Physical integration of the existing condition of intermodal public transportation transfer points in Padang City, Indonesia

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¹Civil Engineering Department, Universitas Andalas, Padang, Indonesia

Abstract. Based on Padang City Central Bureau of Statistic (BPS Kota Padang), there was an increase in the number of motor vehicles by 4.013% in 2023 from the previous year. It will have a negative impact on congestion and air pollution in the short term and long term. Therefore, intermodal integration is needed in order to optimize the public transport service system. It is necessary for researching the integration of public transportation facilities and infrastructure to find out the problematic aspects of physical integration. This paper will discuss about the results of observations on physical integration of existing facilities and infrastructure in the intermodal public transportation area.

1 Introduction

Padang City is one of the provincial capitals in Indonesia with a population of nearly one million people. According to the Central Bureau of Statistics (BPS) for Padang City (2023), there will be 919,145 people living in this city in 2022. Of this population, Padang City is categorized as a large city with a population of between 250,000 and 1,000,000 people based on public transportation service criteria, based on Minister of Transportation Regulation No.15 of 2019.

Transportation is the activity of moving people or objects from one place to another using an intermediary in the form of a vehicle mode in a road crossing space. If defined in more detail, public transportation is a vehicle used by the general public to transport people and/or goods with direct or indirect costs [1]. Each mode of transportation, public transportation has different fares, schedules and routes. Various regions have their own regulations to regulate their transportation system.

In addition to the problem of the increasing number of motorized vehicles, there is one strategic issue contained in the 2019-2024 Padang City Transportation Service Strategic Plan, namely that public transport services have not yet been integrated because there is no feeder transport available and there is still a lack of integrated facilities and infrastructure such as between the stop and the station. Therefore, one of the improvements to the existing public transport system is to create continuity between modes of mass transportation.

Intermodal integration in a city is important in order to maximize the function of public transportation in serving its users. In other words, intermodal integration means connecting different modes of transportation into an integrated public transport system. There are kind of actions implemented in transportation system management. One of these actions is to improve public transport services and the efficiency of their management [2).

Integrated and connected public transportation is a solution to the urgency of a city's population movement. Effective transportation is a transportation system that fulfills the capacity being transported, integrated or integrated with intermodal transportation, orderly, orderly, smooth, fast, precise, safe, secure, comfortable and at an affordable cost. The meaning of efficiency in transportation is that the burden on users is minimal and has high utility [2].

This study will discuss the results of observations on the existing condition of modal interchange facilities and infrastructure at train stations that are connected to other public transport stops. Based on this research, it is known that the integration aspects of intermodal transport nodes are in good or bad condition at existing stations.

2 Physical integration

Physical integration is the integration of public transportation infrastructure consisting of route integration and transfer facility integration. Route integration is changes to the route structure to make it more aligned passenger travel patterns. Facility integration is the determination of transfer points as the center of the movement of people between different transit modes and within different routes of the same mode [3].

There are several aspects that affect the passenger experience when changing modes from one mode to another. Reliable and legible information, travel and waiting times, availability of facilities, and safety and
security. The application of park and ride infrastructure is urgently needed to achieve integration and the existence of complementary services in and around the station. The other factors such as pedestrian flow, intensive use of travelators and aspects related to sustainability are also taken into account [4].

The main advantage of intermodal services is that the variety of systems provided and offered allows different modes to meet different travel needs. However, passengers refuse to change modes due to distractions triggered in their journeys which lead to delays, the need for orientation and walking between vehicles with different lanes and modes which adds to the delay, but also often reduces the level of safety [5].

There are several divisions of indicators in assessing the physical integration of public transport facilities and infrastructure which are carried out based on survey results in the location. The indicators consist of proximity, connectivity, convenience, safety, security, and attractiveness which are then given a value according to existing conditions. The results of the analysis and evaluation of the interpretation of the data are useful for knowing the degree of physical integration aspect of the public transportation modal transfer facilities [6].

Based on Transportation Research Record about Intermodal Transfer Facilities, the intermodal transfer facility is a factor in the effectiveness of the transportation network. It integrates various modes of transportation to the maximum number of users. A bad connector will disappoint potential users or causing them to switch to another mode. In addition, the poor practice of operating the transportation system sometimes causing congestion and delays, indicating insufficient transfer facilities. There is a need to define optimizing factors the total effectiveness of the transport network. More information is needed on its effects system operating practices on efficiency of capital transfer and use of space, and procedures should be developed to increase efficiency and reduce space requirements, passengers inconvenience, and delay. There are several transfer elements that mentioned like access, modal, human, building, transfer, processing, service, and traffic [7].

