

GSJ: Volume 7, Issue 10, October 2019, Online: ISSN 2320-9186 www.globalscientificjournal.com

# STUDY OF ROAD SAFETY ASSESMENT IN THE CONTEXT OF PRESENT CONDITION OF JINAH PARK TO GORA QABRISTAN IN PESHAWAR CITY

I.Shahzad khan<sup>1</sup>, Imtiaz<sup>2</sup>, K. Salman<sup>1</sup>, I. Obaid khan<sup>2</sup>, S. M. Ali<sup>1</sup>, B. Khan<sup>1</sup>, C. A. Mehmood<sup>1</sup>, U. Farid<sup>1</sup>

1Civil Engineering Department, Iqra National University Peshawer Pakistan.

2Civil Engineering Department, University of Engineering and Technology, Peshawer Pakistan.

Sshahzadkhan88@gmail.com, khalid4134@gmail.com, iqrarafridi2000@gmail.com, {hallianali, bilalkhan, chaudhry, umarfarid}@ciit.net.pk

Abstract— the present situation of GT road Peshawar shows that no road safety assessment is performed before on the road during construction and design. That is why the road congestion and road accidents are at high rate. This paper presents a study on assessment of existing facilities on basis of which road safety infrastructure planning is established. Considering location, existing road network of GT road in Peshawar, this assessment study was carried out with sample road section (Jinnah Park to Gura Qabristan). The indicators included completion rate of traffic markings and signs, installment rationality of traffic signs and traffic signals, pedestrian crossing facilities, road side conditions and,. Other elements such as guardrails, sight-guiding facilities were also considered. Road safety level was decided on the general score obtained from scoring systems. Such as completeness and rationality. When the final score of situation came out then according to that scoring specific countermeasures were discussed for diversified road sections so as to prevent crashes and improve local road safety

## Keywords: STUDY OF ROAD SAFETY ASSESMENT IN THE CONTEXT OF PRESENT CONDITION OF JINAH PARK TO GORA QABRISTAN IN PESHAWAR CITY

#### Introduction

## **OBJECTIVE OF STUDY**

The objective of this study was to complete a road safety assessment (RSA) leading to proposed safety enhancement for GT road from (Gura Qabristan to Jinnah park). The study area is about 4.2 Km. Due to the crash history of the corridor and earlier project proposal that have not been implemented due to community concerns, RSA team was chosen to conduct the RSA (Road Safety Assessment) to evaluate this safety issues through the corridor. Road safety assessments are a valuable tool for transportation agencies to evaluate road safety issues contributing to injuries and deaths and to identify opportunities for improvement. RSA are also an effective tool for proactively improving road way roadside safety. As such, The RSA Process may be employed on any type of facility and during any stage of the project development process, including existing facilities that are open to traffic. The FWHA defines an RSA as a 'formal safety performance evaluation of an existing or future road or intersection by an independent, multidisciplinary team." The primary focus of an RSA is safety while working within the context of the other aspects such as mobility, access, surrounding land use, and/or aesthetic. RSAs conducted by a team that is independent of the design and operations of the facility are able to address safety by means of a thorough review of roadway, traffic, environmental and human factors and conditions. By focusing on safety, RSA ensure that potentially hazardous roadway and road side elements don't "Fall through the cracks" RSAs typically follow an eight steps RSA process. Shown below



- The objective of this study is to examine the proposed section of G.T Road for geometric design, pavement and road side conditions.
- Any flaws or errors in terms of above parameters should be identified.

- ✓ Sections of the road should be looked at, in detail for fulfilling the road standards in terms of above parameters.
- ✓ Technical recommendations would be proposed to remove the flaws to make it safe passages for the movement of vehicles and people.

#### **STUDY PURPOSE**

The purpose of the RSA was to identify safety issues that may be contributing to the reported crashes along the corridor and to identify potential measures to mitigate these issues. Another goal of the RSA was to identify safety issues that have not yet resulted in crashes and suggest proactive improvements to correct or mitigate these issues.

#### PROJECT BACKGROUND

Within the limits of the study, GT road is a 4 lane road ,providing a connection through Hayatabad and Peshawar motor way.

This road serves a variety of road users and vehicles, including local commuters/residents, tourists, pedestrians, bicyclists, heavy commercial vehicles, and farm equipment. During the last few years, various interim improvements along the study corridor have been implemented that may have addressed some of the safety concerns that originally triggered a need for an extensive safety project

#### I. CHAPTER 2

# II. LITERATURE REVIEW

#### A. INTRODUCTION

The present situation of GT road Peshawar shows that no road safety assessment is performed before on the road during construction and design. That is why the road congestion and road accidents are at high rate. So anroad safety assessment is essential to overcome the transportation crisis in Peshawar city. This chapter will provide information about the history, results, features, performance, benefits, component and terms related to RSA system. The chapter is divided into the following sections:

- History of RSA
- Results of RSA worldwide
- SAFETY IMPROVEMENT COUNTERMEASURES

## **History of RSA**

This Road Safety Assessment (RSA) was initiated by the California Department of Transportation (Caltrans). The processes used during the workshop were a combination of the Federal Highway Administration (FHWA) RSA process and Caltrans' Value Analysis tools and techniques. Road Assessment Programs (RAP) are now active in over 70 countries worldwide covering Europe, Asia Pacific, North America, Latin America and the Caribbean, and Africa.

Modeled road traffic injury fatality rates (per 100 000
population), by WHO region and income group

WHO REGION	HIGH-INCOME	MIDDLE-INCOME	LOW-INCOME	TOTAL
AFRICAN REGION <sup>®</sup>	—	32.2	32.3	32.2
REGION OF THE AMERICAS <sup>4</sup>	13.4	17.3	—	15.8
SOUTH-EAST ASIA REGION <sup>®</sup>	—	16.7	16.5	16.6
EASTERN MEDITERRANEAN REGION	28.5	35.8	27.5	32.2
EUROPEAN REGION	7.9	19.3	12.2	13.4
WESTERN PACIFIC REGION	7.2	16.9	15.6	15.6
GLOBAL	10.3	19.5	21.5	18.8

O-day definition. 10 high-income countri

Figure 4. Trends in road traffic fatality rates in selected high-income countries



#### SAFETY IMPROVEMENT COUNTERMEASURES

# Road lane:

DIFF:A **lane** is a part of the <u>carriageway</u> within a <u>road</u> marked out for use by a single line of vehicles in such a way as to control and guide drivers for the purpose of reducing traffic conflicts. Most public roads (<u>highways</u>) have at least two lanes, one for traffic in each direction, separated by <u>lane</u> <u>markings</u>. Major highways often have two roadways separated by a <u>median</u>, each with multiple lanes.

# Lane width:

The U.S. <u>Interstate Highway System</u> uses a 12-foot (3.7 m) standard for lane width. 11-foot (3.4 m) lanes are found to be acceptable by the <u>Federal Highway Administration</u> for automobile traffic, but as lane width decreases (9-foot (2.7 m) lanes are found in some areas) traffic capacity decreases.<sup>[3]</sup> A full-width freeway lane typically has a capacity of 2,000 cars per hour.

In the United Kingdom, many lanes are <u>found in the</u> <u>countryside</u>, and most of these lanes are wide enough for one car at a time and often have a lay by for cars to pass. In general, European laws and road width vary per country, with the minimum widths of lanes being anywhere between 2.5 to 3.25 metres (8.2 to 10.7 ft)



# Lane Width: Flexibility in the AASHTO Guidelines

The AASHTO Green Book (2) recognizes the need for flexibility and provides that flexibility, citing how lane width can be tailored, to a degree, to fit the particular environment in which the roadway functions (e.g., lowvolume rural roads or residential areas versus higher volume rural or urban facilities). The formulation of these values demonstrates considerable flexibility. The AASHTO Green Book (2) recognizes the need for flexibility and provides that flexibility, citing how lane width can be tailored, to a degree, to fit the particular environment in which the roadway functions (e.g., low-volume rural roads or residential areas versus higher volume rural or urban facilities). The formulation of these values demonstrates considerable flexibility.

For lower speed, lower volume rural roads and highways with little or no truck traffic, lane widths as low as 9 ft (2.7 m) may be acceptable; lane widths substantially less than 12 ft (3.6 m) are considered adequate for a wide range of volume, speed, and other conditions.

For the reconstruction of rural two-lane highways, the AASHTO Green Book (2) notes that less than 12-ft or 3.6-m lane widths may be retained "where alignment and safety

record are satisfactory." In other words, widening a narrow existing highway is not mandated if its safety performance is acceptable. Flexibility is also evident for lower-class roads and streets, with recommended narrower lane widths consistent with lower design speeds on such roads.

The discussion of lane width in the AASHTO Green Book (2) for urban areas also reflects a high degree of flexibility. It is noted that lane widths "may vary from 10 to 12 ft (3.0 to 3.6 m) for arterials."

