	299.45	298.88	298.88	298.07	
ASSISE	DISTANCES						-11.50	-9.50			-2.00	0.00	2.00			9.50	11.50				
ASSISE	COTES						298.75	298.78			298.85	298.85	298.85			298.92	298.89				

PROFIL 504 Cross section

ETUDE EVITEMENT
OUEST AXE PRINC

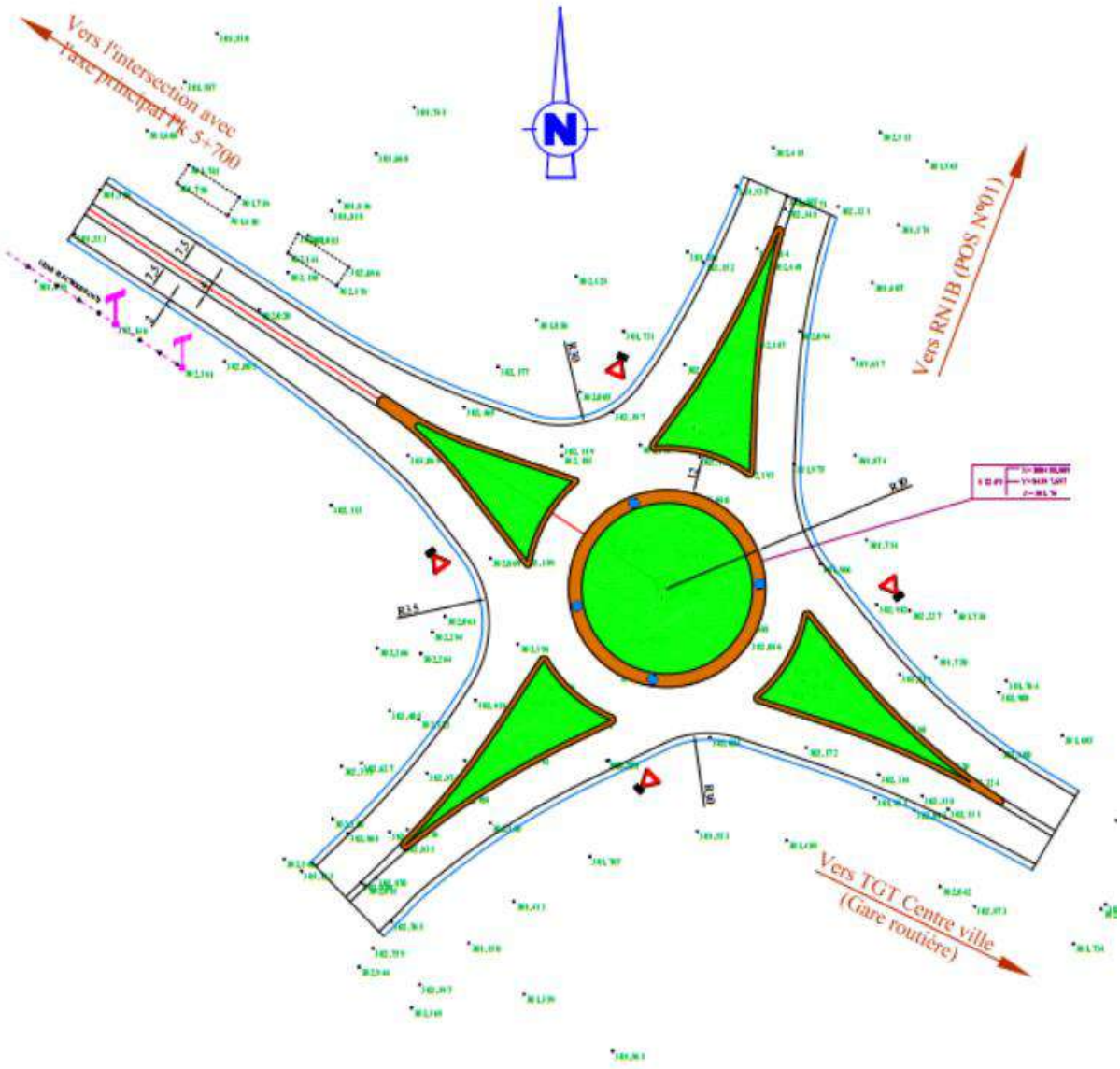
S = 11850.000
ZTN = 291.232
ZPRO= 291.920

ECHS=1/ 200
ECHZ=1/ 200
PC = 290.0

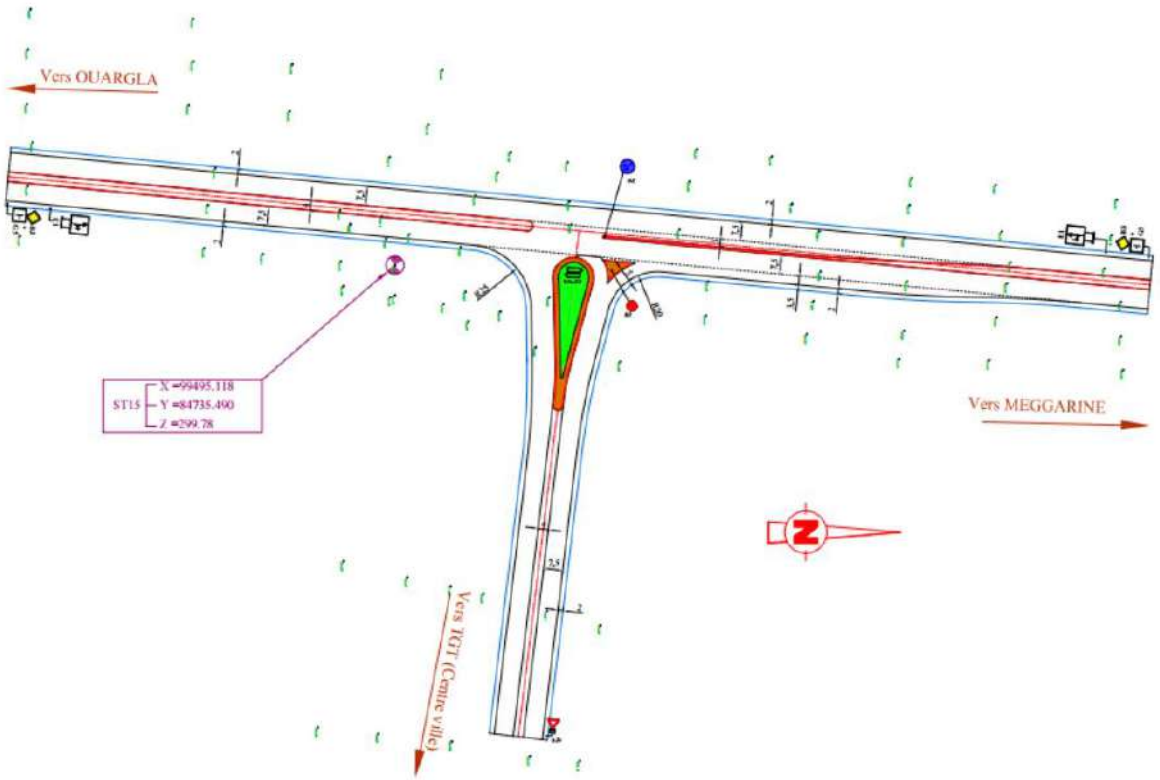


TERRAIN	DISTANCES	-17.26	-15.92	-3.01	0.95	1.35	2.53	5.76	12.76				
	COTES	294.21	294.44	291.79	291.06	291.06	291.04	291.03	291.21				
PROJET	DISTANCES	-16.69	-12.10	-12.07	-11.50	-9.50	-2.00	0.00	2.00	9.50	11.50	12.07	12.18
	COTES	294.30	291.25	291.25	291.81	291.84	291.92	291.92	291.92	291.84	291.81	291.25	291.19
ASSISE	DISTANCES	-11.50	-9.50	-2.00	0.00	2.00	9.50	11.50					
	COTES	291.25	291.28	291.36	291.36	291.36	291.28	291.25					

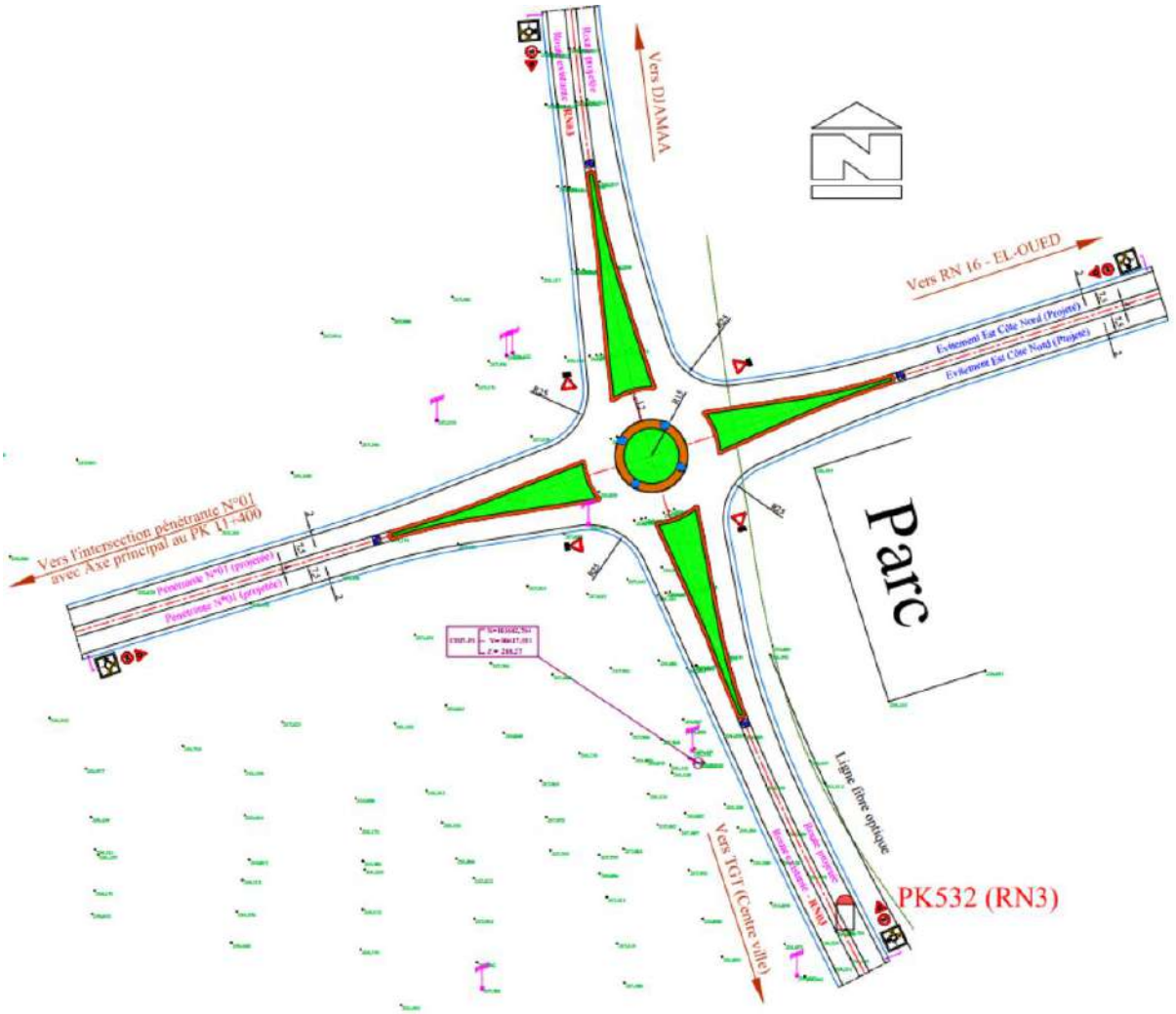
1-Development of the Penetrating crossroads N°03 with the roundabout of POS N°02:



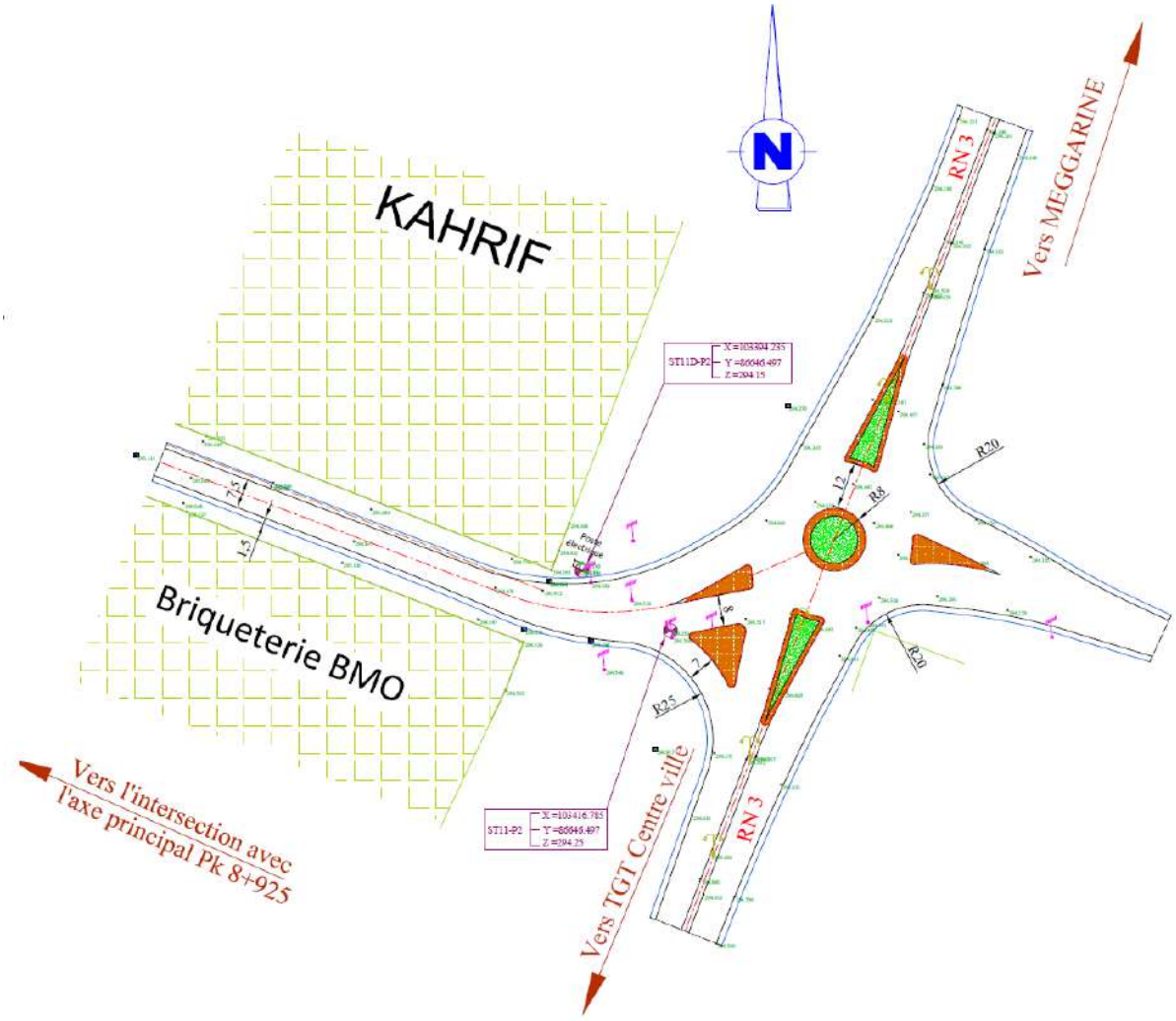
2-Development of the junction Penetrating intersection N°03 with main axis at PK 5+700



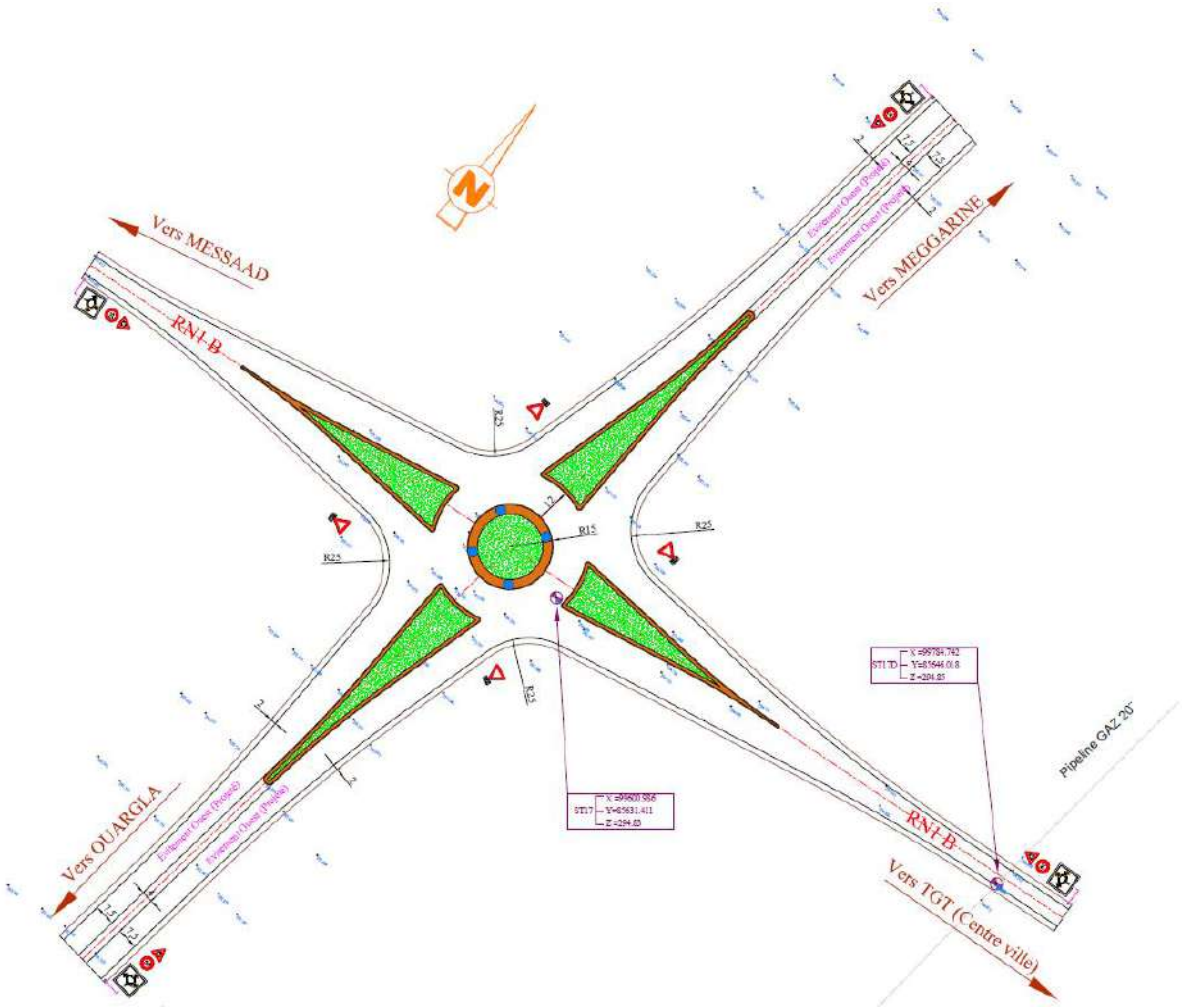
3-Development of the Penetrating crossroads N°01 - RN 03 (PK 531+800)



4-Development of the intersection Penetrating intersection N°02 with the RN03 (KAHRIF-Briqueterie BMO) :



5-Development of the RN1B junction (PK 416+450) / West Evitement:



6-Development of the junction Penetrating intersection N°01 with main axis at PK 11+400:

7-Development of the intersection Penetrating intersection N°02 with main axis at 8+925:

Annex 02

ÉTUDE DE L'ÉVITEMENT OUEST DE LA VILLE DE TOUGGOURT SUR 30 KM

TRONÇON PRINCIPAL SUR 17026.013 ml

Caractéristiques géométriques

1. AXE EN PLAN

ELEM	CARACTERISTIQUES	LONGUEUR	ABSCISSE	X	Y
			0.000	100005.631	79996.337
D1	GIS = 339.535g	183.805			
			183.805	99856.144	80103.286
L1	A = 334.000 Rf= 1000.000 L = 111.556				
			295.361	99764.239	80166.490
	XC= 99228.623 YC= 79322.028 R = 1000.000 L = 54.868				
			350.230	99717.122	80194.592
	Rd= 1000.000 A = 334.000 L = 111.556	277.980			
			461.786	99617.837	80245.424
D2	GIS = 328.940g	610.790			
			1072.576	99069.078	80513.618
L2	A = 280.000 Rf= -800.000 L = 98.000				
			1170.576	98981.942	80558.431
	XC= 99376.555 YC= 81254.333 R = -800.000 L = 1050.193				
			2220.769	98602.990	81458.286
	Rd= -800.000 A = 280.000 L = 98.000	1246.193			
			2318.769	98631.817	81551.933
D3	GIS = 20.310g	1327.420			
			3646.189	99048.163	82812.368
L3	XC= 118038.929				

