UNIVERSIDAD NACIONAL DE CAJAMARCA

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# ESCUELA ACADÉMICO PROFESIONAL DE INGENIERÍA CIVIL



# TESIS

**“EVALUACIÓN DE LA GEOMETRÍA VIAL DEL CAMINO VECINAL SANTA ROSA – CHAUPELANCHE DE ACUERDO A LAS NORMAS DG 2013”.**

**PARA OPTAR EL TÍTULO PROFESIONAL DE:**

# INGENIERO CIVIL

**Presentado por el bachiller:**

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**RESUMEN**

La presente tesis tuvo como objetivo principal realizar la evaluación de la geometría vial de acuerdo a la norma DG -2013. Debido a que el valor del promedio del tráfico semanal fue de 28 vehículos, la evaluación de la geometría vial se ha realizado con el manual de diseño de carreteras no pavimentadas de bajo volumen de tránsito (MDCNPBVT). El camino vecinal Santa Rosa – Chaupelanche, actualmente presenta diversas características geométricas deficientes en relación a su alineamiento horizontal, alineamiento vertical y sección transversal, debido a que no es más que un camino improvisado para solventar la necesidad de comunicación. El objetivo general de esta investigación fue realizar la evaluación de las características geométricas del camino vecinal Santa Rosa – Chaupelanche (Km 00+00 – Km 05+000), de acuerdo con el manual de diseño de carreteras no pavimentadas de bajo volumen de tránsito (MDCNPBVT). Se procedió a la obtención del inventario vial que corresponde a la toma de datos del levantamiento topográfico; luego se realizó el procesamiento y análisis de datos obtenidos en campo para ser evaluados comparativamente según el manual mencionado. Llegando a los siguientes resultados y conclusiones: longitud de tramos en tangente el 32% cumple y el 68% no cumple; radios mínimos el 100% cumple; longitud de curvas horizontales el 99% no cumple y el 1% cumple; distancias de visibilidad de curvas horizontales 86% no necesita y 14% necesita; sobreanchos 54% cumple y 46% no cumple; pendientes el 79% cumplen y el 21% no cumple; longitud de curvas verticales el 100% cumple; anchos de berma y calzada el 35% cumple y 65% no cumple; peraltes el 41% cumple y 59% no cumple; taludes de corte el 97% cumple y 3% no cumple; taludes de relleno el 95% cumple y 5% no cumple; cunetas el 100% no cumple. Finalmente por incidencia de porcentajes el camino vecinal no cumple en un 40% sus características geométricas.

**Palabras Claves:** Camino vecinal ,características geométricas, evaluación.

**ABSTRACT**

The main objective of this thesis was to evaluate the road geometry according to the DG-2013 standard. Because the value of the average weekly traffic was 28 vehicles, the road geometry evaluation was carried out with the design manual of unpaved roads with low traffic volume (MDCNPBVT). The Santa Rosa - Chaupelanche neighborhood road currently has several deficient geometrical characteristics in relation to its horizontal alignment, vertical alignment and cross section, because it is no more than an improvised way to solve the need for communication. The general objective of this investigation was to perform the evaluation of the geometric characteristics of the Santa Rosa - Chaupelanche neighborhood road (Km 00 + 00 - Km 05 + 000), in accordance with the design manual for unpaved roads with low traffic volume ( MDCNPBVT). We proceeded to obtain the road inventory that corresponds to the data collection of the topographic survey; then the processing and analysis of data obtained in the field was performed to be evaluated comparatively according to the aforementioned manual. Arriving at the following results and conclusions: length of sections in tangent, 32% comply and 68% does not comply; minimum radios 100% meets; length of horizontal curves 99% does not comply and 1% meets; horizontal curve visibility distances 86% do not need and 14% need; widened 54% meets and 46% does not comply; pending 79% comply and 21% does not comply; Vertical curve length 100% meets; width of berm and road 35% meets and 65% does not comply; cant 41% meets and 59% does not comply; cut slopes 97% meets and 3% does not comply; filling slopes 95% complies and 5% does not comply; ditches 100% does not comply. Finally, due to the incidence of percentages, the neighborhood road does not meet its geometric characteristics by 40%.

**Keywords:** Neighborhood road, geometric characteristics, evaluation

**CAPÍTULO I. INTRODUCCIÓN.**

Uno de los problemas más importantes que afectan al país, es la escasa existencia de vías adecuadas, puesto que muchas de estas vías se han realizado por iniciativa de los mismos pobladores, sin la aplicación y conocimiento de normativas correspondientes a diseño vial. Por tal motivo surge la necesidad del Ministerio de Transportes y Comunicaciones de emitir normas para garantizar que los proyectos de desarrollo vial se realicen de manera eficaz y eficiente. Siendo uno de ellos el manual de diseño de carreteras no pavimentadas de bajo volumen de tránsito (MDCNPBVT). Por ello, en la presente tesis se elaboró un estudio que analiza y compara los distintos parámetros geométricos del camino vecinal Santa Rosa – Chaupelanche (Km 00+000 – Km 05+000), basado en el manual de diseño de carreteras no pavimentadas de bajo volumen de tránsito (MDCNPBVT)

El trabajo se desarrolló en cinco capítulos: el primer capítulo comprende la introducción, el segundo el marco teórico, el tercero materiales y métodos, el cuarto análisis y discusión de los resultados, el quinto las conclusiones y recomendaciones.