### Table 1. Physical integration aspect standards on public transportation modal transfer facilities.

<table>
<thead>
<tr>
<th>PROXIMITY</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Distance</strong></td>
<td></td>
</tr>
<tr>
<td>The walking distance for Indonesians is around ± 400 m. When carrying goods, the distance is not more than 300 m</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TRAVELING TIME</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Walking Time</strong></td>
<td></td>
</tr>
<tr>
<td>Walking speed in general when there are no obstacles is around 4.8 km/hour or 79.2 m/minute (1.32 m/second). If there are obstacles, there will be a 25% delay in travel time</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CONNECTIVITY</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Availiability of Access</strong></td>
<td></td>
</tr>
<tr>
<td>Assessment criteria for the availability of walking access factors:</td>
<td></td>
</tr>
<tr>
<td>a. No pedestrian space available but it is needed</td>
<td></td>
</tr>
<tr>
<td>b. Pedestrian space is available but very congested and not maintained</td>
<td></td>
</tr>
<tr>
<td>c. Pedestrian space available but congested and needs better maintenance</td>
<td></td>
</tr>
<tr>
<td>d. Walking paths are available, which are sometimes congested but clean and well maintained</td>
<td></td>
</tr>
<tr>
<td>e. No pedestrian space is required as users can walk safely on the road</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CONVENIENCE</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Availability of Signage</strong></td>
<td></td>
</tr>
<tr>
<td>a. Directions for entrance/exit of the station area and station building</td>
<td></td>
</tr>
<tr>
<td>b. Directions to other public transportation facilities</td>
<td></td>
</tr>
<tr>
<td>c. Train itinerary</td>
<td></td>
</tr>
<tr>
<td>d. Railroad route map</td>
<td></td>
</tr>
<tr>
<td>e. Bus stop signs</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ACCESS CONVENIENCE</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Access Convenience</strong></td>
<td></td>
</tr>
<tr>
<td>a. Availability of weather protection</td>
<td></td>
</tr>
<tr>
<td>b. Layout that does not interfere with the flow of pedestrians</td>
<td></td>
</tr>
<tr>
<td>c. The surface and texture of the walkways are not easy to slip</td>
<td></td>
</tr>
<tr>
<td>d. Accessible to pedestrians with physical limitations (disabilities)</td>
<td></td>
</tr>
<tr>
<td>e. Curb ramps</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ACCESS WIDTH</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Access Width</strong></td>
<td></td>
</tr>
<tr>
<td>Land use as a terminal/bus stop has a minimum width of 2 meters and a recommended width of 3 meters. Access is said to be comfortable if it is 1.5 meters wide. The minimum requirement for a person to move freely is 1.2 meters</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SAFETY</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Crossing Facilities</strong></td>
<td></td>
</tr>
<tr>
<td>a. Marked crossing (zebra cross)</td>
<td></td>
</tr>
<tr>
<td>b. Traffic light to signal crossing time</td>
<td></td>
</tr>
<tr>
<td>c. Availability of overpass or underpass</td>
<td></td>
</tr>
<tr>
<td>d. Pedestrian sign</td>
<td></td>
</tr>
<tr>
<td>e. Rumble strip next to the crossing</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SECURITY</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Area Security</strong></td>
<td></td>
</tr>
<tr>
<td>a. Located at the point of maximum surveillance</td>
<td></td>
</tr>
<tr>
<td>b. There is lighting for at night</td>
<td></td>
</tr>
<tr>
<td>c. There is CCTV / Street Watching</td>
<td></td>
</tr>
</tbody>
</table>

Many community activities around the pedestrian space

<table>
<thead>
<tr>
<th>ATTRACTIVENESS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Amiability and Access Functions</strong></td>
<td></td>
</tr>
<tr>
<td>a. The availability of convenience facilities such as seating</td>
<td></td>
</tr>
<tr>
<td>b. There are shady trees</td>
<td></td>
</tr>
<tr>
<td>c. There is a garden in the promenade</td>
<td></td>
</tr>
<tr>
<td>d. There are street furniture such as trash cans and potted vegetation</td>
<td></td>
</tr>
</tbody>
</table>