	YC= 76539.345 R = -20000.000	48.064			
			3694.253	99063.294	82857.989
D4	GIS = 20.463g	829.233			
			4523.486	99325.275	83644.750
L4	A = 400.000 Rf= 1200.000 L = 133.333				
			4656.819	99365.044	83771.995
	XC= 98207.211 YC= 84087.310 R = 1200.000 L = 138.874				
			4795.694	99393.709	83907.800
	Rd= 1200.000 A = 400.000 L = 133.333	405.541			
			4929.027	99408.757	84040.263
D5	GIS = 6.022g	1226.553			
			6155.580	99524.615	85261.332
L5	XC= 101864.108 YC= 85039.355 R = -2350.000	127.246			
			6282.826	99540.057	85387.622
D6	GIS = 9.469g	428.553			
			6711.379	99603.568	85811.443
L6	XC= 101779.275 YC= 85485.406 R = -2200.000	232.080			
			6943.459	99649.993	86038.722
D7	GIS = 16.185g	578.144			
			7521.604	99795.401	86598.282
L7	XC= 102215.039 YC= 85969.514 R = -2500.000	111.345			
			7632.948	99825.795	86705.389
D8	GIS = 19.021g	801.922			
			8434.871	100061.841	87471.784
L8	XC= 97911.521 YC= 88134.072 R = 2250.000	191.528			
			8626.399	100110.363	87657.004
D9	GIS = 13.601g	840.048			
			9466.447	100288.478	88477.952

L9	XC= 98040.773 YC= 88965.621 R = 2300.000	195.586			
			9662.033	100321.776	88670.623
D10	GIS = 8.188g	942.104			
			10604.136	100442.611	89604.945
L10	XC= 98112.020 YC= 89906.356 R = 2350.000	248.983			
			10853.119	100461.417	89853.100
D11	GIS = 1.443g	723.884			
			11577.003	100477.822	90576.798
L11	XC= 102677.257 YC= 90526.941 R = -2200.000	243.428			
			11820.431	100496.778	90819.362
D12	GIS = 8.487g	501.448			
			12321.878	100563.429	91316.360
L12	XC= 102942.134 YC= 90997.355 R = -2400.000	188.945			
			12510.824	100595.886	91502.448
D13	GIS = 13.499g	810.313			
			13321.137	100766.420	92294.613
L13	XC= 102917.148 YC= 91831.612 R = -2200.000	538.999			
			13860.136	100942.950	92802.458
D14	GIS = 29.096g	252.913			
			14113.049	101054.559	93029.413
L14	A = 468.000 Rf= -1400.000 L = 156.446				
			14269.494	101126.190	93168.472
	XC= 102346.036 YC= 92481.467 R = -1400.000 L = 1290.331				
			15559.825	102155.920	93868.498
	Rd= -1400.000 A = 468.000 L = 156.446	1603.222			
			15716.271	102311.578	93883.954
D15	GIS = 94.885g	557.117			
			16273.388	102866.898	93928.667

L15	A = 334.000 Rf= -1000.000 L = 111.556				
			16384.944	102978.226	93935.551
	XC= 103002.791 YC= 92935.853 R = -1000.000 L = 154.473				
			16539.418	103132.332	93927.427
	Rd= -1000.000 A = 334.000 L = 111.556	377.585			
			16650.974	103242.319	93908.876
D16	GIS = 111.821g	375.040			
			17026.013	103610.912	93839.636

LONGUEUR DE L'AXE 17026.013

2. PROFIL EN LONG

ELEM	CARACTERISTIQUES DES ELEMENTS	LONGUEUR	ABSCISSE	Z
			0.000	299.705
D1	PENTE= -0.131 %	219.922		
			219.922	299.416
P1	S= 227.1448 Z= 299.4115 R = 5500.00	222.683		
			442.606	303.632
D2	PENTE= 3.917 %	206.644		
			649.250	311.727
D3	PENTE= 2.462 %	9.750		
			659.000	311.967
D4	PENTE= 1.308 %	13.000		
			672.000	312.137
D5	PENTE= 0.444 %	9.000		
			681.000	312.177
D6	PENTE= -0.444 %	9.000		
			690.000	312.137
D7	PENTE= -1.308 %	13.000		
			703.000	311.967
D8	PENTE= -2.462 %	9.750		
			712.750	311.727
D9	PENTE= -3.918 %	160.899		
			873.649	305.423
P9	S= 1167.4940 Z= 299.6668 R = 7500.00	163.458		
			1037.107	300.800
D10	PENTE= -1.738 %	66.038		
			1103.145	299.652
P10	S= 1250.9171 Z= 298.3676 R = 8500.00	117.122		
			1220.267	298.423
D11	PENTE= -0.361 %	272.595		
			1492.862	297.440
P11	S= 1543.3444 Z= 297.3489 R = 14000.00	64.276		
			1557.138	297.356
D12	PENTE= 0.099 %	392.071		
			1949.209	297.742
P12	S= 1970.8850 Z= 297.7526 R = -22000.00	101.582		
			2050.791	297.608
D13	PENTE= -0.363 %	284.004		

			2334.795	296.576
P13	S= 2352.9552 Z= 296.5430 R = 5000.00	30.835		
			2365.629	296.559
D14	PENTE= 0.253 %	423.151		
			2788.780	297.632
P14	S= 2824.2676 Z= 297.6767 R = -14000.00	143.844		
			2932.624	297.257
D15	PENTE= -0.774 %	110.524		
			3043.148	296.402
P15	S= 3120.5454 Z= 296.1024 R = 10000.00	113.936		
			3157.084	296.169
D16	PENTE= 0.365 %	68.046		
			3225.130	296.418
P16	S= 3270.8034 Z= 296.5012 R = -12500.00	99.740		
			3324.870	296.384
D17	PENTE= -0.433 %	75.490		
			3400.359	296.058
P17	S= 3469.5643 Z= 295.9081 R = 16000.00	128.907		
			3529.267	296.020
D18	PENTE= 0.373 %	246.486		
			3775.753	296.939
P18	S= 3822.7683 Z= 297.0270 R = -12600.00	98.495		
			3874.247	296.922
D19	PENTE= -0.409 %	166.662		
			4040.910	296.241
P19	S= 4075.6376 Z= 296.1699 R = 8500.00	245.187		
			4286.096	298.775
D20	PENTE= 2.476 %	22.792		
			4308.888	299.340
P20	S= 4469.8272 Z= 301.3321 R = -6500.00	190.574		
			4499.462	301.265
D21	PENTE= -0.456 %	210.291		
			4709.753	300.306
P21	S= 4653.2194 Z= 300.4347 R = -12400.00	171.882		
			4881.635	298.331
D22	PENTE= -1.842 %	77.697		

			4959.332	296.900
P22	S= 5060.6453 Z= 295.9666 R = 5500.00	133.838		
			5093.170	296.063
D23	PENTE= 0.591 %	142.392		
			5235.562	296.905
P23	S= 5185.2965 Z= 296.7562 R = 8500.00	78.876		
			5314.438	297.737
D24	PENTE= 1.519 %	65.990		
			5380.428	298.740
P24	S= 5476.1450 Z= 299.4669 R = -6300.00	148.253		
			5528.682	299.248
D25	PENTE= -0.834 %	24.179		
			5552.861	299.046
P25	S= 5501.1578 Z= 299.2618 R = -6200.00	92.627		
			5645.487	297.582
D26	PENTE= -2.328 %	93.438		
			5738.926	295.407
P26	S= 5836.6974 Z= 294.2687 R = 4200.00	87.953		
			5826.878	294.280
D27	PENTE= -0.234 %	174.412		
			6001.290	293.872
P27	S= 6034.0207 Z= 293.8342 R = 14000.00	47.420		
			6048.710	293.842
D28	PENTE= 0.105 %	266.850		
			6315.560	294.122
P28	S= 6298.7719 Z= 294.1131 R = 16000.00	68.881		
			6384.440	294.342
D29	PENTE= 0.535 %	94.982		
			6479.422	294.851
P29	S= 6543.6736 Z= 295.0230 R = -12000.00	91.156		
			6570.578	294.993
D30	PENTE= -0.224 %	200.737		
			6771.315	294.543
P30	S= 6793.7348 Z= 294.5176 R = 10000.00	102.371		
			6873.685	294.837
D31	PENTE= 0.800 %	96.158		

			6969.844	295.606
P31	S= 7025.8092 Z= 295.8297 R = -7000.00	110.312		
			7080.156	295.619
D32	PENTE= -0.776 %	210.941		
			7291.097	293.981
P32	S= 7403.6727 Z= 293.5441 R = 14500.00	67.508		
			7358.605	293.614
D33	PENTE= -0.311 %	299.686		
			7658.291	292.683
P33	S= 7678.4935 Z= 292.6512 R = 6500.00	83.418		
			7741.709	292.959
D34	PENTE= 0.973 %	78.506		
			7820.215	293.722
P34	S= 7936.9206 Z= 294.2897 R = -12000.00	160.990		
			7981.205	294.208
D35	PENTE= -0.369 %	319.849		
			8301.054	293.028
P35	S= 8328.7317 Z= 292.9765 R = 7500.00	60.470		
			8361.524	293.048
D36	PENTE= 0.437 %	102.539		
			8464.063	293.497
P36	S= 8516.5311 Z= 293.6112 R = -12000.00	134.696		
			8598.759	293.330
D37	PENTE= -0.685 %	83.263		
			8682.022	292.759
P37	S= 8729.9878 Z= 292.5946 R = 7000.00	101.563		
			8783.584	292.800
D38	PENTE= 0.766 %	92.546		
			8876.130	293.508
P38	S= 8937.3833 Z= 293.7429 R = -8000.00	147.740		
			9023.870	293.275
D39	PENTE= -1.081 %	46.733		
			9070.602	292.770
P39	S= 9116.0079 Z= 292.5248 R = 4200.00	59.605		
			9130.208	292.549
D40	PENTE= 0.338 %	386.462		

			9516.670	293.855
P40	S= 9557.2401 Z= 293.9239 R = -12000.00	98.593		
			9615.262	293.784
D41	PENTE= -0.484 %	77.031		
			9692.293	293.411
P41	S= 9718.8869 Z= 293.3469 R = 5500.00	114.653		
			9806.947	294.052
D42	PENTE= 1.601 %	34.883		
			9841.830	294.610
P42	S= 9945.9003 Z= 295.4435 R = -6500.00	166.342		
			10008.172	295.145
D43	PENTE= -0.958 %	113.737		
			10121.909	294.056
P43	S= 10188.9709 Z= 293.7343 R = 7000.00	105.960		
			10227.869	293.842
D44	PENTE= 0.556 %	71.069		
			10298.938	294.237
P44	S= 10365.6204 Z= 294.4226 R = -12000.00	152.127		
			10451.064	294.118
D45	PENTE= -0.712 %	239.210		
			10690.274	292.415
P45	S= 10740.1161 Z= 292.2377 R = 7000.00	87.118		
			10777.392	292.337
D46	PENTE= 0.533 %	104.881		
			10882.273	292.895
P46	S= 10920.6146 Z= 292.9976 R = -7200.00	85.455		
			10967.729	292.843
D47	PENTE= -0.654 %	228.975		
			11196.703	291.345
P47	S= 11258.8675 Z= 291.1417 R = 9500.00	107.002		
			11303.705	291.248
D48	PENTE= 0.472 %	49.398		
			11353.103	291.481
P48	S= 11409.7393 Z= 291.6143 R = -12000.00	93.797		
			11446.899	291.557
D49	PENTE= -0.310 %	213.361		

			11660.261	290.896
P49	S= 11683.1759 Z= 290.8606 R = 7400.00	79.481		
			11739.741	291.077
D50	PENTE= 0.764 %	134.943		
			11874.684	292.108
P50	S= 11958.7680 Z= 292.4296 R = -11000.00	150.634		
			12025.318	292.228
D51	PENTE= -0.605 %	92.882		
			12118.200	291.666
P51	S= 12239.2002 Z= 291.3004 R = 20000.00	63.602		
			12181.802	291.383
D52	PENTE= -0.287 %	169.789		
			12351.590	290.895
P52	S= 12388.8995 Z= 290.8419 R = 13000.00	62.339		
			12413.930	290.866
D53	PENTE= 0.193 %	110.605		
			12524.534	291.079
P53	S= 12538.3969 Z= 291.0923 R = -7200.00	50.930		
			12575.464	290.997
D54	PENTE= -0.515 %	99.439		
			12674.903	290.485
P54	S= 12731.5333 Z= 290.3392 R = 11000.00	150.332		
			12825.235	290.738
D55	PENTE= 0.852 %	94.624		
			12919.858	291.544
P55	S= 12984.5976 Z= 291.8201 R = -7600.00	160.285		
			13080.144	291.219
D56	PENTE= -1.257 %	82.072		
			13162.216	290.188
P56	S= 13269.0764 Z= 289.5159 R = 8500.00	76.466		
			13238.682	289.570
D57	PENTE= -0.358 %	178.010		
			13416.692	288.934
P57	S= 13457.8136 Z= 288.8602 R = 11500.00	78.170		
			13494.862	288.920
D58	PENTE= 0.322 %	67.967		

			13562.829	289.139
P58	S= 13614.3746 Z= 289.2219 R = -16000.00	93.196		
			13656.025	289.168
D59	PENTE= -0.260 %	288.485		
			13944.510	288.417
P59	S= 13973.1445 Z= 288.3795 R = 11000.00	91.216		
			14035.726	288.557
D60	PENTE= 0.569 %	196.035		
			14231.761	289.673
P60	S= 14302.8766 Z= 289.8751 R = -12500.00	136.480		
			14368.241	289.704
D61	PENTE= -0.523 %	67.975		
			14436.215	289.349
P61	S= 14506.2860 Z= 289.1655 R = 13400.00	126.489		
			14562.705	289.284
D62	PENTE= 0.421 %	123.424		
			14686.128	289.804
P62	S= 14737.4944 Z= 289.9121 R = -12200.00	103.110		
			14789.238	289.802
D63	PENTE= -0.424 %	483.653		
			15272.891	287.751
P63	S= 15334.8137 Z= 287.6197 R = 14600.00	154.219		
			15427.111	287.911
D64	PENTE= 0.632 %	47.898		
			15475.009	288.214
P64	S= 15528.7435 Z= 288.3841 R = -8500.00	100.838		
			15575.847	288.254
D65	PENTE= -0.554 %	33.459		
			15609.306	288.068
P65	S= 15649.7596 Z= 287.9561 R = 7300.00	80.548		
			15689.854	288.066
D66	PENTE= 0.549 %	81.723		
			15771.577	288.515
P66	S= 15839.6827 Z= 288.7021 R = -12400.00	156.560		
			15928.137	288.387
D67	PENTE= -0.713 %	82.912		

			16011.049	287.795
P67	S= 16051.7091 Z= 287.6501 R = 5700.00	77.987		
			16089.035	287.772
D68	PENTE= 0.655 %	73.795		
			16162.831	288.256
P68	S= 16204.7409 Z= 288.3928 R = -6400.00	74.340		
			16237.171	288.311
D69	PENTE= -0.507 %	82.533		
			16319.704	287.892
P69	S= 16367.8427 Z= 287.7705 R = 9500.00	85.426		
			16405.130	287.844
D70	PENTE= 0.392 %	31.978		
			16437.108	287.969
P70	S= 16484.2082 Z= 288.0616 R = -12000.00	126.287		
			16563.396	287.800
D71	PENTE= -0.660 %	214.531		
			16777.926	286.385
P71	S= 16850.5148 Z= 286.1451 R = 11000.00	94.149		
			16872.076	286.166
D72	PENTE= 0.196 %	153.938	17026.013	286.468

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3. TABULATION

N° PROF	ABSCISSE CURVILIGN	COTE TN	COTE PROJET	X PROFIL	Y PROFIL	ANGLE PROFIL	DEV GAU	DEV DRO
1	0.000	299.765	299.705	100005.631	79996.337	39.535g	1.00	-1.00
2	25.000	299.453	299.672	99985.299	80010.884	39.535g	1.00	-1.00
3	50.000	297.730	299.639	99964.967	80025.430	39.535g	1.00	-1.00
4	75.000	297.538	299.607	99944.634	80039.977	39.535g	1.00	-1.00
5	100.000	297.587	299.574	99924.302	80054.523	39.535g	1.00	-1.00
6	125.000	297.640	299.541	99903.970	80069.070	39.535g	1.00	-1.00
7	150.000	297.819	299.508	99883.638	80083.616	39.535g	1.00	-1.00
8	175.000	297.856	299.475	99863.306	80098.163	39.535g	1.00	-1.00
9	183.805	297.865	299.464	99856.144	80103.286	39.535g	1.00	-1.00
10	200.000	298.317	299.442	99842.970	80112.704	39.460g	1.00	-0.26
11	225.000	297.855	299.412	99822.581	80127.171	39.051g	1.00	0.88
12	250.000	299.219	299.459	99802.059	80141.448	38.285g	2.03	2.03
13	275.000	298.225	299.620	99781.328	80155.420	37.162g	3.17	3.17
14	295.361	298.335	299.835	99764.239	80166.490	35.984g	4.10	4.10
15	300.000	298.271	299.894	99760.316	80168.965	35.689g	4.10	4.10
16	325.000	297.778	300.282	99738.978	80181.991	34.097g	4.10	4.10
17	350.000	299.394	300.784	99717.322	80194.480	32.506g	4.10	4.10
18	350.230	299.412	300.789	99717.122	80194.592	32.491g	4.10	4.10
19	375.000	299.828	301.399	99695.371	80206.444	31.089g	2.97	2.97
20	400.000	299.762	302.128	99673.191	80217.978	30.029g	1.82	1.82
21	425.000	300.915	302.970	99650.854	80229.205	29.326g	1.00	0.68
22	450.000	301.748	303.921	99628.425	80240.247	28.980g	1.00	-0.46
23	461.786	301.967	304.383	99617.837	80245.424	28.940g	1.00	-1.00
24	475.000	301.991	304.901	99605.965	80251.226	28.940g	1.00	-1.00
25	500.000	300.841	305.880	99583.504	80262.203	28.940g	1.00	-1.00
26	525.000	301.062	306.860	99561.043	80273.181	28.940g	1.00	-1.00
27	550.000	302.872	307.839	99538.582	80284.158	28.940g	1.00	-1.00
28	575.000	301.882	308.818	99516.121	80295.136	28.940g	1.00	-1.00
29	600.000	300.874	309.798	99493.660	80306.113	28.940g	1.00	-1.00
30	625.000	300.606	310.777	99471.199	80317.090	28.940g	1.00	-1.00
31	650.000	299.929	311.745	99448.738	80328.068	28.940g	1.00	-1.00
32	675.000	299.550	312.150	99426.276	80339.045	28.940g	1.00	-1.00
33	700.000	300.204	312.006	99403.815	80350.022	28.940g	1.00	-1.00
34	725.000	299.722	311.247	99381.354	80361.000	28.940g	1.00	-1.00
35	750.000	299.714	310.268	99358.893	80371.977	28.940g	1.00	-1.00
36	775.000	299.715	309.288	99336.432	80382.954	28.940g	1.00	-1.00
37	800.000	299.695	308.309	99313.971	80393.932	28.940g	1.00	-1.00
38	825.000	300.392	307.329	99291.510	80404.909	28.940g	1.00	-1.00
39	850.000	301.022	306.350	99269.049	80415.887	28.940g	1.00	-1.00
40	875.000	300.621	305.370	99246.588	80426.864	28.940g	1.00	-1.00
41	900.000	301.625	304.437	99224.127	80437.841	28.940g	1.00	-1.00
42	925.000	300.553	303.587	99201.666	80448.819	28.940g	1.00	-1.00
43	950.000	301.928	302.820	99179.205	80459.796	28.940g	1.00	-1.00
44	975.000	300.007	302.137	99156.744	80470.773	28.940g	1.00	-1.00
45	1000.000	299.573	301.537	99134.283	80481.751	28.940g	1.00	-1.00
46	1025.000	299.221	301.020	99111.822	80492.728	28.940g	1.00	-1.00
47	1050.000	298.921	300.576	99089.361	80503.705	28.940g	1.00	-1.00
48	1072.576	299.211	300.184	99069.078	80513.618	28.940g	1.00	-1.00
49	1075.000	299.243	300.141	99066.900	80514.683	28.943g	0.86	-1.00