* 1. **Planteamiento del problema**

En la actualidad en nuestro país existen diversos problemas relacionados con las carreteras y caminos vecinales aledaños a las zonas urbanas, esta ocurrencia y magnitud están directamente vinculados con un mal diseño de sus características geométricas, conllevado de esta manera a no brindar condiciones mínimas que permitan mantener una adecuada funcionalidad, transitabilidad y comodidad a los usuarios de dichas vías de comunicación.

Estos problemas se deben a un incremento de núcleos poblacionales, ocasionado mayores demandas de transporte, reflejándose en la necesidad de construir nuevas carreteras y caminos vecinales. Sin embargo al tratarse de zonas alejadas o aledañas estas construcciones no cuentan con una etapa de planificación y diseño de sus características geométricas, pues gran parte de ellas son construidas por la población misma sin contar con un asesoramiento técnico y normativo. Se debe tener en consideración que cada proyecto de diseño geométrico de carreteras es único en cuanto a las características del área, los puntos obligatorios de circulación, las necesidades de los usuarios de la carretera y los probables usos que se planifiquen.

En el departamento de Cajamarca parte su red vial está compuesta por carreteras y caminos vecinales sin pavimentar, tal es el caso del camino vecinalSanta Rosa – Chaupelanche, que se encuentra ubicado en la provincia de Chota, conectando a las poblaciones de Chota y Chaupelanche**;** fue construido en el año 1940, para dar acceso a la actividad de la agricultura al mercado, mejorar el flujo de bienes y servicios y promover el desarrollo de la salud pública y la educación.

Este camino vecinal fue construido por los pobladores de dichas zonas sin hacer uso de alguna normativa de diseño vial tal como el Manual de Diseño de Carreteras No Pavimentadas de Bajo Volumen de Tránsito (MDCNPBVT). Actualmente presenta diversas características geométricas deficientes en relación a su alineamiento horizontal, alineamiento vertical y sección transversal, debido a que no es más que un camino improvisado para solventar la necesidad de comunicación.

Cabe resaltar que estas características geométricas deficientes ocasionan que el camino vecinal no proporcione una adecuada serviciabilidad pues generan obstaculización de la fluidez vehicular, incrementan el tiempo de recorrido, producen mayor consumo de combustible debido al sobreesfuerzo de los motores, incrementan los costos de operación por parte de los usuarios de las vías y ocasionan una mayor probabilidad de que ocurran accidentes de tránsito y posibles pérdidas de vida de los usuarios.

Con las consideraciones anteriores se realizó la evaluación de las características geométricas del camino vecinal Santa Rosa – Chaupelanche;para poder verificar si dichas características geométricas cumplen con las diferentes especificaciones técnicas del Manual de Diseño de Carreteras No Pavimentadas de Bajo Volumen de Tránsito (MDCNPBVT). En el caso de no cumplirse los resultados, estos servirán para que se tengan en consideración para su etapa de pavimentación o mejoramiento de dicho camino vecinal para cumplir con la necesidad de los pobladores y caseríos aledaños, de contar con una vía adecuada, la cual les garantice a los mismos la intercomunicación en todo momento, sin importar condiciones del tiempo, ni dificultad de cualquier tipo de vehículo para la circulación y así poder garantizar el dinamismo de su actividades económicas y sociales.

* 1. **Formulación del problema**

¿Las características geométricas del camino vecinal Santa Rosa – Chaupelanche (Km 00+000 – Km 05+000), cumplen con los parámetros del manual de diseño de carreteras no pavimentadas de bajo volumen de tránsito (MDCNPBVT)?

* 1. **Hipótesis general**

Las características geométricas del camino vecinal Santa Rosa – Chaupelanche (Km 00+000 – Km 05+000), no cumplen con los parámetros establecidos en manual de diseño de carreteras no pavimentadas de bajo volumen de tránsito (MDCNPBVT).

* 1. **Justificación de la investigación**

La presente tesis se realizó para verificar si las características geométricas del camino vecinal Santa Rosa – Chaupelanche (Km 00+000 – Km 05+000) cumplen con el manual de diseño de carreteras no pavimentadas de bajo volumen de tránsito (MDCNPBVT), esto debido a que dicho camino vecinal tiene la función de un trayecto alterno a la ruta nacional PE – 3N, que conecta a la comunidad de Chaupelanche con la ciudad de Chota. Los resultados de esta investigación servirán para poner en evidencia si las características geométricas de este camino vecinal cumplen con la normativa mencionada, en caso contrario para que se tengan en cuenta en la etapa correspondiente a su pavimentación o mejoramiento, para garantizar un correcto funcionamiento de dicho medio de comunicación.