## III. SHOULDER WIDTH

DEF: Shoulders provide a number of important functions. Safety and efficient traffic operations can be adversely affected if any of the following functions are compromised:

## **EXPLANATION**

- Shoulders provide space for emergency storage of disabled vehicles (Figure 7). Particularly on high-speed, high-volume highways such as urban freeways, the ability to move a disabled vehicle off the travel lanes reduces the risk of rear-end crashes and can prevent a lane from being closed, which can cause severe congestion and safety problems on these facilities.
  - Shoulders provide space for enforcement activities (Figure 7). This is particularly important for the outside (right) shoulder because law enforcement personnel prefer to conduct enforcement activities in this location. Shoulder widths of approximately 8 feet or greater are normally required for this function.
- Shoulders provide an area for drivers to maneuver to avoid crashes (Figure 7). This is particularly important on high-speed, high-volume highways or at locations where there is limited stopping sight distance. Shoulder widths of approximately 8 feet or greater are normally required for this function.
- Shoulders improve bicycle accommodation (Figure 8). For most highways, cyclists are legally allowed to ride on the travel lanes. A paved or partially paved shoulder offers cyclists an alternative to ride with some separation from vehicular traffic. This type of shoulder can also reduce risky passing maneuvers by drivers.
- Shoulders increase safety by providing a stable, clear recovery area for drivers who have left the travel lane. If a driver inadvertently leaves the lane or is attempting to avoid a crash or an object in the lane ahead, a firm, stable shoulder greatly increases

the chance of safe recovery. However, areas with pavement edge drop-offs can be a significant safety risk. Edge drop-offs (Figure 9) occur where gravel or earth material is adjacent to the paved lane or shoulder. This material can settle or erode at the pavement edge, creating a drop-off that can make it difficult for a driver to safely recover after driving off the paved portion of the roadway. The drop-off can contribute to a loss of control as the driver tries to bring the vehicle back onto the roadway, especially if the driver does not reduce speed before attempting to recover.

- Shoulders improve stopping sight distance at horizontal curves by providing an offset to objects such as barrier and bridge piers (Figure 10).
- On highways with curb and enclosed drainage systems, shoulders store and carry water during storms, preventing water from spreading onto the travel lanes.
- On high-speed roadways, shoulders improve capacity by increasing driver comfort.

Shoulders on this urban freeway provide enough width for crash avoidance, storage of disabled vehicles, maintenance activities, and enforcement.

• Figure 7 is a photo of an urban freeway with three lanes in each direction and shoulders on both the outside and median-side that are 10 to 12 feet wide.

#### TABLE 7

for Minimum Shoulder Width

	Rural	Urban					
US (feet)	Metric (meters)	US (feet)	Metric (meters)				
4-12	1.2-3.6	4-12	1.2-3.6				
1–10	0.3-3.0	1–10	0.3-3.0				
2-8	0.6-2.4	2-8	0.6-2.4				
2-8	0.6-2.4	2-8	0.6-2.4				
2-8	0.6-2.4	-	-				
	US (feet) 4–12 1–10 2–8 2–8 2–8	Kural           US (feet)         Metric (meters)           4-12         1.2-3.6           1-10         0.3-3.0           2-8         0.6-2.4           2-8         0.6-2.4           2-8         0.6-2.4	Waral         VS (feet)         VS (feet)           US (feet)         Metric (meters)         US (feet)           4-12         1.2-3.6         4-12           1-10         0.3-3.0         1-10           2-8         0.6-2.4         2-8           2-8         0.6-2.4         2-8           2-8         0.6-2.4         2-8				

Source: A Policy on Geometric Design of Highways and Streets, AASHTO

#### Horizontal alignment

- It is the design of the road in the horizontal plane
- Consists of a series of straights (tangents), circular curves and transition curves
- Should provide safe travel at a uniform design speed.

## **Factors Affecting Alignment**

- Safety
- GradesDesign speed
- Cost of resumption of land
- Construction costs.

Operating speed is influenced by all other factors so it is the critical factor to consider.

#### **Alignment Considerations**

- Curvature
- Movement on a circular path
- Superelevalation
- Side friction
- Sight distance
- Curve geometry
- Curves with adverse cross-fall
- Short curves
- Small changes in alignment

#### Super elevation (e)

• Superelevation is slope across pavement surface and is fully developed in the circular curve

• e is +ve when road slopes towards centre of curve or -ve (adverse) if road slopes away from the centre of curve.



#### Superelevation (e)

When being applied to the road need to take into account

- Safety
- Comfort
- Appearance
- Design speed
- Tendency for slow vehicles to track towards centre
- Difference between inner and outer formation levels
- Stability of high laden vehicles
- · Length of road to introduce superelevation
- Provision for drainage

# Superelevation (e)

Maximum Superelevation



• Max range from flat to mountainous of 0.06 - 0.12 respectively but most authorities limit to 0.10

In urban areas limit max values to 0.04-0.05 Minimum Superelevation

• Should be elevated to at least the cross-fall on straights i.e 3% (0.03)

# Vertical Alignment

Specifies the elevations of points along a roadway.Elevations are determined by need to provide proper

drainage and driver safety.

• A primary concern of vertical alignment is to establish a transition between two roadway grades by means of a vertical curve.

Design Speed<sup>(</sup> (mph) Stopping<sup>(2</sup> Passing (ft)  $(\mathbf{ft})$ 20 125 800 25 150 250 30 200 1,100 35 250 1.300 40 300 1,500 1,650 45 360 50 430 1,800 55 500 1,950 60 580 2,100 65 660 2.300 2,500 70 750 75 2,600 840 2.700 80 930

Sight Distance Standards





**Primary Stopping Sight Distance Factors** 

- Perception-reaction time
- Driver eye height
- Object height
- Vehicle operating speed
- Pavement coefficient of friction
- Deceleration rates
- Roadway grade

#### **Current Design Perception- Reaction Time**

Human factors research defined perception-reaction times for (1):

- design 2.5 sec
- operations/control 1.0 sec

These perception reaction times were based on observed behavior for the 85th percentile driver; that is, 85% of drivers could react in that time or less. More recent research has shown these times to be conservative for design.

Wortman and Mathias (2) reported both the "surprise" and alerted 85<sup>th</sup> percentile perception reaction times. This was in an urban environment; the time was measured after the yellow indication until brake lights appeared.

Two types of Vertical Curves:

1. Crest Vertical Curves.

2. Sag Vertical Curves

# Sight distance

Def.:

Sight distance is the continuous length of highway ahead, visible to the highway user.

Explanation: Road geometry affects the sight distance available to the driver. Sight distance, in the context of road design, is defined as "the length of roadway ahead visible to the driver."[1] Sight distance is how far a road user (usually a vehicle driver) can see before the line of sight is blocked by a hill crest, or an obstacle on the inside of a horizontal curve or intersection. Insufficient sight distance can adversely affect the safety or operations of a roadway or intersection.

The sight distance needed for a given situation is the distance travelled during the two phases of a driving maneuver: perception-reaction time (PRT), and maneuver time (MT). Perception-reaction time is the time it takes for a road user to realize that a reaction is needed to a road condition, decided what maneuver is appropriate, and start the maneuver. Maneuver time is the time it takes to complete the maneuver. The distance driven during perception-reaction time and maneuver time is the sight distance needed.

During highway design and traffic safety investigations, highway engineers compare the available sight distance to how much sight distance is needed for the situation. Depending on the situation, one of three types of sight distances will be used: The Wortman et al. research found:

• alerted 85% perception-reaction time 0.9 sec

• "surprise" 85% perception-reaction time 1.3 sec

(1) AASHTO, "Policy on Geometric Design of Streets and Highways," Washington, DC,

1984, 1990, and 1994.

(2) Wortman, R.H., and J.S. Matthias, "Evaluation of Driver Behavior at Signalized

Intersections," Transportation Research Record 904, T.R.B, Washington, D.C., 1983.

#### 1) Stopping sight distance

Stopping sight distance is the distance traveled during perception-reaction time (while the vehicle driver perceives a situation requiring a stop, realizes that stopping is necessary, and applies the brake), and maneuver time (while the driver decelerates and comes to a stop). Actual stopping distances are also affected by road conditions, the mass of the car, the incline of the road, and numerous other factors. For design, a conservative distance is needed to allow a vehicle traveling at design speed to stop before reaching a stationary object in its path. Typically the design sight distance allows a below-average driver to stop in time to avoid a collision.



## 2) Decision sight distance

Decision sight distance is used when drivers must make decisions more complex than stop or don't stop. It is longer than stopping sight distance to allow for the distance traveled while making a more complex decision. The decision sight distance is "distance required for a driver to detect an unexpected or otherwise difficult-to-perceive information source or hazard in a roadway environment that may be visually cluttered, recognize the hazard or its threat potential, select an appropriate speed and path, and initiate and complete the required maneuver safely and efficiently Ideally, roads are designed for the decision sight distance, using 6 to 10 seconds for perception-reaction time and 4 to 5 seconds to perform the right maneuver.