50	1100.000	298.525	299.707	99044.458	80525.700	29.245g	-0.57	-1.00
51	1125.000	297.930	299.300	99022.114	80536.912	30.056g	-2.00	-2.00
52	1150.000	297.801	298.967	98999.960	80548.496	31.374g	-3.42	-3.42
53	1170.576	297.523	298.747	98981.942	80558.431	32.839g	-4.60	-4.60
54	1175.000	297.454	298.707	98978.100	80560.624	33.191g	-4.60	-4.60
55	1200.000	297.142	298.520	98956.619	80573.412	35.181g	-4.60	-4.60
56	1225.000	296.933	298.406	98935.549	80586.865	37.170g	-4.60	-4.60
57	1250.000	296.827	298.316	98914.909	80600.970	39.160g	-4.60	-4.60
58	1275.000	296.794	298.225	98894.721	80615.713	41.149g	-4.60	-4.60
59	1300.000	296.725	298.135	98875.002	80631.080	43.139g	-4.60	-4.60
60	1325.000	296.710	298.045	98855.774	80647.055	45.128g	-4.60	-4.60
61	1350.000	296.716	297.955	98837.054	80663.624	47.118g	-4.60	-4.60
62	1375.000	296.695	297.865	98818.860	80680.769	49.107g	-4.60	-4.60
63	1400.000	296.643	297.775	98801.212	80698.474	51.096g	-4.60	-4.60
64	1425.000	296.654	297.685	98784.125	80716.722	53.086g	-4.60	-4.60
65	1450.000	296.614	297.594	98767.616	80735.495	55.075g	-4.60	-4.60
66	1475.000	296.529	297.504	98751.703	80754.774	57.065g	-4.60	-4.60
67	1500.000	296.445	297.416	98736.399	80774.542	59.054g	-4.60	-4.60
68	1525.000	298.883	297.361	98721.720	80794.778	61.044g	-4.60	-4.60
69	1550.000	297.574	297.350	98707.681	80815.462	63.033g	-4.60	-4.60
70	1575.000	296.882	297.373	98694.295	80836.575	65.022g	-4.60	-4.60
71	1600.000	296.506	297.398	98681.576	80858.097	67.012g	-4.60	-4.60
72	1625.000	296.479	297.423	98669.535	80880.005	69.001g	-4.60	-4.60
73	1650.000	296.438	297.447	98658.184	80902.278	70.991g	-4.60	-4.60
74	1675.000	296.396	297.472	98647.535	80924.895	72.980g	-4.60	-4.60
75	1700.000	296.410	297.496	98637.597	80947.834	74.970g	-4.60	-4.60
76	1725.000	296.415	297.521	98628.382	80971.073	76.959g	-4.60	-4.60
77	1750.000	296.417	297.546	98619.897	80994.588	78.949g	-4.60	-4.60
78	1775.000	296.409	297.570	98612.150	81018.356	80.938g	-4.60	-4.60
79	1800.000	296.373	297.595	98605.150	81042.355	82.927g	-4.60	-4.60
80	1825.000	296.447	297.620	98598.904	81066.561	84.917g	-4.60	-4.60
81	1850.000	296.450	297.644	98593.417	81090.950	86.906g	-4.60	-4.60
82	1875.000	296.300	297.669	98588.694	81115.499	88.896g	-4.60	-4.60
83	1900.000	296.291	297.693	98584.741	81140.184	90.885g	-4.60	-4.60
84	1925.000	296.306	297.718	98581.561	81164.980	92.875g	-4.60	-4.60
85	1950.000	296.310	297.743	98579.157	81189.863	94.864g	-4.60	-4.60
86	1975.000	296.251	297.752	98577.532	81214.809	96.853g	-4.60	-4.60
87	2000.000	301.723	297.733	98576.687	81239.794	98.843g	-4.60	-4.60
88	2025.000	298.905	297.686	98576.623	81264.793	100.832g	-4.60	-4.60
89	2050.000	296.565	297.610	98577.341	81289.781	102.822g	-4.60	-4.60
90	2075.000	296.498	297.520	98578.839	81314.735	104.811g	-4.60	-4.60
91	2100.000	296.418	297.429	98581.115	81339.630	106.801g	-4.60	-4.60
92	2125.000	296.416	297.338	98584.169	81364.442	108.790g	-4.60	-4.60
93	2150.000	296.383	297.247	98587.996	81389.147	110.780g	-4.60	-4.60
94	2175.000	296.250	297.156	98592.593	81413.719	112.769g	-4.60	-4.60
95	2200.000	296.132	297.066	98597.956	81438.136	114.758g	-4.60	-4.60
96	2220.769	297.033	296.990	98602.990	81458.286	116.411g	-4.60	-4.60
97	2225.000	296.825	296.975	98604.079	81462.374	116.741g	-4.36	-4.36
98	2250.000	296.131	296.884	98610.905	81486.423	118.390g	-2.93	-2.93
99	2275.000	296.280	296.793	98618.258	81510.317	119.533g	-1.50	-1.50
100	2300.000	296.661	296.702	98625.943	81534.106	120.167g	-0.07	-1.00
101	2318.769	296.386	296.634	98631.817	81551.933	120.310g	1.00	-1.00
102	2325.000	296.244	296.612	98633.771	81557.849	120.310g	1.00	-1.00

103	2350.000	295.959	296.544	98641.612	81581.588	120.310g	1.00	-1.00
104	2375.000	296.054	296.583	98649.453	81605.326	120.310g	1.00	-1.00
105	2400.000	296.275	296.646	98657.295	81629.065	120.310g	1.00	-1.00
106	2425.000	296.014	296.710	98665.136	81652.803	120.310g	1.00	-1.00
107	2450.000	295.986	296.773	98672.977	81676.541	120.310g	1.00	-1.00
108	2475.000	297.091	296.836	98680.819	81700.280	120.310g	1.00	-1.00
109	2500.000	295.971	296.900	98688.660	81724.018	120.310g	1.00	-1.00
110	2525.000	295.960	296.963	98696.501	81747.757	120.310g	1.00	-1.00
111	2550.000	297.021	297.026	98704.342	81771.495	120.310g	1.00	-1.00
112	2575.000	297.313	297.090	98712.184	81795.234	120.310g	1.00	-1.00
113	2600.000	296.816	297.153	98720.025	81818.972	120.310g	1.00	-1.00
114	2625.000	296.692	297.217	98727.866	81842.711	120.310g	1.00	-1.00
115	2650.000	296.801	297.280	98735.708	81866.449	120.310g	1.00	-1.00
116	2675.000	296.199	297.343	98743.549	81890.188	120.310g	1.00	-1.00
117	2700.000	296.829	297.407	98751.390	81913.926	120.310g	1.00	-1.00
118	2725.000	296.191	297.470	98759.231	81937.664	120.310g	1.00	-1.00
119	2750.000	296.626	297.533	98767.073	81961.403	120.310g	1.00	-1.00
120	2775.000	296.108	297.597	98774.914	81985.141	120.310g	1.00	-1.00
121	2800.000	297.027	297.656	98782.755	82008.880	120.310g	1.00	-1.00
122	2825.000	297.478	297.677	98790.596	82032.618	120.310g	1.00	-1.00
123	2850.000	296.094	297.653	98798.438	82056.357	120.310g	1.00	-1.00
124	2875.000	297.629	297.585	98806.279	82080.095	120.310g	1.00	-1.00
125	2900.000	298.395	297.472	98814.120	82103.834	120.310g	1.00	-1.00
126	2925.000	296.267	297.314	98821.962	82127.572	120.310g	1.00	-1.00
127	2950.000	298.321	297.123	98829.803	82151.311	120.310g	1.00	-1.00
128	2975.000	297.740	296.929	98837.644	82175.049	120.310g	1.00	-1.00
129	3000.000	297.071	296.736	98845.485	82198.788	120.310g	1.00	-1.00
130	3025.000	295.365	296.542	98853.327	82222.526	120.310g	1.00	-1.00
131	3050.000	295.221	296.351	98861.168	82246.264	120.310g	1.00	-1.00
132	3075.000	295.307	296.206	98869.009	82270.003	120.310g	1.00	-1.00
133	3100.000	295.596	296.124	98876.851	82293.741	120.310g	1.00	-1.00
134	3125.000	296.693	296.103	98884.692	82317.480	120.310g	1.00	-1.00
135	3150.000	295.842	296.146	98892.533	82341.218	120.310g	1.00	-1.00
136	3175.000	295.632	296.235	98900.374	82364.957	120.310g	1.00	-1.00
137	3200.000	296.000	296.326	98908.216	82388.695	120.310g	1.00	-1.00
138	3225.000	295.828	296.417	98916.057	82412.434	120.310g	1.00	-1.00
139	3250.000	296.804	296.484	98923.898	82436.172	120.310g	1.00	-1.00
140	3275.000	296.600	296.501	98931.739	82459.911	120.310g	1.00	-1.00
141	3300.000	296.356	296.467	98939.581	82483.649	120.310g	1.00	-1.00
142	3325.000	296.178	296.384	98947.422	82507.387	120.310g	1.00	-1.00
143	3350.000	296.548	296.276	98955.263	82531.126	120.310g	1.00	-1.00
144	3375.000	296.235	296.167	98963.105	82554.864	120.310g	1.00	-1.00
145	3400.000	296.268	296.059	98970.946	82578.603	120.310g	1.00	-1.00
146	3425.000	295.448	295.970	98978.787	82602.341	120.310g	1.00	-1.00
147	3450.000	295.281	295.920	98986.628	82626.080	120.310g	1.00	-1.00
148	3475.000	295.555	295.909	98994.470	82649.818	120.310g	1.00	-1.00
149	3500.000	295.669	295.937	99002.311	82673.557	120.310g	1.00	-1.00
150	3525.000	295.567	296.004	99010.152	82697.295	120.310g	1.00	-1.00
151	3550.000	295.576	296.097	99017.994	82721.034	120.310g	1.00	-1.00
152	3575.000	296.503	296.190	99025.835	82744.772	120.310g	1.00	-1.00
153	3600.000	297.382	296.283	99033.676	82768.510	120.310g	1.00	-1.00
154	3625.000	296.256	296.377	99041.517	82792.249	120.310g	1.00	-1.00
155	3646.189	295.551	296.456	99048.163	82812.368	120.310g	1.00	-1.00

156	3650.000	295.556	296.470	99049.359	82815.987	120.323g	1.00	-1.00
157	3675.000	295.587	296.563	99057.220	82839.719	120.402g	1.00	-1.00
158	3694.253	295.610	296.635	99063.294	82857.989	120.463g	1.00	-1.00
159	3700.000	295.738	296.657	99065.109	82863.442	120.463g	1.00	-1.00
160	3725.000	296.499	296.750	99073.007	82887.161	120.463g	1.00	-1.00
161	3750.000	295.542	296.843	99080.906	82910.881	120.463g	1.00	-1.00
162	3775.000	295.546	296.936	99088.804	82934.600	120.463g	1.00	-1.00
163	3800.000	297.220	297.006	99096.702	82958.320	120.463g	1.00	-1.00
164	3825.000	297.123	297.027	99104.601	82982.040	120.463g	1.00	-1.00
165	3850.000	296.767	296.998	99112.499	83005.759	120.463g	1.00	-1.00
166	3875.000	296.119	296.919	99120.397	83029.479	120.463g	1.00	-1.00
167	3900.000	296.166	296.817	99128.296	83053.198	120.463g	1.00	-1.00
168	3925.000	295.748	296.714	99136.194	83076.918	120.463g	1.00	-1.00
169	3950.000	295.713	296.612	99144.092	83100.637	120.463g	1.00	-1.00
170	3975.000	295.618	296.510	99151.991	83124.357	120.463g	1.00	-1.00
171	4000.000	295.532	296.408	99159.889	83148.076	120.463g	1.00	-1.00
172	4025.000	296.214	296.306	99167.787	83171.796	120.463g	1.00	-1.00
173	4050.000	295.987	296.209	99175.685	83195.515	120.463g	1.00	-1.00
174	4075.000	295.607	296.170	99183.584	83219.235	120.463g	1.00	-1.00
175	4100.000	295.848	296.205	99191.482	83242.955	120.463g	1.00	-1.00
176	4125.000	296.207	296.313	99199.380	83266.674	120.463g	1.00	-1.00
177	4150.000	296.359	296.495	99207.279	83290.394	120.463g	1.00	-1.00
178	4175.000	295.942	296.751	99215.177	83314.113	120.463g	1.00	-1.00
179	4200.000	295.788	297.080	99223.075	83337.833	120.463g	1.00	-1.00
180	4225.000	296.278	297.482	99230.974	83361.552	120.463g	1.00	-1.00
181	4250.000	297.508	297.958	99238.872	83385.272	120.463g	1.00	-1.00
182	4275.000	297.869	298.508	99246.770	83408.991	120.463g	1.00	-1.00
183	4300.000	298.045	299.120	99254.668	83432.711	120.463g	1.00	-1.00
184	4325.000	298.351	299.719	99262.567	83456.430	120.463g	1.00	-1.00
185	4350.000	299.459	300.228	99270.465	83480.150	120.463g	1.00	-1.00
186	4375.000	300.466	300.640	99278.363	83503.869	120.463g	1.00	-1.00
187	4400.000	300.958	300.957	99286.262	83527.589	120.463g	1.00	-1.00
188	4425.000	302.041	301.178	99294.160	83551.309	120.463g	1.00	-1.00
189	4450.000	302.675	301.302	99302.058	83575.028	120.463g	1.00	-1.00
190	4475.000	302.397	301.330	99309.957	83598.748	120.463g	1.00	-1.00
191	4500.000	301.962	301.262	99317.855	83622.467	120.463g	1.00	-1.00
192	4523.486	301.570	301.155	99325.275	83644.750	120.463g	1.00	-1.00
193	4525.000	301.541	301.148	99325.753	83646.187	120.463g	1.00	-0.95
194	4550.000	300.667	301.034	99333.633	83669.912	120.324g	1.00	-0.09
195	4575.000	299.606	300.920	99341.415	83693.671	119.936g	1.00	0.78
196	4600.000	298.545	300.806	99349.005	83717.490	119.299g	1.64	1.64
197	4625.000	298.135	300.692	99356.309	83741.399	118.413g	2.50	2.50
198	4650.000	298.480	300.578	99363.234	83765.421	117.279g	3.36	3.36
199	4656.819	298.669	300.547	99365.044	83771.995	116.927g	3.60	3.60
200	4675.000	299.101	300.464	99369.688	83789.573	115.962g	3.60	3.60
201	4700.000	298.778	300.350	99375.638	83813.854	114.636g	3.60	3.60
202	4725.000	299.010	300.227	99381.081	83838.254	113.310g	3.60	3.60
203	4750.000	299.411	300.057	99386.015	83862.762	111.983g	3.60	3.60
204	4775.000	299.737	299.837	99390.437	83887.367	110.657g	3.60	3.60
205	4795.694	299.914	299.616	99393.709	83907.800	109.559g	3.60	3.60
206	4800.000	299.941	299.566	99394.345	83912.059	109.334g	3.45	3.45
207	4825.000	300.022	299.245	99397.764	83936.824	108.175g	2.59	2.59
208	4850.000	299.789	298.873	99400.780	83961.641	107.265g	1.73	1.73

209	4875.000	298.708	298.451	99403.490	83986.494	106.603g	1.00	0.86
210	4900.000	296.796	297.993	99405.990	84011.368	106.190g	1.00	0.00
211	4925.000	295.681	297.532	99408.376	84036.254	106.026g	1.00	-0.86
212	4929.027	295.642	297.458	99408.757	84040.263	106.022g	1.00	-1.00
213	4950.000	295.445	297.072	99410.738	84061.142	106.022g	1.00	-1.00
214	4975.000	295.246	296.633	99413.099	84086.031	106.022g	1.00	-1.00
215	5000.000	295.057	296.301	99415.461	84110.919	106.022g	1.00	-1.00
216	5025.000	294.925	296.082	99417.822	84135.807	106.022g	1.00	-1.00
217	5050.000	294.906	295.977	99420.184	84160.695	106.022g	1.00	-1.00
218	5075.000	294.903	295.985	99422.545	84185.583	106.022g	1.00	-1.00
219	5100.000	294.885	296.103	99424.907	84210.472	106.022g	1.00	-1.00
220	5125.000	294.810	296.251	99427.268	84235.360	106.022g	1.00	-1.00
221	5150.000	294.815	296.399	99429.629	84260.248	106.022g	1.00	-1.00
222	5175.000	295.006	296.547	99431.991	84285.136	106.022g	1.00	-1.00
223	5200.000	295.470	296.694	99434.352	84310.025	106.022g	1.00	-1.00
224	5225.000	295.952	296.842	99436.714	84334.913	106.022g	1.00	-1.00
225	5250.000	296.791	297.002	99439.075	84359.801	106.022g	1.00	-1.00
226	5275.000	297.975	297.229	99441.437	84384.689	106.022g	1.00	-1.00
227	5300.000	296.654	297.530	99443.798	84409.577	106.022g	1.00	-1.00
228	5325.000	296.589	297.898	99446.160	84434.466	106.022g	1.00	-1.00
229	5350.000	297.182	298.277	99448.521	84459.354	106.022g	1.00	-1.00
230	5375.000	298.501	298.657	99450.883	84484.242	106.022g	1.00	-1.00
231	5400.000	299.082	299.007	99453.244	84509.130	106.022g	1.00	-1.00
232	5425.000	299.627	299.259	99455.606	84534.019	106.022g	1.00	-1.00
233	5450.000	300.012	299.413	99457.967	84558.907	106.022g	1.00	-1.00
234	5475.000	300.254	299.467	99460.328	84583.795	106.022g	1.00	-1.00
235	5500.000	300.210	299.422	99462.690	84608.683	106.022g	1.00	-1.00
236	5525.000	300.032	299.277	99465.051	84633.571	106.022g	1.00	-1.00
237	5550.000	299.879	299.070	99467.413	84658.460	106.022g	1.00	-1.00
238	5575.000	299.515	298.822	99469.774	84683.348	106.022g	1.00	-1.00
239	5600.000	299.047	298.474	99472.136	84708.236	106.022g	1.00	-1.00
240	5625.000	298.485	298.025	99474.497	84733.124	106.022g	1.00	-1.00
241	5650.000	296.342	297.477	99476.859	84758.013	106.022g	1.00	-1.00
242	5675.000	294.852	296.895	99479.220	84782.901	106.022g	1.00	-1.00
243	5700.000	293.796	296.313	99481.582	84807.789	106.022g	1.00	-1.00
244	5725.000	293.674	295.731	99483.943	84832.677	106.022g	1.00	-1.00
245	5750.000	293.447	295.164	99486.304	84857.565	106.022g	1.00	-1.00
246	5775.000	293.289	294.722	99488.666	84882.454	106.022g	1.00	-1.00
247	5800.000	293.122	294.429	99491.027	84907.342	106.022g	1.00	-1.00
248	5825.000	292.986	294.285	99493.389	84932.230	106.022g	1.00	-1.00
249	5850.000	292.890	294.226	99495.750	84957.118	106.022g	1.00	-1.00
250	5875.000	292.926	294.168	99498.112	84982.006	106.022g	1.00	-1.00
251	5900.000	292.982	294.109	99500.473	85006.895	106.022g	1.00	-1.00
252	5925.000	293.029	294.051	99502.835	85031.783	106.022g	1.00	-1.00
253	5950.000	293.005	293.992	99505.196	85056.671	106.022g	1.00	-1.00
254	5975.000	292.955	293.934	99507.558	85081.559	106.022g	1.00	-1.00
255	6000.000	292.908	293.875	99509.919	85106.448	106.022g	1.00	-1.00
256	6025.000	293.817	293.837	99512.280	85131.336	106.022g	1.00	-1.00
257	6050.000	293.336	293.843	99514.642	85156.224	106.022g	1.00	-1.00
258	6075.000	293.126	293.869	99517.003	85181.112	106.022g	1.00	-1.00
259	6100.000	293.189	293.896	99519.365	85206.000	106.022g	1.00	-1.00
260	6125.000	293.602	293.922	99521.726	85230.889	106.022g	1.00	-1.00
261	6150.000	293.026	293.948	99524.088	85255.777	106.022g	1.00	-1.00