* 1. **Alcances o delimitación de la investigación.**

En esta tesis se realizó la evaluación de las características geométricas del camino vecinal Santa Rosa – Chaupelanche (Km 00+000 – Km 05+000), distrito de Chota de la provincia de Chota y departamento de Cajamarca. La normativa aplicada en la evaluación fue el manual de diseño de carreteras no pavimentadas de bajo volumen de tránsito (MDCNPBVT).

Las características geométricas que se evaluaron fueron las correspondientes al alineamiento horizontal: longitud de tramos en tangente, radios mínimos, longitud de curva horizontal, distancia de visibilidad en curvas horizontales y sobreanchos; al alineamiento vertical: pendientes y longitud de curvas verticales; y sección transversal: ancho de berma y calzada (corona), peraltes, taludes de corte, taludes de relleno y cunetas.

* 1. **Objetivos**
     1. **Objetivo general**
* Evaluar las características geométricas del camino vecinal Santa Rosa – Chaupelanche (Km 00+00 – Km 05+000), de acuerdo con el manual de diseño de carreteras no pavimentadas de bajo volumen de tránsito (MDCNPBVT).
  + 1. **Objetivos específicos**
* Determinar qué características geométricas: alineamiento horizontal, alineamiento vertical y sección transversal, cumplen con el manual de diseño de carreteras no pavimentadas de bajo volumen de tránsito (MDCNPBVT).
* Determinar qué características geométricas: alineamiento horizontal, alineamiento vertical y sección transversal, no cumplen con el manual de diseño de carreteras no pavimentadas de bajo volumen de tránsito (MDCNPBVT).
* Determinar la incidencia de las características geométricas que cumplen y no cumplen de acuerdo con el manual de diseño de carreteras no pavimentadas de bajo volumen de tránsito (MDCNPBVT).
  1. **Descripción de capítulos**

La tesis se ha dividido en cinco capítulos:

El primero capítulo correspondió a la introducción, el planteamiento del problema, formulación del problema, hipótesis general, justificación, delimitación y objeticos de la investigación. El segundo capítulo correspondió antecedentes teóricos, bases teóricas y definición de términos básicos. En tercer capítulo se describió los materiales y métodos, ubicación de la zona de estudio, procedimientos, análisis de datos y presentación de resultados. En el cuarto capítulo se desarrolló el análisis comparativo de las características geométricas del camino vecinal así como el análisis y discusión de resultados. Finalmente en el quinto capítulo se expuso las conclusiones y recomendaciones.