#### **AASHTO Decision Sight Distance**

The decision sight distance as defined by the AASHTO Green Book is "the distance required for a driver to detect an unexpected or otherwise difficult-to-perceive information source or hazard in a roadway environment that may be visually cluttered, recognize the hazard or its threat potential, select an appropriate speed and path, and initiate and complete the required maneuver safely and efficiently." According to AASHTO, the decision sight distance requires about 6 to 10s to detect and understand the situation and 4 to 4.5s to perform the appropriate maneuver. The sight distance is typically measured from a 1070 mm (3.5 ft.) height of eye to 150 mm (6 in.) object; however, this should depend on the condition that requires the decision sight distance. A table showing the recommended decision sight distances for various maneuvers is given in

## Table.

DECISION SIGHT DISTANCE (Continued)

Table 4A. Decision Sight Distance (meters)						
Design Speed	Decisio	n Sight Distance :	for Avoidance M	laneuver, (meter	s)	
(km/h)	A	в	С	D	Ē	
50	75	160	145	160	200	
60	95	205	175	205	235	
70	125	250	200	240	275	
80	155	300	230	275	315	
90	185	360	275	320	360	
100	225	415	315	365	405	
110	265	455	335	390	435	
120	305	505	375	415	470	

#### Table 2. Design Coefficients of Friction for Stopping Sight Distance

					AASHTO	
					Coefficient of	*
Design Speed		Runni	ng Speed	Friction		
	30 kph	(20 mph)	32 kph	(20 mph)	0.40	
	50 kph	(30 mph)	45 kph	(28 mph)	0.35	
	65 kph	(40 mph)	58 kph	(36 mph)	0.32	
	80 kph	(50 mph)	71 kph	(44 mph)	0.30	1
	100 kph	(60 mph)	84 kph	(52 mph)	0.29	r
	115 kph	(70 mph)	93 kph	(58 mph)	0.28	
					I I	

\*Note: Avoidance Maneuvers

- 1. Avoidance maneuver A: Stop on rural road
- 2. Avoidance maneuver B: Stop on urban road
- 3. Avoidance maneuver C:Speed/path/direction change on rural road
- 4. Avoidance maneuver D: Speed/path/direction change on suburban road
- 5. Avoidance maneuver E: Speed/path/direction change on urban road

Various operating conditions require different maneuvers in response to a situation. The perception-reaction times are shorter for the less complex rural conditions than for urban.

#### *3)* Intersection sight distance

Intersection sight distance is the sight distance needed to safely proceed through an intersection. The distance needed depends on the type of traffic control at the intersection (uncontrolled, yield sign, stop sign or signal), and the maneuver (left turn, right turn, or proceeding straight). <u>All-way stop</u> intersections need the least, and uncontrolled intersections require the most. Intersection sight distance is a key factor in whether no control or yield control can be safely used, ot more restrictive control in needed.

*a*) Corner sight distance

Corner sight distance (CSD) is the road alignment specification which provides a substantially clear line of sight so that the driver of a vehicle, bicyclist or pedestrian waiting at the crossroad may safely anticipate the driver of an approaching vehicle. Corner sight provides an adequate time for the waiting user to either cross all lanes of through traffic, cross the near lanes and turn left, or turn right, without requiring through traffic to radically alter their speed.

## **ROAD MARKING**

**Road surface marking** is any kind of device or material that is used on a <u>road surface</u> in order to convey official information. They can also be applied in other facilities used by vehicles to mark parking spaces or designate areas for other uses.

Road surface markings are used on paved roadways to provide guidance and information to drivers and pedestrians. Uniformity of the markings is an important factor in minimizing confusion and uncertainty about their meaning, and efforts exist to standardize such markings across borders.

However, countries and areas categorize and specify road surface markings in different ways.

Road surface markings are mechanical, non-mechanical, or temporary. They can be used

to delineate <u>traffic lanes</u>,

inform <u>motorists</u> and <u>pedestrians</u> or serve as noise generators

when run across a road, or attempt to wake a sleeping driver when installed in the shoulders of a road.

Road surface marking can also indicate regulation for parking and stopping.

## **Road markings**

The following section provides information on the different road markings recommended for rural

Roads. The following details are provided:

#### **Dimensions:**

The color, width and length of stripe and/or gap if applicable.

#### **Requirements:**

The desirable minimum width and absolute minimum width of sealed road required to provide the

Marking. The minimum traffic volume (VPD) above which the marking should normally be applied.

# Special conditions:

Any special conditions which apply, which would make it desirable to provide markings on roads below the recommended requirements.

#### Accident reduction:

The reduction in accidents expected from the installation of the marking and typical benefit cost ratio (BCR), where known, together with the reference. Obviously the BCR for specific projects can be calculated from the road's accident history and the expected accident reductions (refer Appendix 2). The typical BCR is shown for indicative reasons only. Note: While the recommended values for seal width should be followed, local road controlling Authorities can use lower minimum traffic volume thresholds. If this occurs it is essential that the Lower criteria be applied in a consistent manner and special care be taken on roads that cross into Adjacent authorities. It is also essential that a consistent treatment be provided along a road whose Width varies. Generally the minimum width sections will dictate the standard of marking which Should be applied.

# Centerlines

A center line is used to define the portion of a two way sealed roadway available for travelling in Each direction. It also provides a simple and continuous form of delineation, however its Effectiveness can be reduced at night and in wet weather. Overseas research (see section 9, reference 1) has also shown that marking center lines on very narrow roads may increase accident numbers. **Dimensions:** The centerline shall be a dashed line marked as follows: Color: White Width: 100mm Stripe: 3m Gap: 7m Note: The visibility of centerline markings at night can be improved by using reflectorized paint. The use of reflectorized centerline markings is recommended on roads with a high proportion of Night time accidents. The average percentage of night time accidents is as follows: Rural state highways 37% Local rural roads 42% Dashed center line: (isolated sections) [Type B\*] Total route marking of dashed Centre lines on lower volume roads is not normally necessary, However special circumstances may exist where the marking of isolated sections of centerlines is Desirable: • Where there are frequent horizontal and/or vertical curves • At sub-standard curves • Over sections where the accident record indicates a need • To maintain continuity on a route or with an adjacent road.

It is recommended that centerlines be marked on isolated sections of roads meeting the following criteria:

# Desirable minimum width 5.5m

Absolute minimum width

5.0m.....Minimum volume 100 VPD

## No overtaking lines

No overtaking lines are used at vertical and, on rare occasions, horizontal curves where overtaking Must be prohibited because of restricted visibility or other hazardous conditions. The lines also Serve a similar function to centerlines in that they define the center of the road and delineate the Alignment.

## **Dimensions:**

The no overtaking line shall be a continuous line marked as follows: Color: Reflectorized Yellow Width: 100mm Stripe: Continuous

#### **Requirements:**

No overtaking lines are recommended for all sealed roads meeting the following criteria: Desirable minimum width 5.5m Absolute minimum width 5.0m Note: Details for the marking of no overtaking lines are provided in the Manual of Traffic Signs and Markings (Part Il Markings). No minimum traffic volume is specified, however, no overtaking Lines are generally only recommended on roads where the traffic volume criteria for centerlines Apply and a centerline is marked

# **Edge lines**

Edge lines delineate the edge of the traffic lane and, in situations where the shoulder is paved, edge

Lines separate the shoulder from the traffic lane. They

provide a useful guide to motorists at night

and in foggy or misty conditions. Where roadway shoulders are unsealed, the provision of edge

lines not only enhances road safety but can reduce wear and maintenance of the shoulder.

#### **Dimensions:**

The edge line shall be a continuous line marked as follows: Color: White

Width: 75mm

Stripe: Continuous

Note: The visibility of edge line markings at night can be improved by using reflectorized paint.

The use of reflectorized edge lines is recommended on roads with a high proportion of night time

Accidents. The average percentage of night time accidents is as follows:

Rural state highways 37%

# **Intersection markings**

Highlighting the presence of side roads to main road traffic with the use of road markings serves Two useful purposes. Firstly, the presence of the side road is easier to identify and motorists are Therefore more likely to be aware of the possible hazards associated with an intersection, such as turning traffic. Secondly, the markings act as a useful guide for turning traffic.

# **Types of markings**

Three types of markings can be used:

- Continuous centerline
- Edge line

• Continuity line.

Details for line size and layout for rural side roads are shown in the Manual of Traffic Signs and Markings (Part II, Markings) and in Figure 2 of this guideline. An example of localized seal

Widening is shown in Transit New Zealand Planning for a

Safe and Efficient Highway Network under

The Resource Management Act, diagram 4, page 64 (June 1992). Although this diagram refers to a

Property access similar widening is considered appropriate for side roads

## **Delineation devices**

DEF: Road delineation is a term used to describe elements used to provide guidance to road users. Such elements include road markings, signage and raised pavement markings

Standard delineation features for Arterial and Tourist category roads will include:

٠	Centre line
•	Edge Lines – 100mm Wide
٠	RRPM's
•	Edge Marker Posts
٠	Full markings for Single Lane Bridges
٠	Flag Lights
٠	Hazard Markers (where required)
•	Intersection Controls – on all side roads
•	Curve Warning Signs (where warranted)
٠	Road Name Blades with larger 160mm lettering
•	Advance Intersection Signage
٠	Chevrons
•	Guardrails (where warranted)
Ce	ntre line
Ed	ge Lines - 75mm Wide
RF	RPM's – at locations with safety issues
Ed	ge Marker Posts – isolated
Fu	II markings for Single Lane Bridges
На	zard Markers (where required)
Int	ersection Controls – on all side roads
Cu	rve Warning Signs (where warranted)

Road Name Blades with 120mm lettering

Chevrons

• • • • •

٠

Sight rails most likely instead of Guardrails (where warranted)

Standard delineation features for Local Roads will include:

•	Centre line – Isolated due to road alignment
•	Edge Lines – Isolated due to safety issues
•	Edge Marker Posts – Isolated sections due to safety issues
	including road alignment
	Full markings for Single Lane Bridges where practicable

- Hazard Markers (where required)
- Intersection Controls on main road where required or safety
  - issue
- Curve Warning Signs (where warranted)
- Road Name Blades with 120mm lettering
- Chevrons

Sight rails most likely instead of Guardrails (where warranted)

#### IV. CHAPTER 3

#### V. METHODOLOGY AND DATA COLLECTION

In order to achieve the above mentioned objectives the proposed section of G.T road would be divided in 100m sections and each section would be examinine Field observation as well as videos of each 100 m section would be closely in sighted and the problems would be identified.