262	6155.580	292.942	293.954	99524.615	85261.332	106.022g	1.00	-1.00
263	6175.000	293.004	293.974	99526.529	85280.657	106.548g	1.00	-1.00
264	6200.000	292.969	294.001	99529.228	85305.511	107.226g	1.00	-1.00
265	6225.000	292.940	294.027	99532.192	85330.335	107.903g	1.00	-1.00
266	6250.000	292.950	294.053	99535.419	85355.125	108.580g	1.00	-1.00
267	6275.000	292.971	294.079	99538.910	85379.880	109.257g	1.00	-1.00
268	6282.826	292.993	294.088	99540.057	85387.622	109.469g	1.00	-1.00
269	6300.000	293.082	294.106	99542.602	85404.606	109.469g	1.00	-1.00
270	6325.000	293.195	294.135	99546.307	85429.330	109.469g	1.00	-1.00
271	6350.000	293.001	294.195	99550.012	85454.054	109.469g	1.00	-1.00
272	6375.000	292.858	294.295	99553.717	85478.778	109.469g	1.00	-1.00
273	6400.000	292.856	294.426	99557.422	85503.502	109.469g	1.00	-1.00
274	6425.000	292.999	294.560	99561.127	85528.226	109.469g	1.00	-1.00
275	6450.000	293.375	294.693	99564.832	85552.950	109.469g	1.00	-1.00
276	6475.000	292.898	294.827	99568.537	85577.674	109.469g	1.00	-1.00
277	6500.000	292.774	294.944	99572.242	85602.398	109.469g	1.00	-1.00
278	6525.000	295.095	295.008	99575.947	85627.122	109.469g	1.00	-1.00
279	6537.000	294.745	295.021	99577.725	85638.989	109.469g	1.00	-1.00
280	6550.000	294.072	295.021	99579.652	85651.846	109.469g	1.00	-1.00
281	6575.000	293.134	294.983	99583.357	85676.570	109.469g	1.00	-1.00
282	6600.000	293.036	294.927	99587.062	85701.293	109.469g	1.00	-1.00
283	6625.000	293.699	294.871	99590.767	85726.017	109.469g	1.00	-1.00
284	6650.000	293.928	294.815	99594.472	85750.741	109.469g	1.00	-1.00
285	6675.000	293.924	294.759	99598.177	85775.465	109.469g	1.00	-1.00
286	6700.000	293.595	294.703	99601.882	85800.189	109.469g	1.00	-1.00
287	6711.379	293.403	294.677	99603.568	85811.443	109.469g	1.00	-1.00
288	6725.000	293.080	294.647	99605.628	85824.907	109.864g	1.00	-1.00
289	6750.000	293.518	294.591	99609.627	85849.585	110.587g	1.00	-1.00
290	6775.000	293.967	294.535	99613.905	85874.216	111.311g	1.00	-1.00
291	6800.000	293.339	294.520	99618.463	85898.797	112.034g	1.00	-1.00
292	6825.000	293.138	294.566	99623.300	85923.324	112.757g	1.00	-1.00
293	6850.000	294.088	294.676	99628.415	85947.795	113.481g	1.00	-1.00
294	6875.000	295.181	294.848	99633.809	85972.206	114.204g	1.00	-1.00
295	6900.000	295.804	295.048	99639.479	85996.555	114.928g	1.00	-1.00
296	6925.000	296.819	295.247	99645.425	86020.837	115.651g	1.00	-1.00
297	6943.459	296.663	295.395	99649.993	86038.722	116.185g	1.00	-1.00
298	6950.000	296.360	295.447	99651.638	86045.053	116.185g	1.00	-1.00
299	6975.000	296.080	295.645	99657.926	86069.249	116.185g	1.00	-1.00
300	7000.000	296.124	295.782	99664.213	86093.445	116.185g	1.00	-1.00
301	7025.000	296.047	295.830	99670.501	86117.642	116.185g	1.00	-1.00
302	7050.000	295.816	295.788	99676.789	86141.838	116.185g	1.00	-1.00
303	7075.000	295.476	295.657	99683.077	86166.035	116.185g	1.00	-1.00
304	7100.000	294.791	295.465	99689.364	86190.231	116.185g	1.00	-1.00
305	7125.000	294.088	295.271	99695.652	86214.427	116.185g	1.00	-1.00
306	7150.000	293.701	295.077	99701.940	86238.624	116.185g	1.00	-1.00
307	7175.000	293.353	294.882	99708.227	86262.820	116.185g	1.00	-1.00
308	7200.000	295.683	294.688	99714.515	86287.017	116.185g	1.00	-1.00
309	7225.000	293.878	294.494	99720.803	86311.213	116.185g	1.00	-1.00
310	7250.000	293.568	294.300	99727.090	86335.409	116.185g	1.00	-1.00
311	7275.000	293.404	294.106	99733.378	86359.606	116.185g	1.00	-1.00
312	7300.000	293.260	293.915	99739.666	86383.802	116.185g	1.00	-1.00
313	7325.000	293.379	293.757	99745.953	86407.998	116.185g	1.00	-1.00
314	7350.000	292.995	293.643	99752.241	86432.195	116.185g	1.00	-1.00

315	7375.000	292.776	293.563	99758.529	86456.391	116.185g	1.00	-1.00
316	7400.000	292.753	293.485	99764.816	86480.588	116.185g	1.00	-1.00
317	7425.000	292.671	293.408	99771.104	86504.784	116.185g	1.00	-1.00
318	7450.000	292.666	293.330	99777.392	86528.980	116.185g	1.00	-1.00
319	7475.000	292.599	293.252	99783.680	86553.177	116.185g	1.00	-1.00
320	7500.000	293.990	293.175	99789.967	86577.373	116.185g	1.00	-1.00
321	7521.604	293.491	293.107	99795.401	86598.282	116.185g	1.00	-1.00
322	7525.000	293.397	293.097	99796.257	86601.569	116.272g	1.00	-1.00
323	7550.000	292.701	293.019	99802.699	86625.725	116.908g	1.00	-1.00
324	7575.000	292.585	292.941	99809.381	86649.815	117.545g	1.00	-1.00
325	7600.000	292.473	292.864	99816.304	86673.837	118.182g	1.00	-1.00
326	7625.000	292.338	292.786	99823.467	86697.789	118.818g	1.00	-1.00
327	7632.948	292.298	292.761	99825.795	86705.389	119.021g	1.00	-1.00
328	7650.000	292.213	292.708	99830.814	86721.685	119.021g	1.00	-1.00
329	7675.000	292.424	292.652	99838.173	86745.577	119.021g	1.00	-1.00
330	7700.000	292.751	292.687	99845.532	86769.470	119.021g	1.00	-1.00
331	7725.000	292.426	292.818	99852.890	86793.362	119.021g	1.00	-1.00
332	7750.000	292.539	293.039	99860.249	86817.255	119.021g	1.00	-1.00
333	7775.000	292.696	293.282	99867.608	86841.147	119.021g	1.00	-1.00
334	7800.000	292.885	293.526	99874.967	86865.040	119.021g	1.00	-1.00
335	7825.000	293.383	293.768	99882.325	86888.932	119.021g	1.00	-1.00
336	7850.000	293.607	293.975	99889.684	86912.825	119.021g	1.00	-1.00
337	7875.000	293.738	294.130	99897.043	86936.717	119.021g	1.00	-1.00
338	7900.000	293.950	294.233	99904.402	86960.609	119.021g	1.00	-1.00
339	7925.000	293.630	294.284	99911.760	86984.502	119.021g	1.00	-1.00
340	7950.000	293.192	294.283	99919.119	87008.394	119.021g	1.00	-1.00
341	7975.000	292.745	294.229	99926.478	87032.287	119.021g	1.00	-1.00
342	8000.000	292.447	294.139	99933.837	87056.179	119.021g	1.00	-1.00
343	8025.000	292.698	294.046	99941.195	87080.072	119.021g	1.00	-1.00
344	8050.000	294.005	293.954	99948.554	87103.964	119.021g	1.00	-1.00
345	8075.000	293.589	293.862	99955.913	87127.857	119.021g	1.00	-1.00
346	8100.000	292.953	293.770	99963.272	87151.749	119.021g	1.00	-1.00
347	8125.000	292.529	293.677	99970.630	87175.641	119.021g	1.00	-1.00
348	8150.000	294.804	293.585	99977.989	87199.534	119.021g	1.00	-1.00
349	8175.000	294.311	293.493	99985.348	87223.426	119.021g	1.00	-1.00
350	8200.000	292.959	293.401	99992.707	87247.319	119.021g	1.00	-1.00
351	8225.000	292.882	293.308	100000.065	87271.211	119.021g	1.00	-1.00
352	8250.000	292.888	293.216	100007.424	87295.104	119.021g	1.00	-1.00
353	8275.000	292.775	293.124	100014.783	87318.996	119.021g	1.00	-1.00
354	8300.000	292.663	293.031	100022.142	87342.888	119.021g	1.00	-1.00
355	8325.000	292.325	292.977	100029.500	87366.781	119.021g	1.00	-1.00
356	8350.000	292.134	293.007	100036.859	87390.673	119.021g	1.00	-1.00
357	8375.000	292.085	293.107	100044.218	87414.566	119.021g	1.00	-1.00
358	8400.000	292.093	293.216	100051.577	87438.458	119.021g	1.00	-1.00
359	8425.000	293.147	293.326	100058.935	87462.351	119.021g	1.00	-1.00
360	8434.871	293.485	293.369	100061.841	87471.784	119.021g	1.00	-1.00
361	8450.000	293.378	293.435	100066.245	87486.258	118.593g	1.00	-1.00
362	8475.000	293.086	293.539	100073.310	87510.239	117.885g	1.00	-1.00
363	8500.000	293.631	293.600	100080.108	87534.297	117.178g	1.00	-1.00
364	8525.000	293.217	293.608	100086.638	87558.429	116.470g	1.00	-1.00
365	8550.000	292.339	293.565	100092.900	87582.632	115.763g	1.00	-1.00
366	8575.000	293.981	293.469	100098.892	87606.903	115.056g	1.00	-1.00
367	8600.000	293.977	293.321	100104.615	87631.239	114.348g	1.00	-1.00

368	8625.000	292.485	293.150	100110.066	87655.637	113.641g	1.00	-1.00
369	8626.399	292.482	293.140	100110.363	87657.004	113.601g	1.00	-1.00
370	8650.000	292.273	292.978	100115.367	87680.069	113.601g	1.00	-1.00
371	8675.000	292.375	292.807	100120.668	87704.500	113.601g	1.00	-1.00
372	8700.000	291.974	292.659	100125.969	87728.932	113.601g	1.00	-1.00
373	8725.000	291.897	292.596	100131.270	87753.363	113.601g	1.00	-1.00
374	8750.000	292.193	292.623	100136.570	87777.795	113.601g	1.00	-1.00
375	8775.000	292.086	292.739	100141.871	87802.227	113.601g	1.00	-1.00
376	8800.000	291.937	292.926	100147.172	87826.658	113.601g	1.00	-1.00
377	8825.000	293.638	293.117	100152.473	87851.090	113.601g	1.00	-1.00
378	8850.000	293.717	293.308	100157.773	87875.521	113.601g	1.00	-1.00
379	8875.000	293.103	293.500	100163.074	87899.953	113.601g	1.00	-1.00
380	8900.000	292.759	293.656	100168.375	87924.384	113.601g	1.00	-1.00
381	8925.000	293.929	293.733	100173.676	87948.816	113.601g	1.00	-1.00
382	8950.000	293.506	293.733	100178.976	87973.248	113.601g	1.00	-1.00
383	8975.000	292.782	293.654	100184.277	87997.679	113.601g	1.00	-1.00
384	9000.000	292.926	293.498	100189.578	88022.111	113.601g	1.00	-1.00
385	9025.000	292.318	293.263	100194.879	88046.542	113.601g	1.00	-1.00
386	9050.000	291.761	292.993	100200.179	88070.974	113.601g	1.00	-1.00
387	9075.000	291.867	292.725	100205.480	88095.406	113.601g	1.00	-1.00
388	9100.000	291.994	292.555	100210.781	88119.837	113.601g	1.00	-1.00
389	9125.000	291.937	292.534	100216.082	88144.269	113.601g	1.00	-1.00
390	9150.000	292.252	292.616	100221.382	88168.700	113.601g	1.00	-1.00
391	9175.000	292.687	292.700	100226.683	88193.132	113.601g	1.00	-1.00
392	9200.000	292.491	292.785	100231.984	88217.563	113.601g	1.00	-1.00
393	9225.000	292.771	292.869	100237.285	88241.995	113.601g	1.00	-1.00
394	9250.000	293.010	292.954	100242.585	88266.427	113.601g	1.00	-1.00
395	9275.000	292.311	293.038	100247.886	88290.858	113.601g	1.00	-1.00
396	9300.000	292.442	293.123	100253.187	88315.290	113.601g	1.00	-1.00
397	9325.000	293.094	293.207	100258.488	88339.721	113.601g	1.00	-1.00
398	9350.000	293.389	293.292	100263.788	88364.153	113.601g	1.00	-1.00
399	9375.000	292.817	293.376	100269.089	88388.584	113.601g	1.00	-1.00
400	9400.000	292.876	293.461	100274.390	88413.016	113.601g	1.00	-1.00
401	9425.000	293.068	293.545	100279.691	88437.448	113.601g	1.00	-1.00
402	9450.000	292.982	293.630	100284.991	88461.879	113.601g	1.00	-1.00
403	9466.447	294.007	293.686	100288.478	88477.952	113.601g	1.00	-1.00
404	9475.000	293.710	293.714	100290.276	88486.314	113.365g	1.00	-1.00
405	9500.000	293.140	293.799	100295.353	88510.793	112.673g	1.00	-1.00
406	9525.000	293.355	293.881	100300.164	88535.326	111.981g	1.00	-1.00
407	9550.000	292.877	293.922	100304.707	88559.909	111.289g	1.00	-1.00
408	9575.000	293.382	293.911	100308.983	88584.541	110.597g	1.00	-1.00
409	9600.000	293.032	293.848	100312.992	88609.217	109.905g	1.00	-1.00
410	9625.000	292.832	293.737	100316.731	88633.936	109.213g	1.00	-1.00
411	9650.000	293.046	293.616	100320.202	88658.694	108.521g	1.00	-1.00
412	9662.033	292.977	293.557	100321.776	88670.623	108.188g	1.00	-1.00
413	9675.000	292.841	293.495	100323.440	88683.483	108.188g	1.00	-1.00
414	9700.000	292.570	293.379	100326.646	88708.277	108.188g	1.00	-1.00
415	9725.000	292.434	293.350	100329.853	88733.070	108.188g	1.00	-1.00
416	9750.000	292.576	293.435	100333.059	88757.864	108.188g	1.00	-1.00
417	9775.000	292.774	293.633	100336.266	88782.657	108.188g	1.00	-1.00
418	9800.000	293.428	293.945	100339.472	88807.451	108.188g	1.00	-1.00
419	9825.000	294.041	294.341	100342.679	88832.244	108.188g	1.00	-1.00
420	9850.000	294.536	294.736	100345.885	88857.038	108.188g	1.00	-1.00

421	9875.000	295.659	295.057	100349.092	88881.831	108.188g	1.00	-1.00
422	9900.000	295.901	295.281	100352.298	88906.625	108.188g	1.00	-1.00
423	9925.000	296.987	295.410	100355.505	88931.418	108.188g	1.00	-1.00
424	9950.000	296.641	295.442	100358.711	88956.212	108.188g	1.00	-1.00
425	9975.000	295.980	295.378	100361.918	88981.005	108.188g	1.00	-1.00
426	10000.000	295.324	295.218	100365.124	89005.799	108.188g	1.00	-1.00
427	10025.000	294.818	294.984	100368.331	89030.592	108.188g	1.00	-1.00
428	10050.000	294.542	294.744	100371.537	89055.386	108.188g	1.00	-1.00
429	10075.000	294.193	294.505	100374.744	89080.179	108.188g	1.00	-1.00
430	10100.000	293.859	294.265	100377.950	89104.973	108.188g	1.00	-1.00
431	10125.000	293.542	294.027	100381.157	89129.766	108.188g	1.00	-1.00
432	10150.000	293.174	293.843	100384.363	89154.560	108.188g	1.00	-1.00
433	10175.000	292.985	293.748	100387.570	89179.353	108.188g	1.00	-1.00
434	10200.000	293.274	293.743	100390.776	89204.147	108.188g	1.00	-1.00
435	10225.000	293.525	293.827	100393.983	89228.940	108.188g	1.00	-1.00
436	10250.000	293.600	293.965	100397.189	89253.734	108.188g	1.00	-1.00
437	10275.000	293.690	294.104	100400.396	89278.527	108.188g	1.00	-1.00
438	10300.000	293.928	294.243	100403.602	89303.321	108.188g	1.00	-1.00
439	10325.000	294.196	294.354	100406.809	89328.114	108.188g	1.00	-1.00
440	10350.000	294.265	294.412	100410.015	89352.908	108.188g	1.00	-1.00
441	10375.000	294.262	294.419	100413.222	89377.701	108.188g	1.00	-1.00
442	10400.000	294.080	294.373	100416.428	89402.495	108.188g	1.00	-1.00
443	10425.000	293.865	294.276	100419.635	89427.288	108.188g	1.00	-1.00
444	10450.000	293.480	294.126	100422.841	89452.082	108.188g	1.00	-1.00
445	10475.000	293.051	293.948	100426.048	89476.876	108.188g	1.00	-1.00
446	10500.000	292.608	293.770	100429.254	89501.669	108.188g	1.00	-1.00
447	10525.000	292.159	293.592	100432.461	89526.463	108.188g	1.00	-1.00
448	10550.000	291.963	293.414	100435.667	89551.256	108.188g	1.00	-1.00
449	10575.000	292.251	293.236	100438.874	89576.050	108.188g	1.00	-1.00
450	10600.000	292.401	293.058	100442.080	89600.843	108.188g	1.00	-1.00
451	10604.136	292.395	293.028	100442.611	89604.945	108.188g	1.00	-1.00
452	10625.000	292.660	292.880	100445.195	89625.648	107.623g	1.00	-1.00
453	10650.000	293.529	292.702	100448.049	89650.485	106.945g	1.00	-1.00
454	10675.000	293.052	292.524	100450.639	89675.350	106.268g	1.00	-1.00
455	10700.000	291.962	292.353	100452.964	89700.242	105.591g	1.00	-1.00
456	10725.000	291.484	292.254	100455.024	89725.156	104.914g	1.00	-1.00
457	10750.000	291.653	292.245	100456.819	89750.092	104.236g	1.00	-1.00
458	10775.000	291.463	292.325	100458.349	89775.045	103.559g	1.00	-1.00
459	10800.000	292.159	292.457	100459.613	89800.013	102.882g	1.00	-1.00
460	10825.000	292.771	292.590	100460.612	89824.993	102.205g	1.00	-1.00
461	10850.000	293.078	292.724	100461.344	89849.982	101.527g	1.00	-1.00
462	10853.119	293.126	292.740	100461.417	89853.100	101.443g	1.00	-1.00
463	10875.000	293.281	292.857	100461.913	89874.975	101.443g	1.00	-1.00
464	10900.000	293.307	292.968	100462.479	89899.969	101.443g	1.00	-1.00
465	10925.000	293.279	292.996	100463.046	89924.962	101.443g	1.00	-1.00
466	10950.000	292.999	292.938	100463.612	89949.956	101.443g	1.00	-1.00
467	10975.000	292.720	292.796	100464.179	89974.950	101.443g	1.00	-1.00
468	11000.000	292.351	292.632	100464.746	89999.943	101.443g	1.00	-1.00
469	11025.000	292.084	292.469	100465.312	90024.937	101.443g	1.00	-1.00
470	11050.000	291.893	292.305	100465.879	90049.930	101.443g	1.00	-1.00
471	11075.000	291.686	292.141	100466.445	90074.924	101.443g	1.00	-1.00
472	11100.000	291.591	291.978	100467.012	90099.918	101.443g	1.00	-1.00
473	11125.000	291.474	291.814	100467.578	90124.911	101.443g	1.00	-1.00