**CAPÍTULO II. MARCO TEÓRICO**

* 1. **Antecedentes teóricos**
     1. **A nivel internacional**
* **Quiroz y Estupiñan, 2012**, en su investigación: “Análisis comparativo del diseño geométrico del tramo localizado entre el sector la Piscicultura departamento de Nariño hasta Santiago departamento de Putumayo”; tuvo como objetivo realizar la comparación geométrica del tramo localizado entre el sector la Piscicultura departamento de Nariño hasta Santiago departamento del Putumayo. Para el análisis comparativo se fundamentó en los manuales de diseño geométrico de carreteras de los años 1998 y 2008 establecidas por el Instituto Nacional de Vías – Invias, Colombia. En la investigación se concluyó que la velocidad de diseño fue de 30km/h de acuerdo la normativa aplicada; los radios mínimos fueron inferiores a 30m no cumpliendo con la normativa; los sobreanchos no cumplen lo normativa; el valor de los peraltes no cumplen en un 28.11% del total de curvas analizadas; de la longitud entre tangencia 7 cumplen de las 501 analizadas; las pendientes analizadas no cumplen 37.84%; las longitudes mínimas de curva no cumplen en un 97.86% ; los anchos de calzada son totalmente adecuados para todo el tramo de estudio.
* **Zea, Ortiz y Zamudio, 2009,** en su investigación: “Diagnostico de la vía actual y propuesta de diseño geométrico del tramo comprendido entre el k0+000 hasta el k3+000 de la vía municipio de Tena – Los Alpes (Cudimarca); tuvo como objetivo un análisis de las condiciones actuales de la carretera en cuanto a su geometría vial. Para el diagnóstico de la vía se basó en el Manual de diseño geométrico del Instituto Nacional de Vías (INVIAS). Estos autores concluyeron que la velocidad de diseño fue de 30km/h según la normativa aplicada; los radios mínimos fueron de 30m; la longitud entre tangencia es difícil su cumplimiento por las condiciones de terreno; la calzada fue de 5.50m; inexistencia de bermas; y carencia de cunetas en un 60% del recorrido.
  + 1. **A nivel nacional**
* **Romaní, 2017,** en su investigación: “Análisis del diseño geométrico de la carretera Lima – canta, con relación a sus características operativas, tramo: km.66+000 – km.76+000”; ha tenido como objetivo realizar el análisis del Diseño Geométrico del alineamiento horizontal y vertical de la carretera Lima – Canta en el tramo Km: 66+000.00 hasta Km: 76+000.00, y su relación con las características operativas actuales. Para el análisis de la vía se basó en las normas DG-2014 y AASHTO. En la investigación desarrollada se concluyó que el 10% de longitud de tramos en tangente no cumple; los radios mínimos 10.42% no cumplen; y en pendientes el 16.67% no cumple.
* **Galán y Quispe, 2018,** en su investigación: “Evaluación de las características geométricas de la carretera Huaraz – Pinar, aplicando las normas MTC., en Independencia, Huaraz, Ancash, 2018”; ha tenido como objetivo evaluar las características geométricas de la carretera Huaraz – el Pinar. Para la evaluación se basó en el manual de diseño geométrico de carreteras DG -2001. En la investigación se concluyó que en longitud de tramos en tangente cumplen 33 tramos; radios mínimos cumplen 32%; peraltes cumplen con lo indicado en el manual; pendientes 23% de los tramos no cumplen; distancia de visibilidad en curvas horizontales necesitan el 58%.
  + 1. **A nivel local.**
* **Correa, 2016**, en su investigación: “Evaluación de las características geométricas de la carretera Cajamarca – Gavilán (km 173 – km 178) de acuerdo con las normas de diseño geométrico de carreteras DG -2013”; tuvo como objetivo determinar y evaluar las características geométricas de la carretera Cajamarca – Gavilán (km 173 – km 158). Para la evaluación de la vía se basó en el manual de diseño geométrico de carreteras DG -2013. En la investigación desarrollada se concluyó que la longitud de tramos en tangente 41 cumplen y 48 no cumplen; radios mínimos 79 cumplen y 11 no cumplen; anchos de corona 658 cumplen y 93 no cumplen; peraltes 25 cumplen y 16 no cumplen.
* **Cueva, 2018,** en su investigación: “Evaluación de las características geométricas de la carretera Paccha - Iglesia Pampa – centro poblado Laurel Pampa km 00.0+00 – km 05.5+00 de acuerdo con las normas de diseño geométrico de carreteras DG 2013”, ha tenido como objetivo evaluar las características geométricas de la carretera Paccha – Iglesia Pampa – centro poblado Laurel Pampa (km 00+00 – km 5.5 +00). Para la evaluación de la vía se fundamentó en el manual de diseño geométrico de carreteras DG – 2013. En la investigación se concluyó que la longitud de tramos en tangente el 16% cumple y el 84% no cumple; los radios mínimos el 63% cumple y el 37% no cumple; las curvas horizontales el 100% no cumple; la longitud de transición de peralte el 92% cumple y el 8% no cumple; la evaluación de pendientes el 54% cumplen y el 46% no cumple; la longitud de curvas verticales el 100% cumple; las banquetas de visibilidad el 53% cumple y el 47% no cumple; el ancho de plataforma el 24% cumple y el 76% no cumple; el sobreancho el 62% cumple y el 38% no cumple; los peraltes el 98% cumple y el 2% no cumple; talud de corte y relleno el 86% cumple y el 14% no cumple. La carretera no cumple con algunos parámetros de diseño geométrico dispuestos en el manual de diseño geométrico de carreteras DG-2013, por lo que se plantea mejorar la calidad de ciertos dispositivos de control que ayuden a garantizar la seguridad vial.
* **Huaripata, 2018,** en su investigación: “Evaluación del diseño geométrico de la carretera no pavimentada de bajo volumen de transito tramo C.P. el Tambo – C.P. Laguna Santa Úrsula con respeto al manual de diseño de carreteras de bajo volumen de transito – MTC”; ha tenido como objetivo evaluar la geometría de la carretera C.P. El Tambo – C.P. Laguna Santa Úrsula. Para la evaluación de la

vía se basó en el manual para el diseño de carreteras no pavimentadas de bajo volumen de tránsito (MDCNPBVT).En la investigación se concluyó que la velocidad de diseño fue de 20 km/h en promedio; la longitud de tangente entre curvas de sentido contrario o del mismo sentido son menores que el mínimo lo cual ocasiona la velocidad e incomodidad en el desplazamiento; el valor del sobreancho no cumplen en algunas curvas; el peralte que fue de 8% no cumple en algunas curvas; la pendiente usada fue del 10% y cumple con el parámetro establecido en el MDCNPBVT; el ancho de calzada de 3.5m. no cumplen en algunos tramos de acuerdo al MDCNPBVT; y el ancho de berma de 0.5m. no cumple en ciertos tramos de acuerdo al MDCNPBVT.

* 1. **Bases Teóricas**
     1. **Evaluación de las características geométricas de carreteras**

Cárdenas, G, 2008, menciona que la geometría vial es la parte más importante que se establecen a través de un diseño geométrico, con los niveles adecuados de comodidad, funcionalidad, estética y económica.

La vía será cómoda, en medida en que se disminuyan las aceleraciones de los vehículos y sus variaciones, lo cual se lograra ajustando las curvaturas de la geometría y sus transiciones a las velocidades de operación por las que optan los conductores a lo largo de los tramos rectos.