3 Methodology

Observations were made to directly review aspects of the integration of public transportation nodes with six categories followed by several factors. The observation instrument is presented in the form of scoring. In determining the correct score, a basic theory is needed in making decisions so that the determination of the score is not subjective and the standard of assessment does not change over time and in different places. The following is a description of the determination of each score for all factors from the six aspects:
The technique determines the score on each aspect factor based on the results of observer observations according to the classification and categories that have been determined. Estimation of the scoring method uses a Likert Scale with a description of a score of 1 for "Very Bad", a score of 2 for "Bad", a score of 3 for "Sufficient", a score of 4 for "Good", and a score of 5 for "Very Good".

The summary of the scores for each factor from the three observers was carried out and averaged. The results are summed up as a whole to get a total score for each observation location. Total score indicates the existing integration condition of the intermodal integration aspects of the observed nodes.

### Table 2. Classification of modal transport transfer point evaluation.

<table>
<thead>
<tr>
<th>No.</th>
<th>Intervals</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9 ≤ X ≤ 18</td>
<td>Very Bad</td>
</tr>
<tr>
<td>2</td>
<td>18 ≤ X ≤ 27</td>
<td>Bad</td>
</tr>
<tr>
<td>3</td>
<td>27 ≤ X ≤ 36</td>
<td>Good</td>
</tr>
<tr>
<td>4</td>
<td>36 ≤ X ≤ 45</td>
<td>Very Good</td>
</tr>
</tbody>
</table>

### 4 Result and discussion

#### 4.1 Lubuk Buaya Station

This station is located on Adinegoro Street, Lubuk Buaya, Koto Tangah, has become the front station which is near the regional boundary of Padang City. It is a place for train crossings to and from Minangkabau International Airport and Pariaman City as well as the reverse direction to the downtown of Padang City. There are two bus stops around this station as a place to change modes of public transportation, namely Lubuk Buaya Station Stop and Lubuk Buaya Market Stop. Figure 1 shows satellite imagery of the Lubuk Buaya Station transfer area with bus stops around it.

![Fig. 1. Lubuk Buaya station transfer area and bus stops.](image)

The connectivity between Lubuk Buaya Station and Lubuk Buaya Station Bus Stop is marked by the blue line which has a connection distance of ± 40 m. This area has a pedestrian space with a width of 90 cm which requires more maintenance. There are power poles that occupy the sidewalk. In terms of completeness of signage, there are only train schedules, bus stop signs, and station nameplate. Even though the station and bus stop are on the same side of the road, safety facilities are inadequate. Security in this area is fairly good, but lacks attractive facilities.

#### Table 3. Evaluation of Lubuk Buaya Station - Lubuk Buaya Station bus stop transfer point.

<table>
<thead>
<tr>
<th>No.</th>
<th>Aspect</th>
<th>Factor</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proximity</td>
<td>Distance</td>
<td>5.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Traveling Time</td>
<td>5.00</td>
</tr>
<tr>
<td>2</td>
<td>Connectivity</td>
<td>Availability of Access</td>
<td>2.67</td>
</tr>
<tr>
<td></td>
<td>Convenience</td>
<td>Availability of Signage</td>
<td>3.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Access Convenience</td>
<td>2.67</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Access Width</td>
<td>1.00</td>
</tr>
<tr>
<td>3</td>
<td>Safety</td>
<td>Crossing Facilities</td>
<td>3.33</td>
</tr>
<tr>
<td>4</td>
<td>Security</td>
<td>Area Security</td>
<td>4.00</td>
</tr>
<tr>
<td>5</td>
<td>Attractiveness</td>
<td>Attractability and Access Functions</td>
<td>1.67</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total Score</td>
<td>28.33</td>
</tr>
</tbody>
</table>

**Classification**: Good

#### 4.2 Tabing Station

Tabing Station is located on north of Parupuk Tabing, Koto Tangah. The commuters which is operating through this station are the same as Lubuk Buaya Station, namely Minangkabau Express and Pariaman Express. This station is located between Lubuk Buaya Station in the north and Air Tawar Station in the south. There are two bus stops around it.