474	11150.000	291.395	291.651	100468.145	90149.905	101.443g	1.00	-1.00
475	11175.000	291.314	291.487	100468.712	90174.898	101.443g	1.00	-1.00
476	11200.000	291.246	291.324	100469.278	90199.892	101.443g	1.00	-1.00
477	11225.000	290.967	291.202	100469.845	90224.885	101.443g	1.00	-1.00
478	11250.000	290.746	291.146	100470.411	90249.879	101.443g	1.00	-1.00
479	11275.000	290.803	291.155	100470.978	90274.873	101.443g	1.00	-1.00
480	11300.000	290.788	291.231	100471.544	90299.866	101.443g	1.00	-1.00
481	11325.000	290.646	291.348	100472.111	90324.860	101.443g	1.00	-1.00
482	11350.000	290.589	291.466	100472.677	90349.853	101.443g	1.00	-1.00
483	11375.000	290.469	291.564	100473.244	90374.847	101.443g	1.00	-1.00
484	11400.000	290.202	291.610	100473.811	90399.840	101.443g	1.00	-1.00
485	11425.000	290.141	291.605	100474.377	90424.834	101.443g	1.00	-1.00
486	11450.000	290.173	291.547	100474.944	90449.828	101.443g	1.00	-1.00
487	11475.000	290.290	291.470	100475.510	90474.821	101.443g	1.00	-1.00
488	11500.000	290.526	291.392	100476.077	90499.815	101.443g	1.00	-1.00
489	11525.000	290.829	291.315	100476.643	90524.808	101.443g	1.00	-1.00
490	11550.000	291.244	291.238	100477.210	90549.802	101.443g	1.00	-1.00
491	11575.000	291.441	291.160	100477.776	90574.796	101.443g	1.00	-1.00
492	11577.003	291.442	291.154	100477.822	90576.798	101.443g	1.00	-1.00
493	11600.000	291.460	291.083	100478.463	90599.786	102.108g	1.00	-1.00
494	11625.000	291.387	291.005	100479.433	90624.767	102.832g	1.00	-1.00
495	11650.000	291.162	290.928	100480.686	90649.735	103.555g	1.00	-1.00
496	11675.000	290.833	290.865	100482.224	90674.688	104.279g	1.00	-1.00
497	11700.000	290.773	290.880	100484.044	90699.621	105.002g	1.00	-1.00
498	11725.000	291.101	290.979	100486.148	90724.533	105.725g	1.00	-1.00
499	11750.000	291.370	291.155	100488.535	90749.418	106.449g	1.00	-1.00
500	11775.000	292.138	291.346	100491.204	90774.275	107.172g	1.00	-1.00
501	11800.000	291.761	291.537	100494.156	90799.100	107.896g	1.00	-1.00
502	11820.431	290.980	291.694	100496.778	90819.362	108.487g	1.00	-1.00
503	11825.000	290.991	291.728	100497.385	90823.891	108.487g	1.00	-1.00
504	11850.000	291.232	291.920	100500.708	90848.669	108.487g	1.00	-1.00
505	11875.000	293.705	292.111	100504.031	90873.447	108.487g	1.00	-1.00
506	11900.000	292.258	292.273	100507.354	90898.225	108.487g	1.00	-1.00
507	11925.000	292.693	292.378	100510.677	90923.003	108.487g	1.00	-1.00
508	11950.000	292.789	292.426	100514.000	90947.782	108.487g	1.00	-1.00
509	11975.000	291.770	292.418	100517.323	90972.560	108.487g	1.00	-1.00
510	12000.000	291.056	292.352	100520.646	90997.338	108.487g	1.00	-1.00
511	12025.000	290.943	292.230	100523.969	91022.116	108.487g	1.00	-1.00
512	12050.000	290.622	292.079	100527.292	91046.894	108.487g	1.00	-1.00
513	12075.000	290.523	291.928	100530.615	91071.672	108.487g	1.00	-1.00
514	12100.000	290.584	291.777	100533.938	91096.451	108.487g	1.00	-1.00
515	12125.000	290.508	291.626	100537.261	91121.229	108.487g	1.00	-1.00
516	12150.000	291.525	291.499	100540.583	91146.007	108.487g	1.00	-1.00
517	12175.000	290.940	291.403	100543.906	91170.785	108.487g	1.00	-1.00
518	12200.000	290.181	291.331	100547.229	91195.563	108.487g	1.00	-1.00
519	12225.000	289.798	291.259	100550.552	91220.342	108.487g	1.00	-1.00
520	12250.000	289.710	291.187	100553.875	91245.120	108.487g	1.00	-1.00
521	12275.000	289.614	291.115	100557.198	91269.898	108.487g	1.00	-1.00
522	12300.000	289.866	291.044	100560.521	91294.676	108.487g	1.00	-1.00
523	12321.878	290.202	290.981	100563.429	91316.360	108.487g	1.00	-1.00
524	12325.000	290.250	290.972	100563.846	91319.454	108.570g	1.00	-1.00
525	12350.000	290.579	290.900	100567.330	91344.210	109.233g	1.00	-1.00
526	12375.000	290.807	290.849	100571.072	91368.928	109.896g	1.00	-1.00

527	12400.000	290.805	290.847	100575.071	91393.606	110.559g	1.00	-1.00
528	12425.000	290.612	290.887	100579.327	91418.241	111.222g	1.00	-1.00
529	12450.000	290.416	290.935	100583.840	91442.830	111.886g	1.00	-1.00
530	12475.000	290.428	290.984	100588.608	91467.371	112.549g	1.00	-1.00
531	12500.000	290.377	291.032	100593.632	91491.861	113.212g	1.00	-1.00
532	12510.824	290.375	291.053	100595.886	91502.448	113.499g	1.00	-1.00
533	12525.000	290.456	291.080	100598.869	91516.306	113.499g	1.00	-1.00
534	12550.000	290.567	291.083	100604.130	91540.747	113.499g	1.00	-1.00
535	12575.000	290.404	290.999	100609.392	91565.187	113.499g	1.00	-1.00
536	12600.000	290.027	290.871	100614.653	91589.627	113.499g	1.00	-1.00
537	12625.000	289.873	290.742	100619.915	91614.067	113.499g	1.00	-1.00
538	12650.000	289.894	290.613	100625.176	91638.507	113.499g	1.00	-1.00
539	12675.000	289.885	290.484	100630.437	91662.947	113.499g	1.00	-1.00
540	12700.000	289.875	290.384	100635.699	91687.387	113.499g	1.00	-1.00
541	12725.000	289.814	290.341	100640.960	91711.827	113.499g	1.00	-1.00
542	12750.000	289.806	290.355	100646.221	91736.267	113.499g	1.00	-1.00
543	12775.000	289.803	290.425	100651.483	91760.707	113.499g	1.00	-1.00
544	12800.000	289.804	290.552	100656.744	91785.147	113.499g	1.00	-1.00
545	12825.000	290.216	290.736	100662.006	91809.587	113.499g	1.00	-1.00
546	12850.000	291.930	290.949	100667.267	91834.028	113.499g	1.00	-1.00
547	12875.000	291.006	291.162	100672.528	91858.468	113.499g	1.00	-1.00
548	12900.000	290.953	291.375	100677.790	91882.908	113.499g	1.00	-1.00
549	12925.000	291.950	291.586	100683.051	91907.348	113.499g	1.00	-1.00
550	12950.000	291.952	291.741	100688.312	91931.788	113.499g	1.00	-1.00
551	12975.000	292.060	291.814	100693.574	91956.228	113.499g	1.00	-1.00
552	13000.000	292.573	291.804	100698.835	91980.668	113.499g	1.00	-1.00
553	13025.000	292.352	291.713	100704.097	92005.108	113.499g	1.00	-1.00
554	13050.000	291.943	291.539	100709.358	92029.548	113.499g	1.00	-1.00
555	13075.000	291.311	291.282	100714.619	92053.988	113.499g	1.00	-1.00
556	13100.000	290.599	290.970	100719.881	92078.428	113.499g	1.00	-1.00
557	13125.000	289.862	290.656	100725.142	92102.869	113.499g	1.00	-1.00
558	13150.000	289.422	290.341	100730.403	92127.309	113.499g	1.00	-1.00
559	13175.000	289.165	290.037	100735.665	92151.749	113.499g	1.00	-1.00
560	13200.000	288.993	289.797	100740.926	92176.189	113.499g	1.00	-1.00
561	13225.000	288.855	289.630	100746.188	92200.629	113.499g	1.00	-1.00
562	13250.000	288.791	289.530	100751.449	92225.069	113.499g	1.00	-1.00
563	13275.000	288.790	289.440	100756.710	92249.509	113.499g	1.00	-1.00
564	13300.000	289.241	289.351	100761.972	92273.949	113.499g	1.00	-1.00
565	13321.137	289.150	289.275	100766.420	92294.613	113.499g	1.00	-1.00
566	13325.000	289.133	289.262	100767.236	92298.389	113.611g	1.00	-1.00
567	13350.000	288.464	289.172	100772.679	92322.789	114.334g	1.00	-1.00
568	13375.000	288.378	289.083	100778.399	92347.125	115.058g	1.00	-1.00
569	13400.000	288.408	288.993	100784.395	92371.396	115.781g	1.00	-1.00
570	13425.000	288.309	288.907	100790.667	92395.596	116.504g	1.00	-1.00
571	13450.000	288.223	288.863	100797.213	92419.724	117.228g	1.00	-1.00
572	13475.000	288.268	288.873	100804.033	92443.775	117.951g	1.00	-1.00
573	13500.000	288.302	288.936	100811.125	92467.748	118.675g	1.00	-1.00
574	13525.000	288.309	289.017	100818.490	92491.638	119.398g	1.00	-1.00
575	13550.000	288.310	289.098	100826.126	92515.444	120.122g	1.00	-1.00
576	13575.000	288.608	289.173	100834.031	92539.161	120.845g	1.00	-1.00
577	13600.000	288.623	289.215	100842.206	92562.786	121.568g	1.00	-1.00
578	13625.000	288.511	289.218	100850.649	92586.317	122.292g	1.00	-1.00
579	13650.000	288.532	289.182	100859.358	92609.751	123.015g	1.00	-1.00

580	13675.000	288.503	289.118	100868.333	92633.084	123.739g	1.00	-1.00
581	13700.000	288.397	289.053	100877.573	92656.314	124.462g	1.00	-1.00
582	13725.000	288.291	288.988	100887.076	92679.437	125.186g	1.00	-1.00
583	13750.000	288.194	288.923	100896.841	92702.451	125.909g	1.00	-1.00
584	13775.000	288.101	288.858	100906.867	92725.352	126.632g	1.00	-1.00
585	13800.000	288.110	288.793	100917.153	92748.138	127.356g	1.00	-1.00
586	13825.000	288.135	288.728	100927.697	92770.806	128.079g	1.00	-1.00
587	13850.000	288.123	288.663	100938.498	92793.352	128.803g	1.00	-1.00
588	13860.136	288.102	288.636	100942.950	92802.458	129.096g	1.00	-1.00
589	13875.000	288.070	288.598	100949.509	92815.796	129.096g	1.00	-1.00
590	13900.000	288.046	288.533	100960.542	92838.231	129.096g	1.00	-1.00
591	13925.000	288.017	288.467	100971.574	92860.665	129.096g	1.00	-1.00
592	13950.000	287.903	288.404	100982.606	92883.099	129.096g	1.00	-1.00
593	13975.000	287.774	288.380	100993.639	92905.533	129.096g	1.00	-1.00
594	14000.000	287.746	288.412	101004.671	92927.967	129.096g	1.00	-1.00
595	14025.000	287.989	288.502	101015.703	92950.401	129.096g	1.00	-1.00
596	14050.000	288.180	288.639	101026.736	92972.835	129.096g	1.00	-1.00
597	14075.000	288.250	288.781	101037.768	92995.269	129.096g	1.00	-1.00
598	14100.000	288.261	288.923	101048.801	93017.703	129.096g	1.00	-1.00
599	14113.049	288.268	288.997	101054.559	93029.413	129.096g	1.00	-1.00
600	14125.000	288.248	289.065	101059.834	93040.137	129.117g	0.69	-1.00
601	14150.000	288.273	289.208	101070.900	93062.554	129.294g	0.06	-1.00
602	14175.000	288.372	289.350	101082.060	93084.925	129.654g	-0.58	-1.00
603	14200.000	288.483	289.492	101093.378	93107.216	130.195g	-1.22	-1.22
604	14225.000	288.603	289.634	101104.916	93129.394	130.918g	-1.86	-1.86
605	14250.000	289.112	289.763	101116.737	93151.422	131.822g	-2.50	-2.50
606	14269.494	289.089	289.830	101126.190	93168.472	132.653g	-3.00	-3.00
607	14275.000	289.471	289.844	101128.901	93173.263	132.903g	-3.00	-3.00
608	14300.000	291.475	289.875	101141.448	93194.887	134.040g	-3.00	-3.00
609	14325.000	289.561	289.855	101154.379	93216.282	135.177g	-3.00	-3.00
610	14350.000	288.613	289.786	101167.690	93237.443	136.314g	-3.00	-3.00
611	14375.000	288.549	289.669	101181.377	93258.364	137.451g	-3.00	-3.00
612	14400.000	288.386	289.538	101195.435	93279.036	138.588g	-3.00	-3.00
613	14425.000	288.217	289.407	101209.860	93299.454	139.724g	-3.00	-3.00
614	14450.000	288.193	289.284	101224.647	93319.612	140.861g	-3.00	-3.00
615	14475.000	288.150	289.202	101239.792	93339.502	141.998g	-3.00	-3.00
616	14500.000	288.460	289.167	101255.289	93359.118	143.135g	-3.00	-3.00
617	14525.000	288.635	289.179	101271.135	93378.455	144.272g	-3.00	-3.00
618	14550.000	288.849	289.237	101287.323	93397.506	145.408g	-3.00	-3.00
619	14575.000	288.968	289.336	101303.849	93416.264	146.545g	-3.00	-3.00
620	14600.000	289.018	289.441	101320.707	93434.725	147.682g	-3.00	-3.00
621	14625.000	289.156	289.547	101337.892	93452.881	148.819g	-3.00	-3.00
622	14650.000	289.305	289.652	101355.398	93470.728	149.956g	-3.00	-3.00
623	14675.000	289.146	289.757	101373.221	93488.259	151.093g	-3.00	-3.00
624	14700.000	288.955	289.854	101391.353	93505.469	152.229g	-3.00	-3.00
625	14725.000	288.836	289.906	101409.790	93522.353	153.366g	-3.00	-3.00
626	14750.000	288.924	289.906	101428.526	93538.905	154.503g	-3.00	-3.00
627	14775.000	288.852	289.854	101447.554	93555.120	155.640g	-3.00	-3.00
628	14800.000	289.037	289.757	101466.869	93570.992	156.777g	-3.00	-3.00
629	14825.000	289.092	289.651	101486.464	93586.517	157.913g	-3.00	-3.00
630	14850.000	289.183	289.545	101506.333	93601.689	159.050g	-3.00	-3.00
631	14875.000	289.207	289.439	101526.469	93616.505	160.187g	-3.00	-3.00
632	14900.000	289.062	289.333	101546.868	93630.958	161.324g	-3.00	-3.00

633	14925.000	288.672	289.227	101567.520	93645.045	162.461g	-3.00	-3.00
634	14950.000	288.233	289.121	101588.422	93658.761	163.598g	-3.00	-3.00
635	14975.000	287.781	289.014	101609.564	93672.101	164.734g	-3.00	-3.00
636	15000.000	287.438	288.908	101630.942	93685.062	165.871g	-3.00	-3.00
637	15025.000	287.427	288.802	101652.548	93697.639	167.008g	-3.00	-3.00
638	15050.000	287.459	288.696	101674.374	93709.828	168.145g	-3.00	-3.00
639	15075.000	287.143	288.590	101696.415	93721.625	169.282g	-3.00	-3.00
640	15100.000	287.063	288.484	101718.663	93733.027	170.419g	-3.00	-3.00
641	15125.000	287.200	288.378	101741.112	93744.030	171.555g	-3.00	-3.00
642	15150.000	287.170	288.272	101763.753	93754.631	172.692g	-3.00	-3.00
643	15175.000	287.075	288.166	101786.579	93764.825	173.829g	-3.00	-3.00
644	15200.000	287.027	288.060	101809.584	93774.610	174.966g	-3.00	-3.00
645	15225.000	287.000	287.954	101832.761	93783.983	176.103g	-3.00	-3.00
646	15250.000	286.853	287.848	101856.100	93792.941	177.239g	-3.00	-3.00
647	15275.000	286.758	287.742	101879.596	93801.480	178.376g	-3.00	-3.00
648	15300.000	286.773	287.661	101903.241	93809.598	179.513g	-3.00	-3.00
649	15325.000	287.179	287.623	101927.027	93817.293	180.650g	-3.00	-3.00
650	15350.000	287.424	287.628	101950.947	93824.562	181.787g	-3.00	-3.00
651	15375.000	287.388	287.675	101974.992	93831.403	182.924g	-3.00	-3.00
652	15400.000	287.079	287.765	101999.156	93837.813	184.060g	-3.00	-3.00
653	15425.000	287.110	287.898	102023.431	93843.791	185.197g	-3.00	-3.00
654	15450.000	287.189	288.056	102047.808	93849.334	186.334g	-3.00	-3.00
655	15475.000	286.801	288.214	102072.280	93854.441	187.471g	-3.00	-3.00
656	15500.000	287.744	288.336	102096.840	93859.110	188.608g	-3.00	-3.00
657	15525.000	287.871	288.383	102121.479	93863.340	189.744g	-3.00	-3.00
658	15550.000	287.369	288.358	102146.190	93867.130	190.881g	-3.00	-3.00
659	15559.825	287.445	288.327	102155.920	93868.498	191.328g	-3.00	-3.00
660	15575.000	287.563	288.258	102170.964	93870.480	191.985g	-2.61	-2.61
661	15600.000	287.682	288.120	102195.789	93873.431	192.920g	-1.97	-1.97
662	15625.000	287.435	287.998	102220.651	93876.052	193.674g	-1.33	-1.33
663	15650.000	287.098	287.956	102245.539	93878.415	194.247g	-0.69	-1.00
664	15675.000	287.446	288.000	102270.445	93880.588	194.638g	-0.06	-1.00
665	15700.000	287.616	288.122	102295.360	93882.645	194.847g	0.58	-1.00
666	15716.271	287.669	288.211	102311.578	93883.954	194.885g	1.00	-1.00
667	15725.000	287.697	288.259	102320.279	93884.655	194.885g	1.00	-1.00
668	15750.000	287.711	288.397	102345.198	93886.661	194.885g	1.00	-1.00
669	15775.000	287.713	288.533	102370.118	93888.668	194.885g	1.00	-1.00
670	15800.000	287.873	288.639	102395.037	93890.674	194.885g	1.00	-1.00
671	15825.000	288.197	288.693	102419.957	93892.680	194.885g	1.00	-1.00
672	15850.000	288.689	288.698	102444.876	93894.687	194.885g	1.00	-1.00
673	15875.000	288.490	288.652	102469.795	93896.693	194.885g	1.00	-1.00
674	15900.000	287.984	288.555	102494.715	93898.700	194.885g	1.00	-1.00
675	15925.000	287.463	288.409	102519.634	93900.706	194.885g	1.00	-1.00
676	15950.000	287.386	288.231	102544.553	93902.713	194.885g	1.00	-1.00
677	15975.000	287.652	288.052	102569.473	93904.719	194.885g	1.00	-1.00
678	16000.000	287.574	287.874	102594.392	93906.726	194.885g	1.00	-1.00
679	16025.000	287.189	287.713	102619.311	93908.732	194.885g	1.00	-1.00
680	16050.000	287.207	287.650	102644.231	93910.739	194.885g	1.00	-1.00
681	16075.000	287.298	287.698	102669.150	93912.745	194.885g	1.00	-1.00
682	16100.000	287.439	287.844	102694.069	93914.751	194.885g	1.00	-1.00
683	16125.000	287.574	288.008	102718.989	93916.758	194.885g	1.00	-1.00
684	16150.000	287.587	288.172	102743.908	93918.764	194.885g	1.00	-1.00
685	16175.000	287.623	288.324	102768.827	93920.771	194.885g	1.00	-1.00