La vía será funcional de acuerdo a su tipo, características geométricas y volúmenes de tránsito, de tal manera que se ofrezcan una adecuada movilidad a través de una suficiente velocidad de operación.

La vía será estética al adaptarla al paisaje, permitiendo generar visuales agradables a las perspectivas cambiantes, produciendo en el conductor un recorrido fácil.

La vía debe ser compatible con el medio ambiente, adaptándola a la topografía natural, a los usos del suelo y al valor de la tierra, y procurando mitigar o minimizar los impactos ambientales

Aashto, G, 1994, menciona que las características geométricas de una vía debe satisfacer las necesidades de los usuarios y mantener la integridad del ambiente natural.

* + - 1. **Evaluación geométrica en planta.**

Las características geométricas en planta están constituidos por alineamientos rectos, curvas circulares y de grado de curvatura variable, que permiten una transición suave al pasar de alineamientos rectos a curvas circulares o viceversa o también entre dos curvas circulares de curvatura diferente.

El alineamiento horizontal deberá permitir la operación ininterrumpida de los vehículos, tratando de conservar la misma velocidad de diseño en la mayor longitud de carretera que sea posible.

En general, el relieve del terreno es el elemento de control del radio de las curvas horizontales y el de la velocidad de diseño y a su vez, controla la distancia de visibilidad. **(DG-2018,2018)**

* + - 1. **Evaluación geométrica en perfil y sección transversal.-**

Las características geométricas en perfil y sección transversal están constituido por una serie de rectas enlazadas por curvas verticales parabólicas, a los cuales dichas rectas son tangentes; en cuyo desarrollo, el sentido de las pendientes se define según el avance del kilometraje.

El alineamiento vertical deberá permitir la operación ininterrumpida de los vehículos, tratando de conservar la misma velocidad de diseño en la mayor longitud de carretera que sea posible.

En general, el relieve del terreno es el elemento de control del radio de las curvas verticales que pueden ser cóncavas o convexas, y el de la velocidad de diseño y a su vez, controla la distancia de visibilidad.

Las curvas verticales entre dos pendientes sucesivas permiten lograr una transición paulatina entre pendientes de distinta magnitud y/o sentido, eliminando el quiebre de la rasante. El adecuado diseño de ellas asegura las distancias de visibilidad requeridas por el proyecto. **(DG-2018,2018)**

* + 1. **Manual para el diseño de carreteras no pavimentadas de bajo volumen de tránsito (MDCNPBVT)**

El Manual para el Diseño de Carreteras No Pavimentadas de Bajo Volumen de Tránsito (MDCNPBVT) del Ministerio de Transportes y Comunicaciones (MTC), es un que manual organiza y recopila las técnicas de diseño vial y pone al alcance del usuario tecnologías apropiadas que propician el uso intensivo de mano de obra y de recursos locales.

Se formuló por la existencia de vías que conforman el mayor porcentaje del Sistema Nacional de Carreteras, caracterizadas por tener una superficie de rodadura de material granular y son recorridas generalmente por un volumen menor de 50 vehículos por día y que muy pocas veces llegan hasta 200 vehículos por día. **(MDCNPBVT, 2008).**

**Tabla 2.1:** Características básicas de la superficie de rodadura de las carreteras no pavimentadas de bajo volumen de transito

|  |  |  |
| --- | --- | --- |
| **Carretera de Bvt** | **IMD Proyectado** | **Ancho de Calzada (M)** |
| T3 | 101-200 | 2 carriles  5.50-6.00 |
| T2 | 50-100 | 2 carriles  5.50-6.00 |
| T1 | 16-50 | 1 Carril (\*) ó 2 carriles  3.50-6.00 |
| T0 | < 15 | 1 carril (\*)  3.50-4.50 |
| Trocha carrozable | IMD indefinido | 1 sendero (\*) |

Fuente: (MDCNPBVT, 2008), p. 17

* + 1. **Clasificación de carreteras**
       1. **Clasificación de acuerdo a la demanda**

Según la normativa DG - 2018, establece la siguiente clasificación:

1. **Autopistas de primera clase**

Son carreteras con IMDA (Índice Medio Diario Anual) mayor a 6.000 veh/día, de calzadas divididas por medio de un separador central mínimo de 6,00 m; cada una de las calzadas debe contar con dos o más carriles de 3,60 m de ancho como mínimo.

1. **Autopistas de segunda clase**

Son carreteras con un IMDA entre 6.000 y 4.001 veh/día, de calzadas divididas por medio de un separador central que puede variar de 6,00 m hasta 1,00 m, en cuyo caso se instalará un sistema de contención vehicular; cada una de las calzadas debe contar con dos o más carriles de 3,60 m de ancho como mínimo.

1. **Carreteras de primera clase.**

Son carreteras con un IMDA entre 4.000 y 2.001 veh/día, con una calzada de dos carriles de 3,60 m de ancho como mínimo. Puede tener cruces o pasos vehiculares a nivel y en zonas urbanas es recomendable que se cuente con puentes peatonales o en su defecto con dispositivos de seguridad vial.