Each problem would be mentioned in the form of charts which will give us high risky sections of the proposed road. Lastly recommendation on each issue would be discussed to make it safe sections of the road for users.

## STEPS INVOLVED:

- 1) Field visits
- 2) Performing video
- 3) Measurements
- 4) Comparison of Parameters with AASHTO GREEN BOOK standards
- 5) Scoring
- 6) Charts

#### 1) FIELD VISITS:

The RSA team visit the road section (Gora Qabristan Jinnah Park) in which they have to examine different parameters .such as

- They examine the undulations are there on the road
- They examine the condition of the pavement surface in terms of lane marking, line width etc.
- They examine other parameters such as shoulder width, lane width, slope of road, horizontal and vertical alignments, road markings..etc.
- They examine the road side conditions. in terms of provision for the pedestrians.

#### 2) PERFORMING VIDEOS:

The RSA team performs a video of Road Surface and Road side conditions

RSA team performs video of each 100 meter section in the proposed section of GT Road.

The video should be perform in such a way that all the required parameters on the roadway may be visible.(such as left ,right side and front).

#### 3) Measurement with Tap:

The RSA team measure all the Road section each and every 100 meter section in terms of lane width, shoulder width etc. It helps them while comparing it with the AASHTO GREEN BOOK standards.

GS.

www.globalsci

## 4) Comparison with the Standards:

After the collection of data with the help of video and after its study the RSA teams will compare the parameters included in the proposed road section with the standards of AASHTO.

This will help in finding the critical portion of the proposed road section.

With the help of AASHTO guide lines the correct values of roads parameters can be achieved.

#### 5) Scoring:

The RSA team did scoring after the comparison of the parameters with the standards.

The scoring is in the form of table. in which there will be Parameters, AASHTO standards, and the current condition of the road.

The scoring is in the form of digits from (0-5).which will show poor, good, fair, excellent condition of the road in term of parameters.

#### 6) CHARTS:

The RSA team prepares a Bar chart and a Graph chart after collection of data.

After scoring the RSA team prepares graph chart which show them the critical portion of the road.