686	16200.000	287.757	288.391	102793.747	93922.777	194.885g	1.00	-1.00
687	16225.000	287.825	288.361	102818.666	93924.784	194.885g	1.00	-1.00
688	16250.000	287.764	288.246	102843.586	93926.790	194.885g	1.00	-1.00
689	16273.388	287.682	288.127	102866.898	93928.667	194.885g	1.00	-1.00
690	16275.000	287.673	288.119	102868.505	93928.797	194.886g	0.93	-1.00
691	16300.000	287.531	287.992	102893.426	93930.775	195.087g	-0.22	-1.00
692	16325.000	287.420	287.867	102918.359	93932.605	195.645g	-1.36	-1.36
693	16350.000	287.432	287.787	102943.312	93934.146	196.560g	-2.50	-2.50
694	16375.000	287.453	287.773	102968.286	93935.259	197.831g	-3.65	-3.65
695	16384.944	287.452	287.786	102978.226	93935.551	198.436g	-4.10	-4.10
696	16400.000	287.415	287.825	102993.280	93935.807	199.395g	-4.10	-4.10
697	16425.000	287.510	287.922	103018.279	93935.733	200.986g	-4.10	-4.10
698	16450.000	287.606	288.013	103043.269	93935.033	202.578g	-4.10	-4.10
699	16475.000	287.754	288.058	103068.233	93933.709	204.169g	-4.10	-4.10
700	16500.000	287.671	288.051	103093.156	93931.761	205.761g	-4.10	-4.10
701	16525.000	287.530	287.992	103118.023	93929.191	207.352g	-4.10	-4.10
702	16539.418	287.443	287.935	103132.332	93927.427	208.270g	-4.10	-4.10
703	16550.000	287.355	287.881	103142.818	93926.002	208.912g	-3.62	-3.62
704	16575.000	287.043	287.724	103167.536	93922.257	210.174g	-2.47	-2.47
705	16600.000	286.937	287.559	103192.186	93918.092	211.080g	-1.33	-1.33
706	16625.000	286.827	287.394	103216.787	93913.645	211.629g	-0.19	-1.00
707	16650.000	286.868	287.229	103241.362	93909.055	211.821g	0.96	-1.00
708	16650.974	286.873	287.222	103242.319	93908.876	211.821g	1.00	-1.00
709	16675.000	286.979	287.064	103265.933	93904.440	211.821g	1.00	-1.00
710	16700.000	286.456	286.899	103290.503	93899.824	211.821g	1.00	-1.00
711	16725.000	285.662	286.734	103315.073	93895.209	211.821g	1.00	-1.00
712	16750.000	285.384	286.569	103339.643	93890.593	211.821g	1.00	-1.00
713	16775.000	285.309	286.404	103364.214	93885.978	211.821g	1.00	-1.00
714	16800.000	285.133	286.261	103388.784	93881.362	211.821g	1.00	-1.00
715	16825.000	284.923	286.175	103413.354	93876.747	211.821g	1.00	-1.00
716	16850.000	284.871	286.145	103437.924	93872.131	211.821g	1.00	-1.00
717	16875.000	284.873	286.172	103462.495	93867.516	211.821g	1.00	-1.00
718	16900.000	284.955	286.221	103487.065	93862.901	211.821g	1.00	-1.00
719	16925.000	285.513	286.270	103511.635	93858.285	211.821g	1.00	-1.00
720	16950.000	285.131	286.319	103536.205	93853.670	211.821g	1.00	-1.00
721	16975.000	285.149	286.368	103560.776	93849.054	211.821g	1.00	-1.00
722	17000.000	286.177	286.417	103585.346	93844.439	211.821g	1.00	-1.00
723	17026.013	286.468	286.468	103610.912	93839.636	211.821g	1.00	-1.00

4. VOLUMES TERRASSEMENT

N° PROF	ABSCISSE CURVILIGN	LONGUEUR APPLIC	DEBLAI SECTION	REMBLAI SECTION	DEBLAI VOLUME	DEBLAI CUMULE	REMBLAI VOLUME	REMBLAI CUMULE
1	0.000	12.50	16.53	0.00	206.6	207	0.0	0
2	25.000	25.00	9.59	0.00	239.8	446	0.0	0
3	50.000	25.00	0.00	33.79	0.0	446	844.7	845
4	75.000	25.00	0.00	37.52	0.0	446	937.9	1783
5	100.000	25.00	0.00	36.00	0.0	446	900.1	2683
6	125.000	25.00	0.00	32.05	0.0	446	801.4	3484
7	150.000	25.00	0.00	27.64	0.0	446	691.1	4175
8	175.000	16.90	0.00	24.30	0.0	446	410.8	4586
9	183.805	12.50	0.00	23.73	0.0	446	296.7	4883
10	200.000	20.60	0.00	17.79	0.0	446	366.2	5249
11	225.000	25.00	0.00	25.46	0.0	446	635.7	5885
12	250.000	25.00	4.99	3.54	124.9	571	87.9	5973
13	275.000	22.68	0.23	16.00	5.2	577	362.0	6335
14	295.361	12.50	0.00	23.37	0.0	577	292.1	6627
15	300.000	14.82	0.00	26.82	0.0	577	397.5	7024
16	325.000	25.00	0.00	47.78	0.0	577	1196.0	8220
17	350.000	12.61	0.12	26.61	1.5	578	338.0	8558
18	350.230	12.50	0.10	26.35	1.2	579	331.4	8889
19	375.000	24.89	0.00	29.09	0.0	579	723.2	9613
20	400.000	25.00	0.00	39.37	0.0	579	983.9	10597
21	425.000	25.00	0.00	39.19	0.0	579	980.3	11577
22	450.000	18.39	0.00	39.83	0.0	579	732.7	12309
23	461.786	12.50	0.00	56.53	0.0	579	706.6	13016
24	475.000	19.11	0.00	69.88	0.0	579	1335.2	14351
25	500.000	25.00	0.00	132.61	0.0	579	3315.1	17666
26	525.000	25.00	0.00	156.61	0.0	579	3915.3	21582
27	550.000	25.00	0.00	147.65	0.0	579	3691.3	25273
28	575.000	25.00	0.00	210.13	0.0	579	5253.1	30526
29	600.000	25.00	0.00	285.86	0.0	579	7146.5	37673
30	625.000	25.00	0.00	352.11	0.0	579	8802.6	46475
31	650.000	25.00	0.00	448.33	0.0	579	11208.2	57684
32	675.000	25.00	0.00	499.29	0.0	579	12482.3	70166
33	700.000	25.00	0.00	446.45	0.0	579	11161.3	81327
34	725.000	25.00	0.00	433.88	0.0	579	10847.1	92174
35	750.000	25.00	0.00	386.27	0.0	579	9656.8	101831
36	775.000	25.00	0.00	333.53	0.0	579	8338.3	110169
37	800.000	25.00	0.00	284.79	0.0	579	7119.8	117289
38	825.000	25.00	0.00	198.35	0.0	579	4958.6	122248
39	850.000	25.00	0.00	157.09	0.0	579	3927.2	126175
40	875.000	25.00	0.00	126.60	0.0	579	3164.9	129340
41	900.000	25.00	0.00	71.43	0.0	579	1785.8	131126
42	925.000	25.00	0.00	73.07	0.0	579	1826.9	132953
43	950.000	25.00	1.51	13.02	37.7	617	325.6	133278
44	975.000	25.00	0.00	41.26	0.0	617	1031.6	134310
45	1000.000	25.00	0.00	36.41	0.0	617	910.1	135220
46	1025.000	25.00	0.00	30.33	0.0	617	758.1	135978
47	1050.000	23.79	0.00	22.52	0.0	617	535.8	136514

48	1072.576	12.50	0.00	11.29	0.0	617	141.1	136655
49	1075.000	13.71	0.00	9.91	0.0	617	135.9	136791
50	1100.000	25.00	0.00	21.55	0.0	617	538.9	137330
51	1125.000	25.00	0.00	21.28	0.0	617	532.1	137862
52	1150.000	22.79	0.00	14.56	0.0	617	332.1	138194
53	1170.576	12.50	0.00	17.17	0.0	617	215.3	138409
54	1175.000	14.71	0.00	18.32	0.0	617	270.4	138679
55	1200.000	25.00	0.00	20.72	0.0	617	519.9	139199
56	1225.000	25.00	0.00	23.26	0.0	617	583.3	139783
57	1250.000	25.00	0.00	23.97	0.0	617	600.9	140384
58	1275.000	25.00	0.00	22.33	0.0	617	559.8	140943
59	1300.000	25.00	0.00	21.28	0.0	617	533.5	141477
60	1325.000	25.00	0.00	19.59	0.0	617	491.0	141968
61	1350.000	25.00	0.00	17.75	0.0	617	444.9	142413
62	1375.000	25.00	0.00	15.45	0.0	617	387.5	142800
63	1400.000	25.00	0.00	13.86	0.0	617	347.9	143148
64	1425.000	25.00	0.00	11.77	0.0	617	295.8	143444
65	1450.000	25.00	0.00	10.49	0.0	617	263.5	143708
66	1475.000	25.00	0.00	10.37	0.0	617	260.6	143968
67	1500.000	25.00	0.00	10.23	0.0	617	257.2	144225
68	1525.000	25.00	56.85	0.00	1419.3	2036	0.0	144225
69	1550.000	25.00	19.61	0.00	488.1	2524	0.0	144225
70	1575.000	25.00	3.29	3.94	81.3	2606	99.6	144325
71	1600.000	25.00	0.10	8.39	2.4	2608	211.0	144536
72	1625.000	25.00	0.00	9.63	0.1	2608	242.1	144778
73	1650.000	25.00	0.00	10.83	0.0	2608	272.1	145050
74	1675.000	25.00	0.00	12.34	0.0	2608	310.0	145360
75	1700.000	25.00	0.00	12.99	0.0	2608	326.2	145686
76	1725.000	25.00	0.00	13.87	0.0	2608	348.1	146035
77	1750.000	25.00	0.00	14.56	0.0	2608	365.3	146400
78	1775.000	25.00	0.00	15.16	0.0	2608	380.3	146780
79	1800.000	25.00	0.00	16.67	0.0	2608	418.0	147198
80	1825.000	25.00	0.00	15.51	0.0	2608	389.0	147587
81	1850.000	25.00	0.00	16.62	0.0	2608	417.0	148004
82	1875.000	25.00	0.00	20.58	0.0	2608	515.8	148520
83	1900.000	25.00	0.00	21.65	0.0	2608	542.6	149062
84	1925.000	25.00	0.13	20.81	3.3	2612	522.3	149585
85	1950.000	25.00	0.00	22.41	0.0	2612	561.8	150147
86	1975.000	25.00	10.13	20.05	249.3	2861	503.9	150650
87	2000.000	25.00	106.82	0.00	2664.6	5525	0.0	150650
88	2025.000	25.00	49.69	0.00	1245.0	6770	0.0	150650
89	2050.000	25.00	0.00	11.83	0.0	6770	296.9	150947
90	2075.000	25.00	0.00	11.46	0.0	6770	287.6	151235
91	2100.000	25.00	0.00	11.10	0.0	6770	278.6	151514
92	2125.000	25.00	0.00	9.24	0.0	6770	232.3	151746
93	2150.000	25.00	0.07	7.79	1.8	6772	195.9	151942
94	2175.000	25.00	0.00	8.59	0.0	6772	215.8	152158
95	2200.000	22.88	0.00	8.48	0.0	6772	194.8	152352
96	2220.769	12.50	16.58	0.00	207.5	6980	0.0	152352
97	2225.000	14.62	11.80	0.00	172.6	7152	0.0	152352
98	2250.000	25.00	0.40	1.98	9.9	7162	49.4	152402
99	2275.000	25.00	7.82	0.00	196.1	7358	0.0	152402
100	2300.000	21.88	10.90	0.00	238.5	7597	0.0	152402

101	2318.769	12.50	8.07	0.00	100.9	7698	0.0	152402
102	2325.000	15.62	5.43	0.00	84.8	7783	0.0	152402
103	2350.000	25.00	1.55	0.08	38.9	7821	2.0	152404
104	2375.000	25.00	1.72	0.00	43.0	7864	0.0	152404
105	2400.000	25.00	9.67	0.00	241.7	8106	0.0	152404
106	2425.000	25.00	3.46	1.09	86.4	8193	27.3	152431
107	2450.000	25.00	0.00	3.44	0.0	8193	86.1	152517
108	2475.000	25.00	20.84	0.00	520.9	8713	0.0	152517
109	2500.000	25.00	0.00	8.06	0.0	8713	201.4	152719
110	2525.000	25.00	0.00	9.19	0.0	8713	229.9	152948
111	2550.000	25.00	12.50	0.00	312.5	9026	0.0	152948
112	2575.000	25.00	15.10	0.00	377.6	9404	0.0	152948
113	2600.000	25.00	17.74	0.76	443.5	9847	19.1	152968
114	2625.000	25.00	2.74	0.25	68.4	9916	6.3	152974
115	2650.000	25.00	4.32	1.06	108.0	10024	26.4	153000
116	2675.000	25.00	0.00	13.45	0.0	10024	336.3	153337
117	2700.000	25.00	3.06	2.43	76.4	10100	60.8	153397
118	2725.000	25.00	0.00	17.37	0.0	10100	434.3	153832
119	2750.000	25.00	0.00	12.33	0.0	10100	308.2	154140
120	2775.000	25.00	0.00	21.97	0.0	10100	549.3	154689
121	2800.000	25.00	2.95	9.76	73.7	10174	244.1	154933
122	2825.000	25.00	3.02	2.22	75.5	10249	55.4	154989
123	2850.000	25.00	0.00	26.38	0.0	10249	659.6	155648
124	2875.000	25.00	14.13	0.16	353.2	10602	4.0	155652
125	2900.000	25.00	31.31	0.00	782.8	11385	0.0	155652
126	2925.000	25.00	0.70	8.36	17.6	11403	209.0	155861
127	2950.000	25.00	32.82	0.00	820.5	12223	0.0	155861
128	2975.000	25.00	39.99	0.00	999.8	13223	0.0	155861
129	3000.000	25.00	28.36	1.62	709.0	13932	40.6	155902
130	3025.000	25.00	0.55	11.99	13.8	13946	299.8	156202
131	3050.000	25.00	0.00	13.05	0.0	13946	326.2	156528
132	3075.000	25.00	0.15	6.68	3.8	13950	167.0	156695
133	3100.000	25.00	3.24	1.25	81.1	14031	31.2	156726
134	3125.000	25.00	27.58	0.00	689.6	14721	0.0	156726
135	3150.000	25.00	2.99	1.41	74.6	14795	35.3	156761
136	3175.000	25.00	2.24	2.57	56.0	14851	64.3	156826
137	3200.000	25.00	6.72	0.00	168.1	15019	0.0	156826
138	3225.000	25.00	0.06	3.63	1.4	15021	90.7	156916
139	3250.000	25.00	22.79	1.36	569.6	15590	33.9	156950
140	3275.000	25.00	13.75	0.44	343.7	15934	10.9	156961
141	3300.000	25.00	14.22	0.00	355.4	16289	0.0	156961
142	3325.000	25.00	12.96	0.00	323.9	16613	0.0	156961
143	3350.000	25.00	22.72	0.00	568.0	17181	0.0	156961
144	3375.000	25.00	17.37	0.00	434.3	17616	0.0	156961
145	3400.000	25.00	30.41	1.95	760.2	18376	48.6	157010
146	3425.000	25.00	16.20	2.53	405.0	18781	63.4	157073
147	3450.000	25.00	2.95	1.24	73.7	18855	31.1	157104
148	3475.000	25.00	6.20	0.00	155.0	19010	0.0	157104
149	3500.000	25.00	8.01	0.00	200.3	19210	0.0	157104
150	3525.000	25.00	4.12	0.00	103.1	19313	0.0	157104
151	3550.000	25.00	2.05	0.00	51.2	19364	0.0	157104
152	3575.000	25.00	23.47	0.00	586.8	19951	0.0	157104
153	3600.000	25.00	52.55	0.00	1313.8	21265	0.0	157104

154	3625.000	23.09	17.05	0.00	393.7	21659	0.0	157104
155	3646.189	12.50	0.04	6.71	0.6	21659	83.9	157188
156	3650.000	14.41	0.00	7.77	0.0	21659	111.9	157300
157	3675.000	22.13	0.00	9.18	0.0	21659	203.1	157503
158	3694.253	12.50	0.79	7.17	9.9	21669	89.6	157593
159	3700.000	15.37	0.00	8.58	0.0	21669	131.9	157724
160	3725.000	25.00	10.75	3.06	268.7	21938	76.5	157801
161	3750.000	25.00	0.00	17.02	0.0	21938	425.4	158226
162	3775.000	25.00	0.00	18.63	0.0	21938	465.6	158692
163	3800.000	25.00	17.07	0.01	426.8	22365	0.1	158692
164	3825.000	25.00	17.16	0.65	428.9	22794	16.2	158708
165	3850.000	25.00	11.50	2.83	287.5	23081	70.8	158779
166	3875.000	25.00	3.58	5.12	89.4	23170	128.0	158907
167	3900.000	25.00	0.14	4.18	3.5	23174	104.5	159012
168	3925.000	25.00	1.33	5.65	33.3	23207	141.3	159153
169	3950.000	25.00	2.97	5.23	74.4	23282	130.7	159284
170	3975.000	25.00	0.00	6.93	0.0	23282	173.4	159457
171	4000.000	25.00	0.00	6.46	0.0	23282	161.4	159619
172	4025.000	25.00	13.44	0.00	335.9	23618	0.0	159619
173	4050.000	25.00	10.44	0.00	261.0	23879	0.0	159619
174	4075.000	25.00	1.07	0.01	26.7	23905	0.3	159619
175	4100.000	25.00	9.38	0.00	234.5	24140	0.0	159619
176	4125.000	25.00	11.72	0.00	292.9	24433	0.0	159619
177	4150.000	25.00	9.25	0.00	231.3	24664	0.0	159619
178	4175.000	25.00	0.01	4.84	0.2	24664	121.0	159740
179	4200.000	25.00	0.00	16.40	0.0	24664	409.9	160150
180	4225.000	25.00	0.00	11.87	0.0	24664	296.7	160446
181	4250.000	25.00	9.61	0.00	240.3	24904	0.0	160446
182	4275.000	25.00	0.05	1.28	1.2	24906	32.1	160479
183	4300.000	25.00	0.00	11.93	0.0	24906	298.2	160777
184	4325.000	25.00	0.00	19.29	0.0	24906	482.2	161259
185	4350.000	25.00	1.69	4.80	42.3	24948	119.9	161379
186	4375.000	25.00	11.01	0.00	275.2	25223	0.0	161379
187	4400.000	25.00	17.81	0.00	445.3	25669	0.0	161379
188	4425.000	25.00	39.59	0.00	989.7	26658	0.0	161379
189	4450.000	25.00	54.12	0.00	1353.0	28011	0.0	161379
190	4475.000	25.00	47.00	0.00	1175.0	29186	0.0	161379
191	4500.000	24.24	34.80	0.00	843.6	30030	0.0	161379
192	4523.486	12.50	25.82	0.00	322.7	30352	0.0	161379
193	4525.000	13.26	24.68	0.00	327.2	30680	0.0	161379
194	4550.000	25.00	5.16	1.56	129.1	30809	39.0	161418
195	4575.000	25.00	0.00	19.48	0.0	30809	486.7	161905
196	4600.000	25.00	0.00	44.92	0.0	30809	1122.9	163027
197	4625.000	25.00	0.00	53.57	0.0	30809	1339.3	164367
198	4650.000	15.91	0.00	41.98	0.0	30809	668.2	165035
199	4656.819	12.50	0.00	35.58	0.0	30809	445.1	165480
200	4675.000	21.59	0.00	21.44	0.0	30809	463.6	165944
201	4700.000	25.00	0.00	25.27	0.0	30809	632.6	166576
202	4725.000	25.00	0.00	16.07	0.0	30809	402.6	166979
203	4750.000	25.00	1.82	2.93	45.1	30854	73.7	167053
204	4775.000	22.85	11.01	0.00	250.5	31104	0.0	167053
205	4795.694	12.50	21.55	0.00	268.7	31373	0.0	167053
206	4800.000	14.65	23.62	0.00	345.4	31718	0.0	167053