1. **Carreteras de segunda clase.**

Son carreteras con IMDA entre 2.000 y 400 veh/día, con una calzada de dos carriles de 3,30 m de ancho como mínimo. Puede tener cruces o pasos vehiculares a nivel y en zonas urbanas es recomendable que se cuente con puentes peatonales o en su defecto con dispositivos de seguridad vial.

1. **Carreteras de tercera clase.**

Son carreteras con IMDA menores a 400 veh/día, con calzada de dos carriles de 3,00 m de ancho como mínimo. De manera excepcional estas vías podrán tener carriles hasta de 2,50 m, contando con el sustento técnico correspondiente.

1. **Trochas carrozables.**

Son vías transitables, que no alcanzan las características geométricas de una carretera, que por lo general tienen un IMDA menor a 200 veh/día. Sus calzadas deben tener un ancho mínimo de 4,00 m, en cuyo caso se construirá ensanches denominados plazoletas de cruce, por lo menos cada 500 m.

* + - 1. **Clasificación de acuerdo a la orografía**

Según la normativa DG - 2018, establece la siguiente clasificación:

1. **Terreno plano (tipo 1)**

Tiene pendientes transversales al eje de las vías menores o iguales al 10% y sus pendientes longitudinales son por lo general menores de tres por ciento (3%), demandando un mínimo de movimiento de tierras, por lo que no presenta mayores dificultades en su trazado.

1. **Terreno ondulado (tipo 2).**

Tiene pendientes transversales al eje de la vía entre 11% y 50% y sus pendientes longitudinales se encuentran entre 3% y 6 %, demandando un moderado movimiento de tierras, lo que permite alineamientos más o menos rectos, sin mayores dificultades en el trazado.

1. **Terreno accidentado (tipo 3).**

Tiene pendientes transversales al eje de la vía entre 51% y el 100% y sus pendientes longitudinales predominantes se encuentran entre 6% y 8%, por lo que requiere importantes movimientos de tierras, razón por la cual presenta dificultades en el trazado.

1. **Terreno escarpado (tipo 4).**

Tiene pendientes transversales al eje de la vía superiores al 100% y sus pendientes longitudinales excepcionales son superiores al 8%, exigiendo el máximo de movimiento de tierras, razón por la cual presenta grandes dificultades en su trazado.

* + 1. **Índice medio diario anual (IMDA)**

En los estudios del tránsito se puede tratar de dos situaciones: el caso de los estudios para carreteras existentes, y el caso para carreteras nuevas, es decir que no existen actualmente.

En el primer caso, el tránsito existente podrá proyectarse mediante los sistemas convencionales que se indican a continuación. El segundo caso requiere de un estudio de desarrollo económico zonal o regional que lo justifique.

La carretera se diseña para un volumen de tránsito que se determina por la demanda diaria que cubrirá, calculado como el número de vehículos promedio que utilizan la vía por día actualmente y que se incrementa con una tasa de crecimiento anual, normalmente determinada por el MTC para las diversas zonas del país. **(MDCNPBVT, 2008).**

* + 1. **Crecimiento del tránsito**

Se puede calcular el crecimiento de tránsito utilizando una fórmula simple:

…….. ***Ecuación 2.1***

donde:

Tn : Tránsito proyectado al ano n

To : Tránsito actual (año base)

i : Tasa de crecimiento anual por tipo de vehículo.

n : Años del periodo de diseño.

Estas tasas pueden variar sustancialmente si existieran proyectos de desarrollo específicos por implementarse con certeza a corto plazo en la zona de la carretera.

La proyección puede también dividirse en dos partes. Una proyección para vehículos de pasajeros que crecerá aproximadamente al ritmo de la tasa de crecimiento de la población. Y una proyección de vehículos de carga que crecerá aproximadamente con la tasa de crecimiento de la economía. Ambos datos sobre índices de crecimiento normalmente obran en poder de la región. **(MDCNPBVT, 2008).**

* + 1. **Clasificación por tipo de vehículo de diseño.**

Expresa, en porcentaje, la participación que le corresponde en el IMDA a las diferentes categorías de vehículos, que acorde al Reglamento Nacional de Vehículos. **(MDCNPBVT, 2008).**

* + 1. **Velocidad directriz**

La selección de la velocidad de diseño será una consecuencia de un análisis técnico-económico de alternativas de trazado que deberán tener en cuenta la orografía del territorio. En territorios planos, el trazado puede aceptar altas velocidades a bajo costo de construcción, pero en territorios muy accidentados será muy costoso mantener una velocidad alta de diseño, porque habría que realizar obras muy costosas para mantener un trazo seguro. Ello solo podría justificarse si los volúmenes de la demanda de tránsito fueran muy altos. **(MDCNPBVT, 2008).**

* + 1. **Distancia de visibilidad**

La Distancia de visibilidad es la longitud continua hacia delante de la carretera que es visible al conductor del vehículo. En diseño, se consideran tres distancias: la de visibilidad suficiente para detener el vehículo; la necesaria para que un vehículo adelante a otro que viaja a velocidad inferior en el mismo sentido; y la distancia requerida para cruzar o ingresar a una carretera de mayor importancia. **(MDCNPBVT, 2008).**

* + - 1. **Distancia de visibilidad de parada**

Distancia de visibilidad de parada es la longitud mínima requerida para que se detenga un vehículo que viaja a la velocidad directriz, antes de que alcance un objeto que se encuentra en su trayectoria.