Hama Jacob	Dian In	and Econolis	Data Barian 15	project	giaulity - microsoft	Litter						0
V cut	roycusy	out romulas	Data Neview vi	ew					=		A 23	
A Corr	Calibri	- 11 - /	A' A' ≡ ≡ ₩··	🚰 Wrap Text 🛛 🤇	Seneral *	- 🛃 📝	- 🚽 🗄	• 🚰		ar -	2 3	
Copy	BI	I - 🖽 - 🔕 -		Merge & Center *	s - % , 18 -11	Conditional Format	Cell Ins	ert Delete F	ormat 2 c	lear v	Sort & Find &	
Clipboard 5		Font	G Aliq	nment G	Number 5	Formatting * as lable Styles	* Stjies *	Cells		Edit	Filter* Select*	
F47	• (9	fx					A					
A 8		C	D F	F	6	н			K		1	м
tance lane widt	th 1 (ft) land	e width 2 (ft) la	ane width 3 (ft) lane widt	h 4 (ft) Average Lane wi	dth Shoulder width (f	t) shoulder line	road side ed	tes slope	road mar	rking foo	t path (ft) road	d signs
.00	12	12	12 -		12	11 0		1	4	1	5	
0-200	11.9	11.9	12 -	11.93333	333 :	11 1		4	4	1	7.1	
0-300	12	12	12 -		12 -	0		5	4	3	7.1	
0-400	12	12	11.8 -	11.93333	333 -	0		5	4	4	7.1	
0-500	14	11.8	11 -	12.26666	667 -	0		5	4	3	5.1	
1-000	12	11.9	12 -	10.00000	667	• 0		5	4	3	5.1	
1.800	12	11.5	11.7 -	10.63333	333 -	o 3		3	2	4	7	
)-900 )-900	12	11	12 -	11.66666	667 -	0		4	4	4	7	
-1000	14	11.7	12 -	12.56666	667 -	0		4	4	4	5.1	
00-1100	14	14	11.7 -	13.23333	333 -	0		4	4	5	3.5	
00-1200	14	12	14 -	13.33333	333	12 4		4	4	5	7	
00-1300	14	14	12 -	13.33333	333	7 4		4	4	5	7.7	
00-1400	25	22	22 -		23	14 4		4	4	5	7	
JU-1500	12	12	11.8 -	11.93333	333 667	9 3		4	4	3	3.1	
0-100	14	15.3	14 -	12.90000	667 -	0		4	-	5	71	
0-1800	14	12.6	14 -	12.53333	333 -	0		4	4	4	7.7	
00-1900	12	12	12 -		12	8 3		4	4	3	7	
00-2000	14	12	12 -	12.66666	667 -	0		5	5	2	6.5	
00-2100	14	12	12 -	12.66666	667 -	0		5	5	2	7	
00-2200	10	12	12	11.33333	333 -	0		5	5	2	6	
Home Insert	Page Lay Calibri	rout Formulas	Data Review V	ew 📑 Wrap Text 🛛 🖗	Seneral +		7	• 🖹	ΣΑ	utoSum * al +	<b>7</b> A	Q
Home Insert ∦ Cut ↓ Copy √ Format Painter	Page Lay Calibri B I U	rout Formulas	Data Review V A`A` ≡ = = ♥ A` ▲ ■ ≡ ≡ ≇ ≇	ew F Wrap Text Merge & Center *	Seneral • \$ • % • 30 + 00	Conditional Format Formatting + as Table	Cell Ins * Styles *	ert Delete F	The second seco	utoSum * ill * Jear *	Sort & Find & Filter * Select *	Q
Home Insert	Page Lay Calibri B J L	rout Formulas	Data Review V A^ A' A' = = = + + + + A A' A' = = = + + + + + + + + + + + + + + + +	ew Whap Text Merge & Center * ment G	ieneral • \$ • % • 10 +0 Number 5	Conditional Format Formatting Y as Table Styles	Cel Ins	ert Delete F	ΣA Primat 2 C	utoSum * ill * Jear * Edit	Sort & Find & Filter * Select * ting	١
Home Insert	Page Lay Calibri B J L	rout Formulas • 11 • ↓ Font fx Distance	Data Review V A A = = = → → A = = → → 5 A lig	ew Whap Text Merge & Center •	ieneral • \$ • % • 128 428 Number ©	Conditional Format Formatting * as Table Styles	Cell Ins * Styles *	ert Delete F Cells	ΣA Primat 2 C	utoSum * ill * Jear * Edit	Sort & Find & Filter* Select*	Û
Home Insert J Cut La Copy Format Painter Clipboard © A1 A 8 trans Looks	Page Lay Calibri B I U	rout Formulas	Data Review V A A A = = = = >·· A A = = = >·· 5 A ign 0 E = A ign A ign 0 E	ew Witap Text C Witap Text C Merge & Center 1 Imment 5	Seneral • \$ • % • % * % * % Number • G	Conditional Format Formatting * as Table Styles H	Cell Inst	ert Delete F Cells	Σ A F F 2 C K	utoSum * ill * Jear * Edit	Sort & Find & Filter * Select * ting	0 M
Home Insert	Page Lay	rout Formulas + 11 - ↓ Font fr Distance C urn b	Data Review V A A A = = = >>+ A A = = = >>+ 5 Align D E E us bays parking la	Witap Text C Witap Text C Merge & Center C Merge & Center C F mes horizontal allignm	ieneral • \$ • % • \$ \$ \$ \$ \$ \$ Number • G men Vertical allignmen	Conditional Format Formatting ~ as Table Styles H nt cycle tracks	Cell Inst	et Delete F Cells	E A A P F C A A A A A A A A A A A A A A A A A A	utoSum * ill * Jear * Edit	L guar	M rd rail
Home Insert	Page Lay Calibri B I U	vout Formulas	Data Review V A A A E E E V C A A A E E A A A A A A A A A A A A A A	eu Whap Text. Merge & Center - ment G P nes horizontal alligne	seneral • \$ • % • 1 st sta Number • G mer Vertical allignmer 5 •	Conditional Format Formatting ~ as Table Styles H nt cycle tracks -	Cell In: *Styles*	ert Delete F Cells	× Σ Α prmat V 2 C K es surface c 1	utoSum * ill * Jear * Edit	Sort & Find & Filter* Select* ing	M rd rail
Home Insert	Page Lay Calibri B Z U u-tu S S	rout Formulas	Data         Review         V           ▲         ▲         ■         ■         ●         ●         ●         ●         ●         ●         ▲         ●         ●         ▲         ●         ●         ▲         ●         ●         ▲         ●         ●         ▲         ●         ●         ▲         ●         ●         ▲         ●         ●         ▲         ●         ●         ▲         ●         ●         ▲         ●         ●         ▲         ●         ●         ●         ▲         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●	eu Whap Text Whap Text Whap Text Whap Cexter Wherpe & Center  Wherpe & Center  F  nes horizontal alligne  -	Seneral • S • % • 20 00 Number • G mer Vertical allignmer S - -	Conditional Format Formatting * as Table Styles H H nt cycle tracks	Cel + Styles + In Delineation	et Delete F Cells	K κ κ κ κ κ κ κ κ κ κ κ κ κ	utoSum * ill * lear * Edit condit carr 2 4 5	Sort & Find & Filter* Select* ing L uber guar 2 4 5	M rd rail
Home Insert	Page Lay	rout Formulas	Data         Reiew         V           A <sup>+</sup> ≡         ≡         ⊗**           A <sup>+</sup> ≡         ≡         ⊗**           B         ≡         ≡         ⊗**           D         E         ≡         ■**           B         =         ≡         ●**           D         E         E         ■           S         parking let         S -           3 -         3 -         3 -	ev SWup Text S SWup Text S Mege & Center - 1 ment S horizontal alligner - -	Seneral * S * % ) \$2 00 Number  G mer Vertical allignmen 5	Conditional Format Formatting * as Table Styles H H nt cycle tracks	Cel + Styles +	ert Delete F Cells	K κ κ surface c 1 0 0	utoSum * il * lear * condit cam 2 4 5 5	L L 4 5 5 5	M rd rail
Home Insert ≩ Cut ≩ Cut ≩ Cut ≩ Cut ↓ Copoard Painter Clipboard P A B tance kerbs 00 0-200 0-300 0-400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1400 1	Page Lay Calibri B I U u-tu 5- 5 5- 5- 5-	rout Formulas	Data         Reiew         ¥           ▲         ■         ■         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●	ew Wap Text	seneral • \$ • % • \$ \$ \$ \$ % • \$ \$ \$ \$ \$ \$ \$ \$ \$	Conditional Format Formatting v a Table Styles H nt cycle tracks - -	Cell In: Styles*	ert Delete F Cells	K sumat 2 C K k s sufface c 1 0 0 0	utoSum * ill * lear * condit carr 2 4 5 5 5 5	L L L L S S S S S S S S S S S S S S S S	M rd rail
Home         Insert           Ja Copy         Copy           A Copy         Format Painter           A 8         B           tance         kerbs           00	Page Lay Calibri B Z U u-tu 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 -	vout Formulas	Data         Review         V           X         X         X         X           X         X         X         X           X         X         X         X           X         X         X         X           X         X         X         X           X         X         X         X           X         X         X         X           X         X         X         X           X         X         X         X           D         E         X         X           D         E         X         X           J         X         X         X           3         X         X         X           4         X         X         X	eer Waap Eed.	seneral • \$ * % • \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	Conditional Format Formations' Styles Styles H H nt cycle tracks - - - -	Cell In Styles 1	ert Delete F Cells	X A primat C C C C C C C C C C C C C C C	utoSum * ill * Tear * Edit condif carr 2 4 5 5 5 5 5 5 5	L L L L S S S S S S S S S S S	M d rail
Home         Insert           Já Cot         Já Coy           Já Coy         Já Coy           A1         A           A1         A           Jacob         A1	Page Lay Calibri B J J - 4 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5	out Formulas - 11 - 2 I Font C bistance C bistance 1	Data         Review         V           ↓         ↓         ➡         ➡         ⊕         ⊕           ↓         ↓         ➡         ➡         ⊕         ⊕         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓         ↓	ev Wap Ted. C C C C C C C C C C C C C C C C C C C	Seneral • \$ • % • % * % * Number • G mer Vertical allignmer 5 - - - 4 - 4 - 4 - -	Conditional Format Conditional Format Styles H H t cycle tracks - - - - -	Cell In: Styles - I Delineation	et Delete F Cells	Σ         A           Image: Figure 1         Image: Figure 1           Image: 1         Image: Figure 1           Image: 1         Image: 1           Image: 1	utoSum * il * Lear * Condit carr 2 4 5 5 5 5 5 5 5 5 5	L guart sort & find & ther Select + the guart 2 4 5 5 5 5 5 5	W M rd rail
Home         Insert           ↓ Copy         ↓ Copy           ↓ Copy         ↓ Format Painter           ↓ Copy         ↓ Format Painter           ↓ Copy         ↓ Endote           ↓ Loon         ↓ Endote	Page Lay Calibri B / L U-tu 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 -	out Formulas - 11 - 2 Fort Fort C 1	Data         Review         V           ▲         ▲         ■         ■         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●	ev Wap Text C	Seneral	Conditional Format Formating v a roles Styles H H t cycle tracks - - - - - - - - - - - - - -	Cell In: Styles - I Delineation - - - -	et Delete F Cells	χ         Α           γ         γ           γ         ζ           γ         ζ           γ         ζ           γ         ζ           γ         ζ           γ         ζ           γ         ζ           γ         ζ           γ         ζ           γ         ζ           γ         ζ           γ         ζ	uttsSum * Edit condif cam 2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5	L guar the guar the guar the guar 2 4 5 5 5 5 5 5 5 5 5	M M rd rail
Home         Insert           J_ Cot	Page Lay Calibri B Z J u-tu 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 -	out Formulas - 11 - 2 2	Data         Review         V           Image: Second	er Wap Tet E Wap Tet C Marge & Cetter - ment G F horizontal alligner - - - -	General         -           \$         %           Number         G           Number         G           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -	Conditional Formations' Formations' as Table Styles H nt cycle tracks - - - - - - - - - - - -	Cell Styles - Delineation	et Delete F Cells	Σ         A           Image: F         Image: F           Image: F         Image: F <td>utaSum * ill * Eatr * Eatr * Eatr * Eatr * Eatr * 5 5 5 5 5 5 5 5 5 5 5 5 5</td> <td>L there guar the guar</td> <td>M rd rail</td>	utaSum * ill * Eatr * Eatr * Eatr * Eatr * Eatr * 5 5 5 5 5 5 5 5 5 5 5 5 5	L there guar the guar	M rd rail
Home         Insert           ↓ Cot         ↓ Copy           ✔ Format Painter         ↓ Copy           ✔ Format Painter         ↓ Copy           ✔ Format Painter         ↓ Copy           ▲         ▲           ▲         ■           ★ Lance Verbs         ↓ Oo           → 200         → 300           → 500         → 500           → 500         → 500           → 500         → 500           → 900         → 1000	Page La Calibri B / J S - S - S - S - S - S - S - S - S - S -	out Formulas + 11 - 1/ Fort Fort C 1 1 3	Data         Review         V           Image: Constraint of the second se	ever Waap Text See Waap Text See Waap Text Marge & Center + F F F F F F - - - - - - - - - - -	seesi	Conditional Formating * a Table Formating * a Table System H H tt cycle tracks - - - - - - - - - - - - - - - - - - -	Cell Instantion	et Delete F Cells	χ         λ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ           μ         μ	utaSum * ill * Edit Edit Edit Edit Edit Condii can 2 4 5 5 5 5 5 5 5 5 5 5 5 5 5	L guar L guar there Select + the guar 2 4 5 5 5 5 5 5 5 5 5 5 5 5 5	M d rail
Home         Insert           Ja Copy         J Copy           J Format Fainter         J Copy           J Format Fainter         B           A1         B           tance         kerbs           00	Page La Calibri B / S 	out Formulas - 11 - 1/ Fort Fort C 1 1 3 3	Data         Review         V           Image: Second	ever What Text B What Peet & Center - meant - - - - - - - - - - - - - -	internal         -           \$ - % + % 2%         -           Number         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -	Conditional Formations - Styles Styles H H nt cycle tracks - - - - - - - - - - - - - - - - - - -	Cell In Syles In Delineation	Let Delete F Cells	К ес к к к к к к к с с с с с с с с с с с с с	utreSum * * lear * Edit condit cam 2 4 5 5 5 5 5 5 5 5 4 3	L Sott & Filter * Select * ing uber guar 2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	M d rail
Home         Insert           ↓ Cut         ↓ Copy           ↓ Format Painter         ↓ Copy           ↓ Copy         ↓ Format Painter           ↓ Solo         ↓ Format Painter           ↓ Format Painter         ↓ Format Painter           ↓ Solo         ↓ Format Painter           ↓ Format Painter         ↓ Format Painter	Page La Calibri B Z S - - - - - - - - - - - - - - - - - - -	out Fonulas + 11 - 2 Font C J 1 3 3	Data         Review         V           ▲         ■         ■         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●         ●	ever the second	erensi         -           \$ - % + % 2%         %           Number         5           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -	Conditional Formating - a fable Formating - a fable Syles H tracks - - - - - - - - - - - - - - - - - - -	Cell in: Sples - in: Delineation - - - - -	an a	κ         κ         κ           γ         2         2           γ         2         2	utreSum * * lear * Edit condi cam 2 4 5 5 5 5 5 5 5 5 5 5 5 5 5	L Sort & Find & Filter 'Select ' nber guar 2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	M M rd rail
Home         Insert           ¥ Cut         ↓2 Coy           ↓2 Coy            ↓2 Coy            ↓2 Coy            ↓2 Coy            ↓30 Cot            ↓300            ↓300            ↓300            ↓500            ↓500            ↓900            ↓900            ↓900            ↓900            ↓9100            ↓0-1000	Page lay Calibri B 2 3 • • • • • • • • • • • • • • • • • • •	eut Fonulas - 11 - 2 Font C C 1 3 3	Data         Review         V           Image: second	ever Whap Text B Whap Text B Whap Text B Whap Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text Text	Sereal         •           Ser. 5k         32           Number         5           Gener Vertical allignmen           5           4           -           -           -           -           -           -           -           -           -           -           -	Conditional Formation - a fable Solies H H H typele tracks - - - - - - - - - - - - - - - - - - -	Cell In: - Styles - In: Delineation - - - - - -	J J J J J J J J J J J J J J J J J J J	х к	uttiSum * Edit Edit S S S S S S S S S S S S S S S S S S S	L guar L guar tober guar 2 4 5 5 5 5 5 5 5 5 5 5 5 5 5	M drail
Home         Insert           ↓ Cut         ↓ Cut           ↓ Cut </td <td>Page In Calibri B Z S </td> <td>out Formulas - 11 - // Font // Distance C J 1 3 3 3</td> <td>Data         Review         V           Image: Constraint of the second sec</td> <td>ever Wap Text of Wap Text of Wap text of Wap text of Merge &amp; Center of Free Sector of Free Secto</td> <td>internal         -           \$ - % + % 2%         -           Number         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -</td> <td>Conditional Formations Super- States Termations - a Table Super- H H trycycle tracks - - - - - - - - - - - - - - - - - - -</td> <td>Cell Styles - In Delineation</td> <td>J Little F Cells</td> <td>К К к к s sufface c 1 0 0 0 0 0 0 0 2 2 2 2 1 1 2 2 2 2 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2</td> <td>uttiSum * Edit elear * Edit 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5</td> <td>L Sott &amp; Find &amp; Fitter Select + ing ther guar 2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5</td> <td>M rd rail</td>	Page In Calibri B Z S 	out Formulas - 11 - // Font // Distance C J 1 3 3 3	Data         Review         V           Image: Constraint of the second sec	ever Wap Text of Wap Text of Wap text of Wap text of Merge & Center of Free Sector of Free Secto	internal         -           \$ - % + % 2%         -           Number         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -	Conditional Formations Super- States Termations - a Table Super- H H trycycle tracks - - - - - - - - - - - - - - - - - - -	Cell Styles - In Delineation	J Little F Cells	К К к к s sufface c 1 0 0 0 0 0 0 0 2 2 2 2 1 1 2 2 2 2 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2	uttiSum * Edit elear * Edit 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	L Sott & Find & Fitter Select + ing ther guar 2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	M rd rail