The distance from Lubuk Buaya Station to the Lubuk Buaya Market Bus Stop is around ± 130 m which is indicated by the red line. Pedestrian space has a width of 280 cm, with conditions where there are disturbances such as merchant advertisements that interrupt the sidewalk, as well as the condition of the sidewalk itself that requires better maintenance. In this node area, there are only train schedules, bus stop signs, and station nameplate. This area does not have crossing facilities although they are needed. Pedestrian space is not attractive, but security from crime is good.

#### Table 4. Evaluation of Lubuk Buaya Station - Lubuk Buaya Market bus stop transfer point.

<table>
<thead>
<tr>
<th>No.</th>
<th>Aspect</th>
<th>Factor</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proximity</td>
<td>Distance</td>
<td>4.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Traveling Time</td>
<td>4.00</td>
</tr>
<tr>
<td>2</td>
<td>Connectivity</td>
<td>Availability of Access</td>
<td>3.33</td>
</tr>
<tr>
<td></td>
<td>Convenience</td>
<td>Availability of Signage</td>
<td>3.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Access Convenience</td>
<td>2.33</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Access Width</td>
<td>4.67</td>
</tr>
<tr>
<td>3</td>
<td>Safety</td>
<td>Crossing Facilities</td>
<td>1.00</td>
</tr>
<tr>
<td>4</td>
<td>Security</td>
<td>Area Security</td>
<td>4.00</td>
</tr>
<tr>
<td>5</td>
<td>Attractiveness</td>
<td>Attractability and Access Functions</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total Score</td>
<td>27.33</td>
</tr>
</tbody>
</table>

**Classification**: Good

The distance from Lubuk Buaya Station to the Lubuk Buaya Market Bus Stop is around ± 130 m which is indicated by the red line. Pedestrian space has a width of 280 cm, with conditions where there are disturbances such as merchant advertisements that interrupt the sidewalk, as well as the condition of the sidewalk itself that requires better maintenance. In this node area, there are only train schedules, bus stop signs, and station nameplate. This area does not have crossing facilities although they are needed. Pedestrian space is not attractive, but security from crime is good.
near the station, namely the Tabing Station 1 Bus Stop and Tabing Station 2 Bus Stop. Figure 2 is an image of the Tabing Station area along with bus stops around it.

The distance between Tabing Station and Station 1 Bus Stop is around ± 60 m, indicated by the blue line. The pedestrian path is 280 cm wide with conditions requiring better maintenance. This sidewalk has ramps, but no disabled guides. Although the two places are on the same side, the safety facilities are poor. The area is classified as quite safe because the area is around the center of community activity and adequate lighting, but CCTV is only in the station. The attractiveness of the area's pedestrian space is fairly poor.

![Tabing Station transfer area and bus stops.](image)

Fig. 2. Tabing Station transfer area and bus stops.

It is shown that the distance between these two facilities is ± 75 m by the red line. There is an overpass in this area with very severe conditions. There are other crossing points which are far away and you have to go around the road first. In fact, crossing safety facilities are in poor condition. This area has complete signage. The access sidewalk is 120 cm wide, has no ramps or guideways. The pedestrian space lacks potential appeal. But from a security perspective, this area is quite good.

Table 5. Evaluation of Tabing Station – Tabing Station Bus Stop 1 Transfer Point.

<table>
<thead>
<tr>
<th>No</th>
<th>Aspect</th>
<th>Factor</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proximity</td>
<td>Distance</td>
<td>5.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Traveling Time</td>
<td>5.00</td>
</tr>
<tr>
<td>2</td>
<td>Connectivity</td>
<td>Availability of Access</td>
<td>3.33</td>
</tr>
<tr>
<td>3</td>
<td>Convenience</td>
<td>Availability of Signage</td>
<td>5.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Access Convenience</td>
<td>2.33</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Access Width</td>
<td>4.67</td>
</tr>
<tr>
<td>4</td>
<td>Safety</td>
<td>Crossing Facilities</td>
<td>1.67</td>
</tr>
<tr>
<td>5</td>
<td>Security</td>
<td>Area Security</td>
<td>3.33</td>
</tr>
<tr>
<td>6</td>
<td>Attractiveness</td>
<td>Amiability and Access Functions</td>
<td>1.33</td>
</tr>
</tbody>
</table>

Total Score: 31.33
Classification: Good

4.3 Air Tawar Station

Air Tawar Station is located on Prof. Dr. Hamka Street and it is between Basko Mall as a shopping center and Padang State University as an education center. The following is a satellite image of the Air Tawar Station with Basko Stop and Simpang Labor Stop in Figure 3.