Para efecto de la determinación de la visibilidad de parada se considera que el objetivo inmóvil tiene una altura de 0.60m y que los ojos del conductor se ubican a 1.10m por encima de la rasante de la carretera.

La pendiente ejerce influencia sobre la distancia de parada. Esta influencia tiene importancia práctica para valores de la pendiente de subida o bajada iguales o mayores a 6%. **(MDCNPBVT, 2008).**

En la tabla 2.2 se muestra la distancia de visibilidad de parada, en función a la velocidad directriz y de la pendiente.

**Tabla 2.2:** Distancias de visibilidad de parada (m)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Velocidad directriz Km/h | Pendiente en bajada | | | | Pendiente en subida | | |
| 0% | 3% | 6% | 9% | 3% | 6% | 9% |
| 20 | 20 | 20 | 20 | 20 | 19 | 18 | 18 |
| 30 | 35 | 35 | 35 | 35 | 31 | 30 | 29 |
| 40 | 50 | 50 | 50 | 53 | 45 | 44 | 43 |
| 50 | 65 | 66 | 70 | 74 | 61 | 59 | 58 |
| 60 | 85 | 87 | 92 | 97 | 80 | 77 | 75 |

Fuente: (MDCNPBVT, 2008), p. 46

* + 1. **Alineamiento horizontal**

El diseño geométrico en planta o alineamiento horizontal, está constituido por alineamientos rectos, curvas circulares y de grado de curvatura variable, que permiten una transición suave al pasar de alineamientos rectos a curvas circulares o viceversa o también entre dos curvas circulares de curvatura diferente.

El alineamiento horizontal deberá permitir la operación ininterrumpida de los vehículos, tratando de conservar la misma velocidad de diseño en la mayor longitud de carretera que sea posible.

En general, el relieve del terreno es el elemento de control del radio de las curvas horizontales y el de la velocidad de diseño y a su vez, controla la distancia de visibilidad. **(DG-2018, 2018)**

* + - 1. **Consideraciones para el alineamiento horizontal**
* El alineamiento carretero se hará tan directo como sea conveniente adecuándose a las condiciones del relieve y minimizando dentro de lo razonable el número de cambios de dirección. El trazado en planta de un tramo carretero está compuesto de la adecuada sucesión de rectas (tangentes), curvas circulares y curvas de transición.
* En general, el relieve del terreno es el elemento de control del radio.
* Para evitar la apariencia de alineamiento quebrado o irregular, es deseable que, para ángulos de deflexión mayores a los indicados en la tabla la longitud de la curva sea por lo menos de 150m. Si la velocidad directriz es menor a 50 km/h y el ángulo de deflexión es mayor que 5º, se considera como longitud de curva mínima deseada la longitud obtenida con la siguiente expresión L = 3V (L = longitud de curva en metros y V = velocidad en km/hora). Es preferible no diseñar longitudes de curvas horizontales mayores a 800 metros. **(MDCNPBVT, 2008).**

**Tabla 2.3:** Ángulos de deflexión máximos para los que no se requiere curva horizontal

|  |  |
| --- | --- |
| Velocidad directriz Km/h | Deflexión máxima aceptable sin curva circular |
| 30 | 2° 30’ |
| 40 | 2° 15’ |
| 50 | 1° 50’ |
| 60 | 1° 30’ |

Fuente: (MDCNPBVT, 2008), p.40.

* + - 1. **Tramos en tangente**

Las longitudes mínimas admisibles y máximas deseables de los tramos en tangente, en función a la velocidad de diseño. Las longitudes de tramos en tangente **(DG-2018, 2018)**, están dados por las expresiones:

…… ***Ecuación 2.2***   
 …… ***Ecuación 2.3***

……. ***Ecuación 2.4***

donde:

Lmin.s : Longitud mínima (m) para trazados en "S" (alineación recta entre alineaciones curvas con radios de curvatura de sentido contrario).

Lmin.o : Longitud mínima (m) para el resto de casos (alineación recta entre alineaciones curvas con radios de curvatura del mismo sentido).

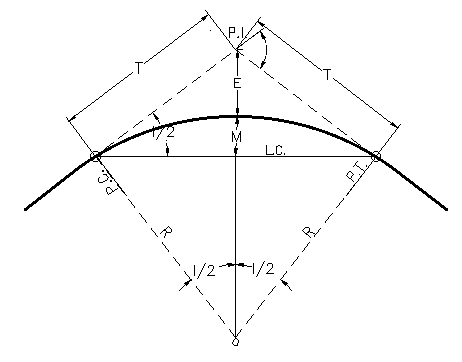
Lmáx : Longitud máxima (m).