Home         Itsuet           ↓ Cot         ↓ Cot           ↓ Cot </td <td>Page In Gilbri B / j - ( - ( - ( - ( - ( - ( - ( - (</td> <td>out Fonnulas - 11 - 2 Font R Distance C J 1 3 3 3</td> <td>Data         Review         V           Image: Second second</td> <td>ever What Text What Text When the 2. Center - ment - - - - - - - - - - - - -</td> <td>erend         -           \$ + % + % @ @         -           Number         5           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -</td> <td>Crondinauti Formattine va Formattine va Styles H H H Cycle tracks - - - - - - - - - - - - - - - - - - -</td> <td>· Syles-</td> <td>J J Celis Celis 3 3 1 1 3 3 3 3 3 3 3 3 3 3 3</td> <td>E A CONTRACT CONTRACT</td> <td>utaSum * ill = * Edit Condit cam 2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5</td> <td>L Sort &amp; Find &amp; Filter Select + nber guar 2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5</td> <td>M nd rail</td>	Page In Gilbri B / j - ( - ( - ( - ( - ( - ( - ( - (	out Fonnulas - 11 - 2 Font R Distance C J 1 3 3 3	Data         Review         V           Image: Second	ever What Text What Text When the 2. Center - ment - - - - - - - - - - - - -	erend         -           \$ + % + % @ @         -           Number         5           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -	Crondinauti Formattine va Formattine va Styles H H H Cycle tracks - - - - - - - - - - - - - - - - - - -	· Syles-	J J Celis Celis 3 3 1 1 3 3 3 3 3 3 3 3 3 3 3	E A CONTRACT	utaSum * ill = * Edit Condit cam 2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	L Sort & Find & Filter Select + nber guar 2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	M nd rail
Home         Insert           Já Cóny         Já Cóny           Já Cóny	Page Lay Calibri B / J U-tu U-tu S- S- S- S- S- S- S- S- S- S- S- S- S-	out Formulas - 11 - 2 - 1 - 2 - 1 - 2 - 1 - 2 2 2 2	Data         Review         V           Image: Constraint of the second sec	ever Waap Text B Waap Text B Waap Text C V Waap Text C V F F F F F F - - - - - - - - - - - - -	Sereal         •           Sereal         •           Number         •           G         •           mer Vertical allignmer         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •	Conditional Formatting v as inless Styles H nt cycle tracks - - - - - - - - - - - - -	- Syles - Parise	Cels Cels 3 3 1 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	K         K           F         F           K         Z           C         C           K         Z           K         S           S         S           S         S           S         S           O         O           O         O           Q         O           I         I           Z         Z           I         I           Q         Q           I         I           Q         Q	utaSum * ill = 2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	L guar hber guar 2 4 5 5 5 5 5 5 5 5 5 5 5 3 3 4 4 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	M M rd rail
Home         Itset           Jia Cay         Jia Cay           A         B           A         B           Jia Cay         Jia Cay	Page tay Catleri B Z S 	out Fonulas - 11 - 2 Font Font C Distance C Distance 3 3 3	Data         Review         V           Image: Second	ever Wap Text of Wap Text of Wap Text of Wap Text of Free Scatter of Free	internal         -           \$ - % + % 2%         -           Number         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -	Conditional Formatting v a trible Styles Styles 	Cel In Syles -	J J Celts	χ         κ           μ         β           μ         β           μ         β           μ         β           μ         β           κ         ζ           κ         κ           κ         κ           κ         κ           κ         κ           κ         κ           κ         κ           κ         κ           κ         κ           κ         κ           κ         κ           κ         κ           κ         κ           κ         κ           κ         κ           κ         κ           κ         κ           κ         κ           κ         κ           κ         κ           κ         κ           κ         κ         κ           κ         κ         κ         κ           κ         κ         κ         κ         κ           κ         κ         κ         κ         κ         κ           κ         κ         κ         κ	utnSum * ill * Edit S S S S S S S S S S S S S S S S S S S	L Guilden Control Cont	M M rd rail
Home         Itset           Já Cát         Já Cát           Já Cát         Já Cát           Já Cát         Já Cát           Já Cát         Gat           A         B           Alance         Herts           Jú Cát         Gat	Page Ia           Calleri           B         I           B         I           Calleri           B         I           Calleri         I           Calleri         I           B         I           S         I           S         I           S         I           S         I           S         I           S         I           S         I           S         I           S         I           S         I           S         I           S         I           S         I           S         I	rout Formulas	Data         Review         V           Image: Constraint of the second sec	ever text of the second	erend         -           \$ + % + % 20         -           Number         5           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -	Crondineal Formations of the Formation of the For	Cel In Syles - - - -	Cels Cels 3 3 1 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	E A A A A A A A A A A A A A A A A A A A	utnSum * ill * Edit condit cam 2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	27 23 Srith Frith Friter Steet were guar 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	M d rail
Home         Inset           Jia Gay         Jia Gay           Jia Gay         Ji	Page tay Cation B Z S - (5 - (5	end Ferndau 1 1 2	Data         Review         V           Image: Constraint of the second sec	ever text of the second	Serest         -           Serest         -           Number         -           G         -           mer Vertical allignmer         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -	Conditional Formattion V Styles Styles H nt cycle tracks - - - - - - - - - - - - - - - - - - -	Cel In Syler Syler - - -	Cels Cels devi pot hol 3 3 3 1 1 3 3 3 3 3 3 3 3 3 3 3 3 3 3	E A A A A A A A A A A A A A A A A A A A	utsSum * Edit Dear * Edit 2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	27 Pa Sort & Fort & A better 2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	M d rail
Home         Inset           Jacoby         Jacoby           Jacoby	Page tay Catleri B Z S - (1) - (1	Front Front Jack State Stat	Data         Review         V           Image: Second	ever when text to a second sec	Serent         -           Serent         -           Number         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -	Conditional Formatting * a trible Styles Styles 	Cel In Syles - Delineation	Celts Celts J J J J J J J J J J J J J J J J J J J	X         K           Image: First state of the state state state of the state s	utaSum * ill - lear * Edit condit can 2 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	27 27 20 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	M rd rail
Home         Itset           Já Cay         Já Cay           Já Cay         Já Cay           Já Cay         Já Cay           A         B           Alance         kerbs           00         1200           1200         1300           1400         1500           1500         1500           100         10100           10100         10100           10-1100         100           10-1000         10-1000           10-1000         10-1000           10-1000         10-1000           10-1000         10-1000           10-1000         10-1000           10-1000         10-1000           10-1000         10-1000           10-1000         10-1000           10-1000         10-1000           10-1000         10-1000	Page tay Caterior B 2 3 	<pre>ved Formative + [n - ]] J - = + ]] Fort C C C D J J J J J J J J J J J J J</pre>	Data         Review         V           Image: second	ker Wap Text B 2 Marps & Center + Rest - - - - - - - - - - - - - -	Serest         •           Serest         •           Number         •           G         •           mer Vertical allignme         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •           -         •	H Conditional Format Conditional Format Styles H tt cycle tracks - - - - - - - - - - - - -	cel he Syler - - - -	Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells Cells	E A A A A A A A A A A A A A A A A A A A	uttsium * ill - lear * Edit condit can 4 5 5 5 5 5 5 5 5 5 5 5 5 5	27 P) Soft & Trick & Set & Trick & Set & Trick & Set & Trick & Set & Se	M rd rail
Home         Inset           Jia Gay         Jia Gay           Jia Gay         Ji	Page La Calibri B Z 3 	end Formatics + [1] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [2] + [	Data         Review         V           Image: Constraint of the second sec	ever versee vers	Serest         -           Serest         -           Number         -           G         -           mer Vertical allignmer         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -	Conditional Formattion     Styles     S	spiese in a spiese	Cells	X         K           F         F           K         X           S         Sufface c           1         0           0         0           0         0           0         0           0         0           1         2           2         1           0         0           0         0           1         1           2         2	utaSun * iii - Edit Edit 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	L         guara           ther         guara           2         4           5         5           5         5           5         5           5         5           5         5           5         5           5         5           5         5           5         5           5         5           5         5           5         5           5         5           5         5           5         5           5         5           5         5           5         5           5         5           5         5           5         5           5         5           5         5           5         5           5         5           5         5           5         5           5         5	M rd rail
Home         Inset           Jacov         Jacov           Jacov         Jacov           Jacov         Jacov           Jacov         Jacov           A         B           A         B           Jacov         Herbs           00	Page to Calibri B / S - - - - - - - - - - - - - - - - - - -	event Fremders Fremders Fremd C C T T T T T T T T T T T T T	Data         Review         V           Total         Total         Total         Total           Total         Total         Total         Total         Total           D         E         Total         Total <tht< td=""><td>ever Wap fet Barrowski wart Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arro</td><td>Serent         -           Serent         -           Number         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -</td><td>Conditional Formattines Formattines' as reliable Styles H tt cycle tracks - - - - - - - - - - - - -</td><td>cal in special calls in 2</td><td>a celestric cele</td><td>K         K           ss surface c         0           0         0           0         0           0         0           1         2           2         0           1         1           2         0           0         0           1         2           2         0           1         2           2         0           0         0</td><td>utaSun * il - Edit Condit cam 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5</td><td>27 29 2014 Bit of a 10 20 10 20 10 10 10 10 10 10 10 10 10 1</td><td>M M rd rail</td></tht<>	ever Wap fet Barrowski wart Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arrowski Arro	Serent         -           Serent         -           Number         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -           -         -	Conditional Formattines Formattines' as reliable Styles H tt cycle tracks - - - - - - - - - - - - -	cal in special calls in 2	a celestric cele	K         K           ss surface c         0           0         0           0         0           0         0           1         2           2         0           1         1           2         0           0         0           1         2           2         0           1         2           2         0           0         0	utaSun * il - Edit Condit cam 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	27 29 2014 Bit of a 10 20 10 20 10 10 10 10 10 10 10 10 10 1	M M rd rail
Home         Inset           ¥ Gat         ↓           ↓ 2 Gay         ✔           ↓ 2 Gay         ✔           ↓ 3 Gay         ✔           ↓ 4 Gay         𝔅           ↓ 1 Gay         𝔅           ↓ 2 Gay         𝔅           ↓ 3 Gay         𝔅           ↓ 4 Gay         𝔅           ↓ 3 Gay         𝔅           ↓ 4 Gay         𝔅           ↓ 5 Gay         𝔅           ↓ 6 Gay         𝔅	Page ta (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (aller) (al	ved Formative + (n - ) J - + + (2 + + ) Fort C C C C 1 3 3 3 3 3 3 3 3 3 3 3 3 3	Data         Review         V           Image: second	ker viewent einen viewent eine	Serest         •           Se % •         %8 · %8 · %8 · %9           Number         •           G         •           Hamber         •           •         •           •         •           •         •           •         •           •         •           •         •           •         •           •         •           •         •           •         •           •         •           •         •           •         •           •         •           •         •           •         •           •         •           •         •           •         •           •         •           •         •           •         •           •         •           •         •           •         •           •         •           •         •           •         •           •         •	Conditional Format Conditional Format Styles     Styles     St	spin-store	Cets     Cets     Cets     Cets     Cets     Cets     Cets     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S     S	K         K           K         K           K         K           K         S           S         S           S         S           S         S           S         S           S         S           S         S           S         S           S         S           S         S           S         S           S         S           S         S           S         S           S         S           S         S           S         S           S         S           S         S           S         S           S         S           S         S           S         S           S         S           S         S           S         S           S         S           S         S           S         S           S         S           S         S           S         S           S         S	utaSun * Edat condi can 2 4 5 5 5 5 5 5 5 5 5	L guarante de la conservación de	M drail