![Air Tawar Station transfer area and bus stops.](image)

Fig. 3. Air Tawar Station transfer area and bus stops.

The connectivity of Air Tawar Station with the Basko bus stop is around ± 45 meters, marked with a blue line. Pedestrian space has a width of 120 cm with conditions requiring better maintenance. There is disturbance on the sidewalk, namely street vendors who eat the sidewalk body. The availability of signage in this area is incomplete and the convenience of access is also not up to standard. Even though it does not require a crossing point, there are still incomplete safety facilities such as bollards. This area has good potential for attractiveness such as parks and street furniture. In terms of security from crime, it is quite good.
Table 7. Evaluation of Air Tawar Station – Basko Bus Stop transfer point

<table>
<thead>
<tr>
<th>No</th>
<th>Aspect</th>
<th>Factor</th>
<th>Score</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proximity</td>
<td>Distance</td>
<td>5.00</td>
<td>Very Good</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Traveling Time</td>
<td>5.00</td>
<td>Very Good</td>
</tr>
<tr>
<td>2</td>
<td>Connectivity</td>
<td>Availability of Access</td>
<td>3.33</td>
<td>Sufficient</td>
</tr>
<tr>
<td>3</td>
<td>Convenience</td>
<td>Availability of Signage</td>
<td>2.00</td>
<td>Bad</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Access Convenience</td>
<td>2.33</td>
<td>Bad</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Access Width</td>
<td>2.67</td>
<td>Sufficient</td>
</tr>
<tr>
<td>4</td>
<td>Safety</td>
<td>Crossing Facilities</td>
<td>2.67</td>
<td>Sufficient</td>
</tr>
<tr>
<td>5</td>
<td>Security</td>
<td>Area Security</td>
<td>4.33</td>
<td>Good</td>
</tr>
<tr>
<td>6</td>
<td>Attractiveness</td>
<td>Amiability and Access Functions</td>
<td>3.33</td>
<td>Sufficient</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
<td><strong>Total Score</strong></td>
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<td><strong>30.67</strong></td>
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</tr>
<tr>
<td></td>
<td><strong>Classification</strong></td>
<td></td>
<td><strong>Good</strong></td>
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</tbody>
</table>

Table 8. Evaluation of Air Tawar Station – Simpang Labor bus stop transfer point

<table>
<thead>
<tr>
<th>No</th>
<th>Aspect</th>
<th>Factor</th>
<th>Score</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proximity</td>
<td>Distance</td>
<td>1.00</td>
<td>Very Bad</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Traveling Time</td>
<td>1.00</td>
<td>Very Bad</td>
</tr>
<tr>
<td>2</td>
<td>Connectivity</td>
<td>Availability of Access</td>
<td>4.00</td>
<td>Good</td>
</tr>
<tr>
<td>3</td>
<td>Convenience</td>
<td>Availability of Signage</td>
<td>3.33</td>
<td>Sufficient</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Access Convenience</td>
<td>3.00</td>
<td>Sufficient</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Access Width</td>
<td>3.00</td>
<td>Sufficient</td>
</tr>
<tr>
<td>4</td>
<td>Safety</td>
<td>Crossing Facilities</td>
<td>1.00</td>
<td>Very Bad</td>
</tr>
<tr>
<td>5</td>
<td>Security</td>
<td>Area Security</td>
<td>4.33</td>
<td>Good</td>
</tr>
<tr>
<td>6</td>
<td>Attractiveness</td>
<td>Amiability and Access Functions</td>
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<td></td>
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</tr>
<tr>
<td></td>
<td><strong>Total Score</strong></td>
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<td><strong>22.67</strong></td>
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<tr>
<td></td>
<td><strong>Classification</strong></td>
<td></td>
<td><strong>Bad</strong></td>
<td></td>
</tr>
</tbody>
</table>

Air Tawar Station with Simpang Labor Bus Stop has connectivity of around ± 430 meters because it needs to go around the road to the crossing first. This can be seen from the figure showing the red line as the connectivity of the two modal transfer facilities. Crossing facilities in this area are not complete. Pedestrian access has a width of 180 cm with well-maintained, clean, and quite comfortable conditions to traverse. The availability of signage is fairly complete in this area. In terms of security is also fairly good in this area. However, the potential attractiveness of pedestrian space is poor.