207	4825.000	25.00	34.67	0.00	865.9	32584	0.0	167053
208	4850.000	25.00	37.45	0.00	935.3	33520	0.0	167053
209	4875.000	25.00	22.85	0.00	571.3	34091	0.0	167053
210	4900.000	25.00	0.00	13.01	0.0	34091	325.3	167378
211	4925.000	14.51	0.00	31.37	0.0	34091	455.3	167833
212	4929.027	12.50	0.00	30.29	0.0	34091	378.6	168212
213	4950.000	22.99	0.00	25.07	0.0	34091	576.2	168788
214	4975.000	25.00	0.00	19.43	0.0	34091	485.6	169274
215	5000.000	25.00	0.00	15.66	0.0	34091	391.5	169665
216	5025.000	25.00	0.00	13.32	0.0	34091	333.1	169998
217	5050.000	25.00	0.00	11.64	0.0	34091	291.0	170289
218	5075.000	25.00	0.00	11.84	0.0	34091	295.9	170585
219	5100.000	25.00	1.81	11.39	45.2	34136	284.7	170870
220	5125.000	25.00	0.34	13.43	8.6	34145	335.8	171206
221	5150.000	25.00	0.00	23.62	0.0	34145	590.4	171796
222	5175.000	25.00	0.00	23.70	0.0	34145	592.4	172388
223	5200.000	25.00	0.00	17.42	0.0	34145	435.4	172824
224	5225.000	25.00	0.00	9.13	0.0	34145	228.2	173052
225	5250.000	25.00	11.72	0.00	293.1	34438	0.0	173052
226	5275.000	25.00	37.46	0.00	936.4	35374	0.0	173052
227	5300.000	25.00	0.10	5.80	2.5	35377	145.1	173197
228	5325.000	25.00	0.00	17.84	0.0	35377	446.0	173643
229	5350.000	25.00	0.00	12.50	0.0	35377	312.6	173956
230	5375.000	25.00	10.65	0.00	266.3	35643	0.0	173956
231	5400.000	25.00	16.80	0.00	420.0	36063	0.0	173956
232	5425.000	25.00	24.71	0.00	617.7	36681	0.0	173956
233	5450.000	25.00	31.28	0.00	782.1	37463	0.0	173956
234	5475.000	25.00	36.78	0.00	919.5	38382	0.0	173956
235	5500.000	25.00	36.32	0.00	907.9	39290	0.0	173956
236	5525.000	25.00	35.52	0.00	888.1	40178	0.0	173956
237	5550.000	25.00	37.30	0.00	932.4	41111	0.0	173956
238	5575.000	25.00	34.30	0.00	857.5	41968	0.0	173956
239	5600.000	25.00	31.57	0.00	789.3	42758	0.0	173956
240	5625.000	25.00	42.99	0.00	1074.8	43832	0.0	173956
241	5650.000	25.00	0.00	11.78	0.0	43832	294.5	174250
242	5675.000	25.00	0.00	37.14	0.0	43832	928.4	175179
243	5700.000	25.00	0.00	49.92	0.0	43832	1247.9	176427
244	5725.000	25.00	0.00	38.02	0.0	43832	950.6	177377
245	5750.000	25.00	0.00	28.72	0.0	43832	718.1	178095
246	5775.000	25.00	0.00	20.97	0.0	43832	524.3	178620
247	5800.000	25.00	0.00	17.72	0.0	43832	443.1	179063
248	5825.000	25.00	0.00	17.34	0.0	43832	433.4	179496
249	5850.000	25.00	0.00	17.31	0.0	43832	432.9	179929
250	5875.000	25.00	0.00	15.73	0.0	43832	393.3	180322
251	5900.000	25.00	0.00	13.28	0.0	43832	331.9	180654
252	5925.000	25.00	0.00	10.73	0.0	43832	268.4	180923
253	5950.000	25.00	0.00	9.04	0.0	43832	225.9	181148
254	5975.000	25.00	0.00	8.45	0.0	43832	211.3	181360
255	6000.000	25.00	0.00	8.61	0.0	43832	215.2	181575
256	6025.000	25.00	14.04	0.00	350.9	44183	0.0	181575
257	6050.000	25.00	4.86	1.98	121.6	44305	49.4	181624
258	6075.000	25.00	0.64	5.88	16.1	44321	147.0	181771
259	6100.000	25.00	0.79	1.42	19.8	44341	35.5	181807

260	6125.000	25.00	6.24	0.00	155.9	44497	0.0	181807
261	6150.000	15.29	1.42	4.65	21.8	44518	71.1	181878
262	6155.580	12.50	0.03	8.82	0.4	44519	110.4	181988
263	6175.000	22.21	0.01	8.32	0.3	44519	185.1	182173
264	6200.000	25.00	0.00	9.53	0.0	44519	238.5	182412
265	6225.000	25.00	0.00	10.71	0.0	44519	267.9	182680
266	6250.000	25.00	0.00	11.92	0.0	44519	298.2	182978
267	6275.000	16.41	0.00	12.54	0.0	44519	206.0	183184
268	6282.826	12.50	0.00	12.22	0.0	44519	152.8	183337
269	6300.000	21.09	0.00	10.77	0.0	44519	227.1	183564
270	6325.000	25.00	0.29	8.91	7.1	44526	222.8	183787
271	6350.000	25.00	0.00	13.75	0.0	44526	343.6	184130
272	6375.000	25.00	0.00	21.11	0.0	44526	527.7	184658
273	6400.000	25.00	0.00	24.25	0.0	44526	606.2	185264
274	6425.000	25.00	0.00	26.65	0.0	44526	666.2	185930
275	6450.000	25.00	0.00	20.90	0.0	44526	522.5	186453
276	6475.000	25.00	0.00	31.73	0.0	44526	793.2	187246
277	6500.000	25.00	0.00	40.56	0.0	44526	1014.0	188260
278	6525.000	18.50	17.46	0.00	323.0	44849	0.0	188260
279	6537.000	12.50	8.18	0.00	102.2	44951	0.0	188260
280	6550.000	19.00	0.00	8.38	0.0	44951	159.2	188419
281	6575.000	25.00	0.00	31.64	0.0	44951	791.1	189210
282	6600.000	25.00	0.00	34.17	0.0	44951	854.3	190065
283	6625.000	25.00	0.00	14.81	0.0	44951	370.2	190435
284	6650.000	25.00	0.90	8.86	22.4	44974	221.5	190656
285	6675.000	25.00	1.37	10.46	34.3	45008	261.4	190918
286	6700.000	18.19	0.00	13.62	0.0	45008	247.7	191165
287	6711.379	12.50	0.00	17.99	0.0	45008	224.7	191390
288	6725.000	19.31	0.00	24.64	0.0	45008	475.7	191866
289	6750.000	25.00	0.00	11.21	0.0	45008	280.5	192146
290	6775.000	25.00	2.88	2.15	71.8	45080	53.9	192200
291	6800.000	25.00	0.00	13.10	0.0	45080	327.5	192528
292	6825.000	25.00	0.00	20.77	0.0	45080	519.1	193047
293	6850.000	25.00	4.21	3.24	105.6	45186	80.7	193128
294	6875.000	25.00	22.75	0.00	569.7	45755	0.0	193128
295	6900.000	25.00	33.47	0.00	837.6	46593	0.0	193128
296	6925.000	21.73	56.09	0.00	1219.0	47812	0.0	193128
297	6943.459	12.50	50.02	0.00	625.2	48437	0.0	193128
298	6950.000	15.77	39.00	0.00	615.0	49052	0.0	193128
299	6975.000	25.00	20.90	0.00	522.5	49575	0.0	193128
300	7000.000	25.00	23.21	0.00	580.2	50155	0.0	193128
301	7025.000	25.00	20.31	0.00	507.8	50663	0.0	193128
302	7050.000	25.00	16.37	0.00	409.1	51072	0.0	193128
303	7075.000	25.00	10.90	0.00	272.6	51344	0.0	193128
304	7100.000	25.00	0.03	2.78	0.8	51345	69.5	193197
305	7125.000	25.00	0.00	15.42	0.0	51345	385.5	193583
306	7150.000	25.00	0.00	19.44	0.0	51345	485.9	194069
307	7175.000	25.00	0.00	21.82	0.0	51345	545.6	194614
308	7200.000	25.00	29.66	0.00	741.4	52087	0.0	194614
309	7225.000	25.00	0.53	0.81	13.3	52100	20.2	194634
310	7250.000	25.00	0.01	3.00	0.2	52100	75.0	194709
311	7275.000	25.00	0.05	2.78	1.3	52101	69.5	194779
312	7300.000	25.00	1.06	1.82	26.4	52128	45.6	194825

313	7325.000	25.00	4.73	0.40	118.3	52246	10.0	194834
314	7350.000	25.00	2.00	2.10	49.9	52296	52.4	194887
315	7375.000	25.00	0.00	4.25	0.0	52296	106.3	194993
316	7400.000	25.00	0.00	3.48	0.0	52296	87.0	195080
317	7425.000	25.00	0.00	3.88	0.0	52296	97.0	195177
318	7450.000	25.00	0.70	1.62	17.5	52313	40.6	195218
319	7475.000	25.00	12.37	1.76	309.2	52623	44.1	195262
320	7500.000	23.30	29.65	0.00	690.8	53313	0.0	195262
321	7521.604	12.50	22.36	0.00	279.5	53593	0.0	195262
322	7525.000	14.20	20.73	0.00	294.5	53887	0.0	195262
323	7550.000	25.00	6.95	0.00	173.9	54061	0.0	195262
324	7575.000	25.00	5.96	0.00	149.2	54211	0.0	195262
325	7600.000	25.00	4.75	0.00	118.8	54329	0.0	195262
326	7625.000	16.47	3.49	0.00	57.5	54387	0.0	195262
327	7632.948	12.50	3.17	0.00	39.6	54426	0.0	195262
328	7650.000	21.03	2.59	0.00	54.4	54481	0.0	195262
329	7675.000	25.00	14.04	0.00	351.0	54832	0.0	195262
330	7700.000	25.00	20.00	0.00	500.0	55332	0.0	195262
331	7725.000	25.00	5.50	0.00	137.5	55469	0.0	195262
332	7750.000	25.00	7.98	0.00	199.4	55669	0.0	195262
333	7775.000	25.00	2.32	0.68	58.0	55727	17.1	195279
334	7800.000	25.00	0.60	2.13	15.1	55742	53.2	195332
335	7825.000	25.00	2.26	0.00	56.5	55798	0.1	195332
336	7850.000	25.00	5.22	0.05	130.6	55929	1.3	195334
337	7875.000	25.00	5.61	0.60	140.4	56069	15.0	195348
338	7900.000	25.00	4.86	0.56	121.5	56191	13.9	195362
339	7925.000	25.00	0.00	7.94	0.0	56191	198.6	195561
340	7950.000	25.00	0.00	14.18	0.0	56191	354.6	195916
341	7975.000	25.00	0.00	22.57	0.0	56191	564.2	196480
342	8000.000	25.00	0.00	26.85	0.0	56191	671.3	197151
343	8025.000	25.00	0.06	14.45	1.4	56192	361.2	197512
344	8050.000	25.00	11.50	0.00	287.6	56480	0.0	197512
345	8075.000	25.00	5.88	0.00	147.1	56627	0.0	197512
346	8100.000	25.00	0.00	7.05	0.0	56627	176.3	197689
347	8125.000	25.00	0.68	10.81	17.1	56644	270.4	197959
348	8150.000	25.00	49.51	0.00	1237.9	57882	0.0	197959
349	8175.000	25.00	47.93	0.00	1198.2	59080	0.0	197959
350	8200.000	25.00	4.68	0.00	117.1	59197	0.0	197959
351	8225.000	25.00	4.74	0.00	118.4	59315	0.0	197959
352	8250.000	25.00	6.96	0.00	173.9	59489	0.0	197959
353	8275.000	25.00	6.25	0.00	156.3	59646	0.0	197959
354	8300.000	25.00	4.81	0.00	120.2	59766	0.0	197959
355	8325.000	25.00	0.81	1.10	20.3	59786	27.4	197986
356	8350.000	25.00	1.25	5.49	31.3	59817	137.3	198124
357	8375.000	25.00	0.63	7.97	15.8	59833	199.1	198323
358	8400.000	25.00	6.40	10.01	160.1	59993	250.3	198573
359	8425.000	17.44	12.64	4.23	220.3	60214	73.7	198647
360	8434.871	12.50	8.49	2.03	106.0	60320	25.4	198672
361	8450.000	20.06	5.95	1.04	119.4	60439	20.9	198693
362	8475.000	25.00	1.35	2.46	33.8	60473	61.4	198755
363	8500.000	25.00	13.22	6.79	329.7	60803	170.4	198925
364	8525.000	25.00	23.91	11.34	595.3	61398	284.4	199209
365	8550.000	25.00	8.50	15.66	211.4	61609	392.6	199602

366	8575.000	25.00	35.83	0.00	895.2	62505	0.0	199602
367	8600.000	25.00	30.28	0.00	756.2	63261	0.0	199602
368	8625.000	13.20	4.92	4.67	65.3	63326	61.5	199663
369	8626.399	12.50	5.28	4.74	66.0	63392	59.2	199723
370	8650.000	24.30	2.38	1.38	58.0	63450	33.6	199756
371	8675.000	25.00	6.24	0.00	156.0	63606	0.0	199756
372	8700.000	25.00	0.00	2.21	0.0	63606	55.2	199811
373	8725.000	25.00	4.08	1.62	102.1	63708	40.4	199852
374	8750.000	25.00	5.09	0.00	127.2	63835	0.0	199852
375	8775.000	25.00	9.94	0.73	248.5	64084	18.2	199870
376	8800.000	25.00	0.00	7.51	0.0	64084	187.7	200058
377	8825.000	25.00	35.30	0.00	882.5	64966	0.0	200058
378	8850.000	25.00	25.79	0.00	644.7	65611	0.0	200058
379	8875.000	25.00	5.44	0.00	136.0	65747	0.0	200058
380	8900.000	25.00	0.05	6.87	1.3	65748	171.8	200230
381	8925.000	25.00	20.91	0.00	522.8	66271	0.0	200230
382	8950.000	25.00	10.22	0.27	255.5	66527	6.9	200236
383	8975.000	25.00	0.00	7.05	0.0	66527	176.3	200413
384	9000.000	25.00	4.68	0.94	116.9	66644	23.4	200436
385	9025.000	25.00	4.95	6.18	123.9	66767	154.6	200591
386	9050.000	25.00	0.00	13.25	0.0	66767	331.4	200922
387	9075.000	25.00	0.08	5.06	2.1	66769	126.4	201049
388	9100.000	25.00	2.06	0.08	51.6	66821	2.1	201051
389	9125.000	25.00	2.16	0.21	53.9	66875	5.3	201056
390	9150.000	25.00	10.10	0.84	252.6	67128	21.0	201077
391	9175.000	25.00	14.66	0.05	366.4	67494	1.2	201078
392	9200.000	25.00	7.08	0.00	177.0	67671	0.0	201078
393	9225.000	25.00	9.77	0.00	244.2	67915	0.0	201078
394	9250.000	25.00	13.01	0.00	325.3	68240	0.0	201078
395	9275.000	25.00	0.42	2.57	10.5	68251	64.2	201142
396	9300.000	25.00	0.07	1.96	1.8	68253	49.0	201191
397	9325.000	25.00	14.84	0.00	371.1	68624	0.0	201191
398	9350.000	25.00	15.67	0.00	391.9	69016	0.0	201191
399	9375.000	25.00	3.11	0.00	77.8	69093	0.0	201191
400	9400.000	25.00	4.21	0.40	105.2	69199	10.0	201201
401	9425.000	25.00	2.47	0.00	61.8	69260	0.0	201201
402	9450.000	20.72	0.59	1.24	12.3	69273	25.8	201227
403	9466.447	12.50	23.46	0.00	293.2	69566	0.0	201227
404	9475.000	16.78	17.50	0.00	293.5	69859	0.0	201227
405	9500.000	25.00	1.57	2.37	39.2	69899	59.5	201287
406	9525.000	25.00	5.73	4.55	142.9	70042	114.1	201401
407	9550.000	25.00	2.99	9.88	74.5	70116	247.5	201648
408	9575.000	25.00	6.60	0.00	165.2	70281	0.0	201648
409	9600.000	25.00	2.33	5.64	58.4	70340	140.7	201789
410	9625.000	25.00	0.01	6.69	0.4	70340	167.1	201956
411	9650.000	18.52	0.99	0.81	18.3	70358	15.0	201971
412	9662.033	12.50	0.87	1.20	10.9	70369	15.0	201986
413	9675.000	18.98	0.00	2.85	0.0	70369	54.2	202040
414	9700.000	25.00	0.06	4.63	1.4	70371	115.9	202156
415	9725.000	25.00	0.00	7.72	0.0	70371	193.0	202349
416	9750.000	25.00	0.00	6.55	0.0	70371	163.8	202513
417	9775.000	25.00	0.00	7.11	0.0	70371	177.7	202691
418	9800.000	25.00	0.77	0.71	19.2	70390	17.9	202708

419	9825.000	25.00	4.29	1.35	107.2	70497	33.8	202742
420	9850.000	25.00	9.10	0.00	227.6	70725	0.0	202742
421	9875.000	25.00	27.51	0.00	687.9	71413	0.0	202742
422	9900.000	25.00	33.92	0.00	848.1	72261	0.0	202742
423	9925.000	25.00	62.28	0.00	1557.0	73818	0.0	202742
424	9950.000	25.00	62.30	0.00	1557.6	75375	0.0	202742
425	9975.000	25.00	33.14	0.00	828.6	76204	0.0	202742
426	10000.000	25.00	19.63	0.00	490.7	76695	0.0	202742
427	10025.000	25.00	10.78	0.00	269.5	76964	0.0	202742
428	10050.000	25.00	9.84	0.00	246.1	77210	0.0	202742
429	10075.000	25.00	7.74	0.00	193.6	77404	0.0	202742
430	10100.000	25.00	5.45	0.00	136.2	77540	0.0	202742
431	10125.000	25.00	3.12	0.00	78.0	77618	0.0	202742
432	10150.000	25.00	0.18	1.47	4.5	77622	36.7	202779
433	10175.000	25.00	0.00	3.79	0.0	77622	94.7	202874
434	10200.000	25.00	2.89	0.00	72.3	77695	0.0	202874
435	10225.000	25.00	6.52	0.00	163.1	77858	0.0	202874
436	10250.000	25.00	5.32	0.00	132.9	77991	0.0	202874
437	10275.000	25.00	4.82	0.00	120.5	78111	0.0	202874
438	10300.000	25.00	7.39	0.00	184.7	78296	0.0	202874
439	10325.000	25.00	10.97	0.00	274.3	78570	0.0	202874
440	10350.000	25.00	11.35	0.00	283.9	78854	0.0	202874
441	10375.000	25.00	10.98	0.00	274.5	79129	0.0	202874
442	10400.000	25.00	7.05	0.00	176.2	79305	0.0	202874
443	10425.000	25.00	4.44	0.00	110.9	79416	0.0	202874
444	10450.000	25.00	0.42	1.69	10.6	79426	42.1	202916
445	10475.000	25.00	0.00	7.66	0.0	79426	191.6	203107
446	10500.000	25.00	0.00	14.92	0.0	79426	373.0	203480
447	10525.000	25.00	0.00	21.48	0.0	79426	537.1	204017
448	10550.000	25.00	0.00	20.65	0.0	79426	516.3	204534
449	10575.000	25.00	0.00	9.10	0.0	79426	227.6	204761
450	10600.000	14.57	1.17	1.35	17.1	79443	19.7	204781
451	10604.136	12.50	1.55	0.44	19.3	79463	5.6	204787
452	10625.000	22.93	11.31	0.00	259.2	79722	0.0	204787
453	10650.000	25.00	42.58	0.00	1064.4	80786	0.0	204787
454	10675.000	25.00	42.65	0.00	1065.5	81852	0.0	204787
455	10700.000	25.00	9.04	0.00	226.2	82078	0.0	204787
456	10725.000	25.00	1.03	3.39	25.7	82104	85.0	204872
457	10750.000	25.00	2.82	1.75	70.3	82174	43.9	204915
458	10775.000	25.00	0.70	4.47	17.5	82192	111.9	205027
459	10800.000	25.00	8.28	0.00	206.7	82398	0.0	205027
460	10825.000	25.00	21.08	0.00	526.4	82925	0.0	205027
461	10850.000	14.06	26.45	0.00	371.7	83296	0.0	205027
462	10853.119	12.50	27.13	0.00	339.1	83635	0.0	205027
463	10875.000	23.44	27.91	0.00	654.2	84290	0.0	205027
464	10900.000	25.00	26.68	0.00	667.0	84957	0.0	205027
465	10925.000	25.00	23.25	0.00	581.2	85538	0.0	205027
466	10950.000	25.00	17.57	0.00	439.2	85977	0.0	205027
467	10975.000	25.00	12.00	0.00	300.0	86277	0.0	205027
468	11000.000	25.00	8.11	0.00	202.7	86480	0.0	205027
469	11025.000	25.00	5.67	0.00	141.6	86621	0.0	205027
470	11050.000	25.00	5.46	0.00	136.4	86758	0.0	205027
471	11075.000	25.00	4.95	0.00	123.9	86882	0.0	205027