# C GSJ

#### Chapter 4

# I. ANALYSIS AND RESULT

All of the data is collected according to the above mentioned methodology. The data include charts of every section in the proposed section of the road which is about 4.2 km. The data is collected depending upon the above given parameters such as lane width, shoulder width, etc. some of the charts are analyzed according to the grading system which is shown in the table below. *Table: Grading system* 

Not at all	0
Very poor	1
Poor	2
Fine	3
Good	4
Excellent	5

Where the charts for lane width, shoulder width etc. Are shown according to the AASHTO Standards. These graphs are given bellow for each of the parameter discussed in the literature review.

### Average Lane width

As in our proposed section (Gora Qabristan to Jinnah Park) there are 3 lanes in most of the sections but are having 4 lanes in some of the section so by taking the average of all of the lanes width we get an average lane width. Which is analyses graphically as shown in the figure.



**AASHTO STANDARDS**: Lane width =12 ft **Remarks**: from the figure it is clear that the standard lane width is 12ft and in our proposed sections (Jinnah Park to Gora Qabristan) most of the section of the road is not according to the standard given by AASHTO.



# Shoulder width

is

The graph of the shoulder width in different section of the road



given below.



**Remarks:** from the above figure it is clear that the standard shoulder width is 10ft but is preferable up to 12ft .In our proposed road section (Jinnah Park to Gura Qabristan) most of the sections are not according to standard given by AASHTO.

In graph above most of the sections are free spaced because of no shoulder were available there.

#### Shoulder line

The graph for the shoulder line is given below. Is according to the grading system as discussed above. The visible and non-visible shoulder lines in the road sections are defined through the grading system. By plotting the values we get the graph below.



**Remarks:** According to the grading system the sections which are having excellent shoulder line marking which are clearly visible on the road surface are shown by the no.5 on y - axis .where is the section with good and fair shoulder line are shown by no.4 and no.3 on the y- axis of the graph. The purpose of the graph is to identify the sections with visible shoulder line on the proposed section (Jinnah park to GuraQabristan).

#### **Road Side Edges**

The current road section is checked in term of road side edges then after that our RSA Team analyzed the data in the form of grading system.by plotting the data in excel the RSA Team get the following graph for different sections.

**Remarks:** According to the grading system the sections that are having excellent road side edges which looks better while sighting it on the road are shown by the no.5 on y - axis .where is the section with good and fair road side edges are shown by no.4 and no.3 on the y- axis of the graph.

The purpose of the graph is to identify the sections with the current road side edges condition on the proposed section (Jinnah park to Gura Qabristan).

#### **Slope In the Proposed Road Sections**

Slope of all the sections are observed through visualization. As the RSA Team also find the road slope through surveying in few of the sections. By recording all the data based on the road slope throughout the sections we analyzed it through grading system and by plotting we get the flowing graph showing different slopes at different sections.