4.4 Tarandam Station

Tarandam Station is located on Proklamasi Street, Ganting Parak Gadang, East Padang District. This transfer point area is close to the Wirabraja Entertainment and Sports Center. The following is a satellite image of Tarandam Station and the stops around it in Figure 4.

Fig. 4. Tarandam Station Transfer Area and Bus Stops

The connectivity between Tarandam Station and Wirabraja Bus Stop 1 which is marked by the blue line has a distance of ± 135 m. The pedestrian space is 120 cm wide, but it is in a very bad condition and uncomfortable to walk on. Signage in this area is incomplete. Safety facilities are also incomplete. In addition, the attractiveness of the intermodal node area is not good. However, this area is fairly good secure.

Table 9. Evaluation of Tarandam Station – Wirabraja Bus Stop 1 transfer point

<table>
<thead>
<tr>
<th>No</th>
<th>Aspect</th>
<th>Factor</th>
<th>Score</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proximity</td>
<td>Distance</td>
<td>4.00</td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Traveling Time</td>
<td>4.00</td>
<td>Good</td>
</tr>
<tr>
<td>2</td>
<td>Connectivity</td>
<td>Availability of Access</td>
<td>2.33</td>
<td>Bad</td>
</tr>
<tr>
<td>3</td>
<td>Convenience</td>
<td>Availability of Signage</td>
<td>2.33</td>
<td>Bad</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Access Convenience</td>
<td>1.67</td>
<td>Bad</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Access Width</td>
<td>1.33</td>
<td>Very Bad</td>
</tr>
<tr>
<td>4</td>
<td>Safety</td>
<td>Crossing Facilities</td>
<td>1.67</td>
<td>Bad</td>
</tr>
<tr>
<td>5</td>
<td>Security</td>
<td>Area Security</td>
<td>1.67</td>
<td>Bad</td>
</tr>
<tr>
<td>6</td>
<td>Attractiveness</td>
<td>Amiability and Access Functions</td>
<td>1.67</td>
<td>Bad</td>
</tr>
<tr>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
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<td></td>
<td><strong>Classification</strong></td>
<td></td>
<td><strong>Bad</strong></td>
<td></td>
</tr>
</tbody>
</table>

Between the Tarandam Station and the Wirabraja Bus Stop 2 which is shown in red in figure, the connection distance is ± 140 meters. The pedestrian space is 300 cm wide and is in very well-maintained condition, not crowded, organized, and also has high spatial appeal. The area is equipped with adequate signage availability. In terms of security is also very good. However, there are no crossing facilities at this transfer point.
### Table 10. Evaluation of Tarandam Station – Wirabraja Bus Stop 2 transfer point.

<table>
<thead>
<tr>
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<th>Aspect</th>
<th>Factor</th>
<th>Score</th>
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<tbody>
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<td>Proximity</td>
<td>Distance</td>
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<tr>
<td></td>
<td></td>
<td>Traveling Time</td>
<td>4.00</td>
</tr>
<tr>
<td>2</td>
<td>Connectivity</td>
<td>Availability of</td>
<td>4.33</td>
</tr>
<tr>
<td></td>
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<td>Access</td>
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<td>Convenience</td>
<td>Availability of</td>
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</tr>
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<td></td>
<td>Signage</td>
<td>Sufficient</td>
</tr>
<tr>
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<td>Access Convenience</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Access Width</td>
<td>5.00</td>
</tr>
<tr>
<td>4</td>
<td>Safety</td>
<td>Crossing Facilities</td>
<td>1.00</td>
</tr>
<tr>
<td>5</td>
<td>Security</td>
<td>Area Security</td>
<td>4.33</td>
</tr>
<tr>
<td>6</td>
<td>Attractiveness</td>
<td>Amiability and</td>
<td>4.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Access Functions</td>
<td>Good</td>
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<td></td>
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</tr>
</tbody>
</table>