472	11100.000	25.00	5.58	0.00	139.5	87021	0.0	205027
473	11125.000	25.00	6.93	0.00	173.2	87194	0.0	205027
474	11150.000	25.00	9.02	0.00	225.4	87420	0.0	205027
475	11175.000	25.00	12.04	0.00	301.1	87721	0.0	205027
476	11200.000	25.00	17.74	0.00	443.5	88164	0.0	205027
477	11225.000	25.00	9.98	0.00	249.4	88414	0.0	205027
478	11250.000	25.00	5.02	0.00	125.4	88539	0.0	205027
479	11275.000	25.00	4.86	0.00	121.4	88660	0.0	205027
480	11300.000	25.00	3.22	0.27	80.5	88741	6.8	205034
481	11325.000	25.00	0.01	3.54	0.3	88741	88.6	205123
482	11350.000	25.00	0.00	7.60	0.0	88741	190.1	205313
483	11375.000	25.00	0.00	12.16	0.0	88741	304.0	205617
484	11400.000	25.00	0.00	20.75	0.0	88741	518.7	206136
485	11425.000	25.00	0.00	21.96	0.0	88741	548.9	206684
486	11450.000	25.00	0.00	19.25	0.0	88741	481.3	207166
487	11475.000	25.00	0.00	13.27	0.0	88741	331.7	207497
488	11500.000	25.00	0.11	4.83	2.6	88744	120.7	207618
489	11525.000	25.00	3.98	0.00	99.5	88843	0.0	207618
490	11550.000	25.00	15.82	0.00	395.5	89239	0.0	207618
491	11575.000	13.50	23.47	0.00	316.9	89556	0.0	207618
492	11577.003	12.50	23.66	0.00	295.5	89851	0.0	207618
493	11600.000	24.00	26.44	0.00	633.9	90485	0.0	207618
494	11625.000	25.00	30.32	0.00	756.9	91242	0.0	207618
495	11650.000	25.00	21.96	0.00	548.6	91791	0.0	207618
496	11675.000	25.00	15.83	0.00	395.5	92186	0.0	207618
497	11700.000	25.00	12.63	0.00	315.7	92502	0.0	207618
498	11725.000	25.00	17.38	0.00	434.0	92936	0.0	207618
499	11750.000	25.00	35.72	0.00	895.9	93832	0.0	207618
500	11775.000	25.00	45.16	0.00	1131.3	94963	0.0	207618
501	11800.000	22.72	19.26	0.00	437.9	95401	0.0	207618
502	11820.431	12.50	0.01	3.40	0.1	95401	42.5	207661
503	11825.000	14.78	0.52	3.77	7.7	95409	55.7	207716
504	11850.000	25.00	19.47	2.82	486.7	95896	70.5	207787
505	11875.000	25.00	50.89	0.00	1272.3	97168	0.0	207787
506	11900.000	25.00	15.35	0.00	383.9	97552	0.0	207787
507	11925.000	25.00	31.50	0.00	787.5	98339	0.0	207787
508	11950.000	25.00	21.77	0.00	544.3	98884	0.0	207787
509	11975.000	25.00	0.75	0.93	18.7	98902	23.3	207810
510	12000.000	25.00	0.00	14.67	0.0	98902	366.8	208177
511	12025.000	25.00	0.00	17.12	0.0	98902	428.1	208605
512	12050.000	25.00	0.00	22.08	0.0	98902	552.0	209157
513	12075.000	25.00	0.00	20.05	0.0	98902	501.2	209658
514	12100.000	25.00	0.00	15.23	0.0	98902	380.7	210039
515	12125.000	25.00	0.00	11.78	0.0	98902	294.5	210333
516	12150.000	25.00	17.24	0.67	431.0	99333	16.9	210350
517	12175.000	25.00	2.86	1.96	71.5	99405	49.0	210399
518	12200.000	25.00	0.00	12.42	0.0	99405	310.4	210710
519	12225.000	25.00	0.00	19.11	0.0	99405	477.7	211187
520	12250.000	25.00	0.00	20.60	0.0	99405	514.9	211702
521	12275.000	25.00	0.00	21.96	0.0	99405	549.0	212251
522	12300.000	23.44	0.00	13.81	0.0	99405	323.6	212575
523	12321.878	12.50	0.04	4.07	0.5	99405	50.8	212626
524	12325.000	14.06	0.13	2.80	1.9	99407	39.3	212665

525	12350.000	25.00	6.73	0.00	168.3	99575	0.0	212665
526	12375.000	25.00	14.14	0.00	353.4	99929	0.0	212665
527	12400.000	25.00	14.04	0.00	350.9	100280	0.0	212665
528	12425.000	25.00	8.39	0.00	209.6	100489	0.0	212665
529	12450.000	25.00	2.30	0.00	57.3	100547	0.0	212665
530	12475.000	25.00	1.13	0.00	28.2	100575	0.1	212665
531	12500.000	17.91	0.56	0.94	10.1	100585	16.8	212682
532	12510.824	12.50	1.08	1.54	13.5	100598	19.2	212701
533	12525.000	19.59	1.59	2.36	31.1	100629	46.2	212747
534	12550.000	25.00	3.64	2.27	91.0	100720	56.9	212804
535	12575.000	25.00	2.23	0.26	55.7	100776	6.6	212811
536	12600.000	25.00	0.00	5.33	0.0	100776	133.2	212944
537	12625.000	25.00	0.00	6.61	0.0	100776	165.2	213109
538	12650.000	25.00	0.00	3.04	0.0	100776	76.0	213185
539	12675.000	25.00	0.63	0.31	15.8	100792	7.7	213193
540	12700.000	25.00	2.59	0.00	64.9	100857	0.0	213193
541	12725.000	25.00	2.41	0.00	60.2	100917	0.0	213193
542	12750.000	25.00	1.36	0.00	34.0	100951	0.0	213193
543	12775.000	25.00	0.20	0.65	5.1	100956	16.2	213209
544	12800.000	25.00	0.00	3.49	0.0	100956	87.1	213296
545	12825.000	25.00	8.44	2.61	211.0	101167	65.2	213361
546	12850.000	25.00	33.96	0.00	848.9	102016	0.0	213361
547	12875.000	25.00	10.36	0.00	259.0	102275	0.0	213361
548	12900.000	25.00	5.29	0.10	132.2	102407	2.4	213364
549	12925.000	25.00	24.83	0.00	620.7	103028	0.0	213364
550	12950.000	25.00	20.41	0.00	510.1	103538	0.0	213364
551	12975.000	25.00	27.54	0.00	688.6	104227	0.0	213364
552	13000.000	25.00	43.12	0.00	1078.0	105305	0.0	213364
553	13025.000	25.00	42.21	0.00	1055.3	106360	0.0	213364
554	13050.000	25.00	29.27	0.00	731.8	107092	0.0	213364
555	13075.000	25.00	16.44	0.00	410.9	107503	0.0	213364
556	13100.000	25.00	6.29	0.00	157.3	107660	0.0	213364
557	13125.000	25.00	0.15	4.95	3.7	107664	123.7	213487
558	13150.000	25.00	0.00	8.09	0.0	107664	202.2	213690
559	13175.000	25.00	0.00	7.29	0.0	107664	182.3	213872
560	13200.000	25.00	0.00	5.35	0.0	107664	133.8	214006
561	13225.000	25.00	0.00	4.67	0.0	107664	116.8	214123
562	13250.000	25.00	0.00	3.89	0.0	107664	97.1	214220
563	13275.000	25.00	4.30	0.86	107.5	107771	21.5	214241
564	13300.000	23.07	15.52	0.00	358.1	108129	0.0	214241
565	13321.137	12.50	15.52	0.12	193.9	108323	1.5	214243
566	13325.000	14.43	14.82	0.19	213.1	108536	2.7	214245
567	13350.000	25.00	0.61	2.18	15.1	108552	54.6	214300
568	13375.000	25.00	0.06	2.42	1.5	108553	60.5	214360
569	13400.000	25.00	1.36	0.29	33.9	108587	7.3	214368
570	13425.000	25.00	1.16	0.41	28.9	108616	10.3	214378
571	13450.000	25.00	0.86	0.79	21.5	108637	19.7	214398
572	13475.000	25.00	1.43	0.40	35.6	108673	10.0	214408
573	13500.000	25.00	0.80	1.38	19.9	108693	34.5	214442
574	13525.000	25.00	0.30	3.16	7.5	108700	79.2	214521
575	13550.000	25.00	0.08	4.04	1.9	108702	101.2	214622
576	13575.000	25.00	2.01	1.54	50.6	108753	38.4	214661
577	13600.000	25.00	0.37	1.04	9.3	108762	26.0	214687

578	13625.000	25.00	0.00	3.41	0.0	108762	85.1	214772
579	13650.000	25.00	0.02	1.62	0.4	108762	40.4	214812
580	13675.000	25.00	0.21	0.61	5.2	108768	15.2	214828
581	13700.000	25.00	0.23	1.34	5.9	108774	33.4	214861
582	13725.000	25.00	0.06	2.22	1.5	108775	55.4	214916
583	13750.000	25.00	0.00	3.01	0.0	108775	75.3	214992
584	13775.000	25.00	0.00	3.67	0.0	108775	91.7	215083
585	13800.000	25.00	0.01	2.21	0.2	108775	55.2	215139
586	13825.000	25.00	0.56	0.34	14.0	108789	8.5	215147
587	13850.000	17.57	1.50	0.00	26.3	108816	0.0	215147
588	13860.136	12.50	1.71	0.00	21.4	108837	0.0	215147
589	13875.000	19.93	1.95	0.00	38.8	108876	0.0	215147
590	13900.000	25.00	2.96	0.00	74.1	108950	0.0	215147
591	13925.000	25.00	3.34	0.00	83.4	109033	0.0	215147
592	13950.000	25.00	2.11	0.00	52.7	109086	0.0	215147
593	13975.000	25.00	0.24	0.48	6.0	109092	11.9	215159
594	14000.000	25.00	0.14	1.68	3.6	109096	41.9	215201
595	14025.000	25.00	2.23	0.00	55.7	109151	0.0	215201
596	14050.000	25.00	2.53	0.00	63.3	109215	0.0	215201
597	14075.000	25.00	1.02	1.04	25.5	109240	25.9	215227
598	14100.000	19.02	0.44	2.39	8.4	109248	45.6	215272
599	14113.049	12.50	0.22	3.44	2.7	109251	43.0	215315
600	14125.000	18.48	0.02	5.03	0.3	109252	93.0	215408
601	14150.000	25.00	0.00	8.09	0.0	109252	202.4	215611
602	14175.000	25.00	0.00	10.01	0.0	109252	250.3	215861
603	14200.000	25.00	0.00	11.69	0.0	109252	292.4	216153
604	14225.000	25.00	0.00	11.60	0.0	109252	290.6	216444
605	14250.000	22.25	6.32	8.25	139.9	109391	184.5	216629
606	14269.494	12.50	6.09	8.50	75.7	109467	106.8	216735
607	14275.000	15.25	11.39	6.28	172.8	109640	96.4	216832
608	14300.000	25.00	40.44	0.00	1011.3	110651	0.0	216832
609	14325.000	25.00	13.95	0.00	350.2	111001	0.0	216832
610	14350.000	25.00	2.16	8.27	54.3	111056	206.4	217038
611	14375.000	25.00	0.18	9.34	4.4	111060	233.3	217272
612	14400.000	25.00	0.00	14.41	0.0	111060	360.7	217632
613	14425.000	25.00	0.00	15.19	0.0	111060	380.1	218012
614	14450.000	25.00	0.00	13.10	0.0	111060	327.6	218340
615	14475.000	25.00	0.00	11.51	0.0	111060	288.3	218628
616	14500.000	25.00	1.45	5.50	36.0	111096	138.3	218766
617	14525.000	25.00	3.88	3.26	96.5	111193	81.9	218848
618	14550.000	25.00	5.65	2.15	140.6	111333	54.2	218903
619	14575.000	25.00	5.80	1.05	144.3	111478	26.6	218929
620	14600.000	25.00	5.20	1.59	129.3	111607	39.9	218969
621	14625.000	25.00	5.12	0.73	127.4	111734	18.3	218987
622	14650.000	25.00	5.42	0.60	134.9	111869	15.1	219002
623	14675.000	25.00	1.75	3.27	43.3	111913	82.3	219085
624	14700.000	25.00	0.01	8.45	0.3	111913	211.9	219297
625	14725.000	25.00	0.00	12.61	0.0	111913	316.0	219613
626	14750.000	25.00	2.01	10.73	50.0	111963	269.3	219882
627	14775.000	25.00	2.35	8.25	58.4	112021	207.0	220089
628	14800.000	25.00	0.95	3.99	23.6	112045	100.1	220189
629	14825.000	25.00	2.65	2.34	65.9	112111	58.8	220248
630	14850.000	25.00	5.93	0.98	147.6	112259	24.6	220272

631	14875.000	25.00	9.05	0.37	225.4	112484	9.3	220282
632	14900.000	25.00	8.22	1.98	204.6	112689	49.7	220331
633	14925.000	25.00	5.63	4.70	139.8	112828	118.1	220450
634	14950.000	25.00	2.12	7.96	52.7	112881	200.0	220650
635	14975.000	25.00	0.00	14.02	0.0	112881	351.4	221001
636	15000.000	25.00	0.00	21.75	0.0	112881	544.6	221546
637	15025.000	25.00	0.00	19.99	0.0	112881	500.5	222046
638	15050.000	25.00	0.00	17.20	0.0	112881	431.0	222477
639	15075.000	25.00	0.00	21.75	0.0	112881	544.8	223022
640	15100.000	25.00	0.00	22.35	0.0	112881	559.5	223581
641	15125.000	25.00	0.00	15.73	0.0	112881	393.9	223975
642	15150.000	25.00	0.00	13.67	0.0	112881	342.5	224318
643	15175.000	25.00	0.00	13.25	0.0	112881	332.0	224650
644	15200.000	25.00	0.00	12.01	0.0	112881	300.8	224950
645	15225.000	25.00	0.00	9.50	0.0	112881	237.9	225188
646	15250.000	25.00	0.00	10.80	0.0	112881	270.6	225459
647	15275.000	25.00	0.00	10.58	0.0	112881	265.2	225724
648	15300.000	25.00	0.11	8.80	2.7	112884	220.9	225945
649	15325.000	25.00	5.28	2.14	131.4	113015	54.0	225999
650	15350.000	25.00	8.87	0.14	221.0	113236	3.4	226002
651	15375.000	25.00	7.74	0.76	192.5	113429	19.1	226022
652	15400.000	25.00	0.80	3.23	19.9	113448	81.1	226103
653	15425.000	25.00	0.15	5.27	3.7	113452	132.2	226235
654	15450.000	25.00	0.00	7.47	0.0	113452	187.2	226422
655	15475.000	25.00	0.00	19.85	0.0	113452	496.3	226918
656	15500.000	25.00	0.59	2.35	14.9	113467	58.5	226977
657	15525.000	25.00	2.40	1.37	60.3	113527	34.2	227011
658	15550.000	17.41	0.00	10.04	0.0	113527	175.2	227186
659	15559.825	12.50	0.04	7.69	0.4	113528	96.5	227283
660	15575.000	20.09	0.88	3.95	17.5	113545	79.7	227362
661	15600.000	25.00	3.85	0.87	96.0	113641	21.8	227384
662	15625.000	25.00	0.54	1.33	13.5	113655	33.3	227417
663	15650.000	25.00	0.00	6.97	0.0	113655	174.3	227592
664	15675.000	25.00	0.19	0.24	4.7	113660	6.0	227598
665	15700.000	20.64	1.46	0.00	30.2	113690	0.0	227598
666	15716.271	12.50	0.46	0.00	5.7	113696	0.0	227598
667	15725.000	16.86	0.19	0.36	3.3	113699	6.0	227604
668	15750.000	25.00	0.00	2.59	0.0	113699	64.8	227668
669	15775.000	25.00	0.00	5.52	0.0	113699	137.9	227806
670	15800.000	25.00	0.00	3.92	0.0	113699	98.1	227904
671	15825.000	25.00	2.92	0.00	72.9	113772	0.0	227904
672	15850.000	25.00	15.14	0.00	378.4	114150	0.0	227904
673	15875.000	25.00	10.48	0.00	261.9	114412	0.0	227904
674	15900.000	25.00	1.69	1.25	42.2	114454	31.2	227936
675	15925.000	25.00	0.00	8.69	0.0	114454	217.3	228153
676	15950.000	25.00	0.00	5.41	0.0	114454	135.4	228288
677	15975.000	25.00	3.79	0.34	94.8	114549	8.6	228297
678	16000.000	25.00	5.75	0.00	143.8	114693	0.0	228297
679	16025.000	25.00	1.67	0.03	41.8	114735	0.7	228298
680	16050.000	25.00	3.69	0.00	92.2	114827	0.0	228298
681	16075.000	25.00	4.94	0.00	123.6	114950	0.0	228298
682	16100.000	25.00	5.41	0.00	135.2	115086	0.0	228298
683	16125.000	25.00	4.18	0.00	104.6	115190	0.0	228298

684	16150.000	25.00	0.65	0.65	16.2	115206	16.3	228314
685	16175.000	25.00	0.02	2.02	0.5	115207	50.6	228365
686	16200.000	25.00	0.42	0.67	10.5	115217	16.7	228381
687	16225.000	25.00	2.02	0.00	50.6	115268	0.0	228381
688	16250.000	24.19	3.08	0.00	74.6	115343	0.0	228381
689	16273.388	12.50	4.03	0.00	50.4	115393	0.0	228381
690	16275.000	13.31	4.03	0.00	53.7	115447	0.0	228381
691	16300.000	25.00	3.54	0.00	88.4	115535	0.0	228381
692	16325.000	25.00	3.62	0.00	90.3	115625	0.0	228381
693	16350.000	25.00	6.07	0.00	151.2	115777	0.0	228381
694	16375.000	17.47	6.29	0.39	109.3	115886	6.8	228388
695	16384.944	12.50	5.84	0.79	72.6	115959	10.0	228398
696	16400.000	20.03	4.91	1.02	97.7	116056	20.6	228419
697	16425.000	25.00	4.62	1.05	114.7	116171	26.5	228445
698	16450.000	25.00	4.65	0.78	115.4	116286	19.6	228465
699	16475.000	25.00	6.35	0.01	158.1	116444	0.2	228465
700	16500.000	25.00	5.74	0.00	142.9	116587	0.0	228465
701	16525.000	19.71	1.92	0.00	37.7	116625	0.0	228465
702	16539.418	12.50	0.95	0.08	11.9	116637	1.0	228466
703	16550.000	17.79	0.28	0.76	5.1	116642	13.6	228480
704	16575.000	25.00	0.00	3.08	0.0	116642	77.1	228557
705	16600.000	25.00	0.00	1.64	0.0	116642	41.0	228598
706	16625.000	25.00	0.95	0.08	23.9	116666	2.0	228600
707	16650.000	12.99	6.33	0.00	82.2	116748	0.0	228600
708	16650.974	12.50	6.61	0.00	82.6	116831	0.0	228600
709	16675.000	24.51	14.40	0.00	353.0	117184	0.0	228600
710	16700.000	25.00	5.97	0.00	149.3	117333	0.0	228600
711	16725.000	25.00	0.00	11.71	0.0	117333	292.9	228893
712	16750.000	25.00	0.00	14.47	0.0	117333	361.8	229254
713	16775.000	25.00	0.00	12.67	0.0	117333	316.7	229571
714	16800.000	25.00	0.00	13.07	0.0	117333	326.7	229898
715	16825.000	25.00	0.00	16.08	0.0	117333	401.9	230300
716	16850.000	25.00	0.00	16.62	0.0	117333	415.5	230715
717	16875.000	25.00	0.00	17.33	0.0	117333	433.2	231148
718	16900.000	25.00	0.00	16.77	0.0	117333	419.4	231568
719	16925.000	25.00	0.03	4.61	0.8	117334	115.2	231683
720	16950.000	25.00	0.00	13.46	0.0	117334	336.6	232019
721	16975.000	25.00	0.00	15.46	0.0	117334	386.6	232406
722	17000.000	25.51	5.72	0.33	145.9	117480	8.4	232414
723	17026.013	13.01	16.06	0.00	208.8	117689	0.0	232414
		17026			**117689**		**232414**	