**AASHTO STANDARD:** 1% to 2% Slope is preferable **Remarks**: According to the grading system the sections which are according to standard are shown by the graph with a no.5 on the y-axis. The sections which are having good slope or which are fair according to AASHTO standards are shown by no.3 and no.4 the Y-axis of the graph. The purpose of the graph is to compare the AASHTO standards with the current road conditions

#### **Road Marking**

Road marking were observed during the field visit. Then it is analyzed through grading system. The section with the best Road marking conditions showing the peak value in the graph below.



**Remarks:** According to the grading system the sections are defined as poor, fair, and good and excellent, in terms of road marking. It means that the marking on the road surface is clearly visible or not at different sections and at different inter section. As the marking on the road sections are described according to grading system as 0, 1,2,3,4,5 in the graph on the Y-axis.

The section (4200-4500) does not include any road mark which is shown in the figure as a clear space.

#### **Footpaths**

During the field visit it is measured with tap throughout all the sections and then the data recorded is compared with AASHTO standards and finally a graph is plot for it. The line in the center of graph is showing the standard value of AASHTO for Footpath.



AASHTO STANDARD: Foot path width = 5ft or 8ft is

## preferable

**Remarks:** from the above figure it is clear that the standard footpath width is 5ft but is preferable up to 8ft. The purpose of the graph is to identify the sections of the road in term of footpath so that to compare it with the standards according to AASHTO.

#### **Road signs**

During the field visit the road signs such as traffic sign boards, weighing bridge sign boards, information signs, Road name signs etc. are observed and then it is recorded in the form of grading system. Then we plot the following graph.



**Remarks:** According to the grading system the sections are defined as poor, fair, and good and excellent, in terms of road sign. It means that the sign on the road surface is clearly visible or not at different sections and at different inter section such as sign boards. As the sign on the road sections are described according to grading system as 0,1,2,3,4,5 in the graph on the Y-axis.

#### Kerbs

Kerbs on the road side edges are sighted and then it is recorded in the list according to grading system .the section that is having kerbs in good condition is showing the peak value in the graph below. The red line in the graph is showing that all the sections are having kerbs in good condition.



**Remarks:** According to the grading system the sections which are having kerbs on the road edges for preventing traffic .the kerbs which looks better while sighting it on the road edges are shown by the no.5 on y - axis .where is the section with good and fair kerbs at road side edges are shown by no.4 and no.3 on the y- axis of the graph. The purpose of the graph is to identify the sections with the current kerbs condition on the road side edges in the proposed section (Jinnah park to Gura Qabristan).

The U-Turn

During the field visit the U-turns are observed by the RSA team. And then did its analysis with the grading system. The U-turns which were more suitable in all of the section are shown in a graph having peak value.

**Remarks:** According to the grading system the sections which are having U-turn on the road for facilitating traffic while entering another road is shown by the grading system from 0-5 on the y-axis of the graph .The U-turn which looks better while observing it on the road and within a good condition are shown by the no.5 on y - axis .where is the



section with good and fair U-turn at road are shown by no.4 and no.3 on the y- axis of the graph.

The purpose of the graph is to identify the sections of the road with U-turn in the proposed section (Jinnah Park to Gura Qabristan).

#### **Bus bays**

During the field visit our RSA Team studies all the sections in term of bus bays for the local busses. we found the bus bays varying in various conditions in term of its width. We then make a record of each and every section in term of bus bays for the local large size vehicles and analyze the data with the help of grading system by plotting a graph.

**Remarks:** According to the grading system the sections which are having Bus bays for the transport of busses on the road for the good and passenger transport and for other



purposes .the Bus bays which looks better while sighting and observing it on the road are shown by the no.5 on y axis .where is the section with good and fair Bus bays at road are shown by no.4 and no.3 on the y- axis of the graph. The purpose of the graph is to identify the sections with the current Bus bays condition on the road in the proposed section (Jinnah Park to Gura Qabristan).



# **Parking lanes**

During the study of the proposed road section we found the parking lanes at various sections not at all sections such as from (4100-4500m) section. Then the data is collected in the form of grading system and a graph is plotted as shown below

**Remarks: According** to the grading system the sections which are having Parking Lanes for the parking of vehicles on the road side used as a facility for drivers to park the vehicle in a safe zone. The Parking lanes which look better while sighting and observing it on the road side are shown by the no.5 on y - axis .where is the section with good and fair Parking lanes at the road side are shown by no.4 and no.3 on the y- axis of the graph.

The section from (4100- 4500) is shown in the figure above because these are the only sections which are having parking lanes in the proposed section (Jinnah Park to Gura Qabristan).

The purpose of the graph is to identify the sections with the current Parking lanes condition on the road sides in the proposed section (Jinnah Park to Gura Qabristan). **CONCLUSION AND RECOMMENDATIONS** 

- ✓ During our study on Road Safety Assessment we had find different flaws at different sections which are not matching the recommended standards of AASHTO.
- ✓ Such study helps us finding the critical sections on the proposed road section (Gora Qabristan to Jinnah Park).
- ✓ So through scouring of every section and with the help of graphs we know all the points needing Safety assessment. The section on which no safety assessment has been done before.
- ✓ From different reports after giving scoring and drawing graphs of each sections we compared that the design of such sections were not according to the design of AASHTO.
- ✓ After finding such flaws in each section we are now recommended that these sections must be according to the Standard of AASHTO and must be re treated if not then these standards should be applied in new making roads so that there must be less chance of road accidents.

We give further recommendation for the improvement of road safety assessments which including average lane width, shoulder width, road signs etc. we first indicate these problems in our study and then we give the recommendation about these parameter according to standards.

# Chapter 6

# PROBLEMS AND RECOMMENDATIONS

PROBLEMS AND REC	OMMENDATIONS	because of bad condition	section.
PROBLEMS	RECOMMENDATIONS	of horizontal alignment in	
AVERAGE LANE	The average lane width should	less skid resistance to	
WIDTH: The average	be provided according to the	wheels	
lane width is not	AASHTO standard which is	DELINEATION	These should be provided in
according to AASHTO	12.ft.	DEVICES: These devices	the proposed sections so that to
standards as also shown		were not provided at	minimize the chances of road
in the graph at different		some sections due to	side accidents at night and for
sections.		which the road edges are	providing safe ride
SHOULDER WIDTH:	Shoulder width should be	not visible at night for the	providing sale fide.
No shoulder width is	provided at each sections	road users	
provided at some	according to the AASHTO	SKID RESISTANCE: On	So proper skid resistance
sections which are not	standard which is 10ft.	the horizontal curves	surface should be provided in
according to the		when the vehicles turn	the overall proposed section so
standards of AASHTO.		causing slip to vehicle	to minimize the problems
SHOULDER LINE:	Road lines such as shoulder line	tires.	occurring from such surface
Shoulder lines were not	will be visible so that drivers		conditions.
visible at most of the	may enter the shoulder line in	CAMBER: Camber	Proper camber should be
sections.	safe conditions or in safe	condition was bad at	provided according to
	motions.	different sections. The	AASHTO guide lines so that
ROAD MARKING:	It should be provided at each	proper drainage condition	proper drainage of rain water
Road marking were not	sections so that to minimize road	through it was bad during	through it is possible.
given at most of the	accidents while crossing the	high rainy season which	
sections of the road.	routes.	causes potholes ditches at	
FOOTPATH: The	It should be according to the	different sections of the	_
footpath at some	Standards of AASHTO which is	road surface.	
sections is not according	5-8ft.it should be given in the	GUARD RAILS: Guard	It should be provided so to
to the standards. Which	road section.	rails were not provided at	make the road sections for the
provide most of the		some sections.	vehicles and road drivers safer.
problems for the			So that the sides of the road are
pedestrians.			clearly visible to drivers.
ROAD SIGN: The road	Road signs should be provided		
sign were not given at	so that the drivers will come to		
most of the section.	know the direction of the road		
	and while entering from one		
	route to other.	References	
U-TURNS: The U-turns	U-turns should be provided at		
were not provided at	minimum distance so that to	1) U.S. Department o	f Transportation, Federal
some sections. Causing	reduce the effort of drivers to	Highway Administ	tration and Value Management
the problems for the	travel large distance for a single	Strategies, Inc	
drivers while driving for	turn.	2) Global status repor	rt on road safety (time for action)
a long distance so to		by world health or	ganization
enter another route.		3) Technical Guidelir	nes for the Preparation of Road

at high speed on the

accident increases

curves the chances of

PROBLEMS	RECOMMENDATION
POT HOLES: The	The road surface should be
existing surface of the	treated at least in 6 months for
road is having much more	the pot holes. So that to provide
pot holes at different	safe road for the road users.
sections. This is providing	
problems for the road	
users while driving.	
HORIZONTAL	For safe driving of the road
ALIGNMENT: When the	users proper horizontal
drivers drives the vehicles	alignment should be provided

at the sections needed. So that

Accidents in the proposed road

to reduce the chances of

65 10 20	110		

www.globalscientificjournal.com

Supersedes Nil.

highway).

Safety Audits, Road Safety Impact Assessments and Road Safety Inspections (October 2011). 4) Towards safer roads (published July 2011) by

5) AASHTO Green book 2011 (policy on design of

6) AASHTO guide for design pavement structure