**Classification**: Good

### Table 11. Evaluation of Padang Station – Padang Station Bus Stop 1 transfer point.

<table>
<thead>
<tr>
<th>No</th>
<th>Aspect</th>
<th>Factor</th>
<th>Score</th>
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</thead>
<tbody>
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<td>Proximity</td>
<td>Distance</td>
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<td></td>
<td></td>
<td>Traveling Time</td>
<td>3.00</td>
</tr>
<tr>
<td>2</td>
<td>Connectivity</td>
<td>Availability of</td>
<td>2.33</td>
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<tr>
<td></td>
<td></td>
<td>Access</td>
<td>Bad</td>
</tr>
<tr>
<td>3</td>
<td>Convenience</td>
<td>Availability of</td>
<td>4.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Signage</td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Access Convenience</td>
<td>2.67</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Access Width</td>
<td>3.00</td>
</tr>
<tr>
<td>4</td>
<td>Safety</td>
<td>Crossing Facilities</td>
<td>2.67</td>
</tr>
<tr>
<td>5</td>
<td>Security</td>
<td>Area Security</td>
<td>4.33</td>
</tr>
<tr>
<td>6</td>
<td>Attractiveness</td>
<td>Amiability and</td>
<td>1.67</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Access Functions</td>
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<tr>
<td></td>
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<td><strong>Total Score</strong></td>
<td><strong>28.33</strong></td>
</tr>
</tbody>
</table>

**Classification**: Good

### 4.5 Padang Station

Padang Station is known as well as Simpang Haru Station by the Padang citizen because it is located at Simpang Haru, East Padang District. This station is located between the centers of community activity such as Simpang Haru Traditional Market, Dharma Andalas University, etc. Figure 5 is a satellite image of Padang Station and the bus stops around it.

![Fig. 5. Padang Station Transfer Area and Bus Stops.](image)

Padang Station Connectivity with Padang Station Bus Stop 1 is approximately ± 280 m away, shown in blue line in Fig. Access is available with a width of 160 cm with uncrowded and clean conditions, but requires more maintenance. There is good signage and adequate crossing facilities. Pedestrian space is less comfortable to traverse because there are no ramps, guideways, and layouts that interfere with the sidewalk. Although the potential for attractiveness is classified as bad, the safety of this area is relatively high.

The connecting distance between Padang Station and Padang Station Bus Stop 2 is around ± 365 m. Access has a width of 160 cm, not crowded, but not maintained. Crossing facilities are quite good, but access convenience facilities are incomplete. Complete signage is available. Lack of complete facilities that cause attraction. However, this area is fairly high secure.

### Table 12. Evaluation of Padang Station – Padang Station Bus Stop 2 Transfer Point

<table>
<thead>
<tr>
<th>No</th>
<th>Aspect</th>
<th>Factor</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Proximity</td>
<td>Distance</td>
<td>3.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Traveling Time</td>
<td>3.00</td>
</tr>
<tr>
<td>2</td>
<td>Connectivity</td>
<td>Availability of</td>
<td>2.33</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Access</td>
<td>Bad</td>
</tr>
<tr>
<td>3</td>
<td>Convenience</td>
<td>Availability of</td>
<td>4.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Signage</td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Access Convenience</td>
<td>2.67</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Access Width</td>
<td>3.00</td>
</tr>
<tr>
<td>4</td>
<td>Safety</td>
<td>Crossing Facilities</td>
<td>2.67</td>
</tr>
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<td>5</td>
<td>Security</td>
<td>Area Security</td>
<td>4.33</td>
</tr>
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<td>6</td>
<td>Attractiveness</td>
<td>Amiability and</td>
<td>2.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Access Functions</td>
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<tr>
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<td><strong>Total Score</strong></td>
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</tbody>
</table>

**Classification**: Good

### 5 Conclusion

In general, most of the current conditions of public transport intermodal nodes are fairly good. The problematic aspect of integration is the aspect of safety and attractiveness. Many of these modal transfer points are not equipped with zebra cross, rumble strips, crossing signs or lights. In addition, there is still a lack of facilities that create attractiveness in the node area such as benches, street furniture and weather protection. As for other problems, such as disruption of the pedestrian space flow due to street vendors or vehicles that eat up the body of the sidewalk, it is also one of the problems.
References

1. Ministry of Transportation No. 15 of 2019 (Jakarta, 2019)
5. K. Saliara, in Mobil. TUM 2014 (2014)