Vd : Velocidad de diseño (Km/h).

* + - 1. **Curvas circulares**

Las curvas horizontales circulares simples son arcos de circunferencia de un solo radio que unen dos tangentes **(DG-2018, 2018).** La figura ilustra los elementos de la curva circular.

**Figura 2.1:** Simbología de la curva circular



**Fuente:**  (DG-2018, 2018),p.128.

donde:

P.C. : Punto de inicio de la curva

P.I. : Punto de intercesión de dos alineamientos consecutivos.

P.T. : Punto de tangencia

E : Externa (m)

M : Distancia de la ordenada media (m)

R : Longitud del radio de la curva (m)

L : Longitud de la curva (m)

L.C : Longitud de la curda (m)

I : Angulo de deflexión (°)

T : Longitud de la subtangente (m)

**Tabla 2.4:** Simbología de la curva circular

|  |  |
| --- | --- |
| Elemento | Fórmula |
| Longitud de la tangente (m) |  |
| Longitud de cuerda (m) |  |
| Longitud de la curva (m) |  |
| Ordenada media (m) |  |
| Distancia a externa (m) |  |

**Fuente:**  (DG-2018, 2018), p.128.

* + - 1. **Radios de diseño**

Los radios mínimos de curvatura horizontal es un valor límite que esta dado en función del valor máximo del peralte y el factor máximo de fricción **(MDCNPBVT, 2008),** para cuyo cálculo puede utilizarse la siguiente fórmula:

donde:

Rmín = Radio mínimo en metros.

V = Velocidad de diseño en Km /h.

Pmáx = Peralte máximo de la curva en valor decimal.

fmáx = Factor máximo de fricción.

**Tabla 2.5:** Radios mínimos y peraltes máximos

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Velocidad directriz (km/h) | Peralte máximo e (%) | Valor límite de fricción fmáx | Calculado radio mínimo (m) | Redondeo radio mínimo (m) |
| 20  30  40  50  60 | 4  4  4  4  4 | 0.18  0.17  0.17  0.16  0.15 | 14.3  33.7  60  98.4  149.1 | 15  35  60  100  150 |
| 20  30  40  50  60 | 6  6  6  6  6 | 0.18  0.17  0.17  0.16  0.15 | 13.1  30.8  54.7  89.4  134.9 | 15  30  55  90  135 |
| 20  30  40  50  60 | 8  8  8  8  8 | 0.18  0.17  0.17  0.16  0.15 | 12.1  28.3  50.4  82  123.2 | 10  30  50  80  125 |
| 20  30  40  50  60 | 10  10  10  10  10 | 0.18  0.17  0.17  0.16  0.15 | 11.2  26.2  46.6  75.7  113.3 | 10  25  45  75  115 |
| 20  30  40  50  60 | 12  12  12  12  12 | 0.18  0.17  0.17  0.16  0.15 | 10.5  24.4  43.4  70.3  104.9 | 10  25  45  70  105 |

Fuente: (MDCNPBVT, 2008), p.44.

* + - 1. **Curvas de vuelta**

Son aquellas curvas que se proyectan sobre una ladera, en terrenos accidentados, con el propósito de obtener o alcanzar una cota mayor, sin sobrepasar las pendientes máximas, y que no es posible lograr mediante trazos alternativos.

Este tipo de curvas no se emplearan en autopistas, en tanto que en carreteras de Primera Clase podrán utilizarse en casos excepcionales justificados técnica y económicamente, debiendo ser 20 m. el radio interior mínimo. Por lo general, las ramas pueden ser alineamientos rectos con sólo una curva de enlace intermedia, y según el desarrollo de la curva de vuelta, dichos alineamientos pueden ser paralelas entre sí, divergentes, etc. **(DG-2018, 2018).**

* + - 1. **Sobreanchos**

La calzada aumenta su ancho en las curvas para conseguir condiciones de operación vehicular comparable a la de las tangentes.

En las curvas, el vehículo de diseño ocupa un mayor ancho que en los tramos rectos. Asimismo, a los conductores les resulta más difícil mantener el vehículo en el centro del carril. **(MDCNPBVT, 2008)**

* + - 1. **Distancia de visibilidad en curvas horizontales**

La distancia de visibilidad en el interior de las curvas horizontales es un elemento del diseño del alineamiento horizontal.

Cuando hay obstrucciones a la visibilidad en el lado interno de una curva horizontal (tales como taludes de corte, paredes o barreras longitudinales), se requiere un ajuste en el diseño de la sección transversal normal o en el alineamiento, cuando la obstrucción no puede ser removida.

De modo general, en el diseño de una curva horizontal, la línea de visibilidad será, por lo menos, igual a la distancia de parada correspondiente y se mide a lo largo del eje central del carril interior de la curva. **(MDCNPBVT, 2008).**

El mínimo ancho que deberá quedar libre de obstrucciones a la visibilidad, será calculado por la expresión siguiente:

donde:

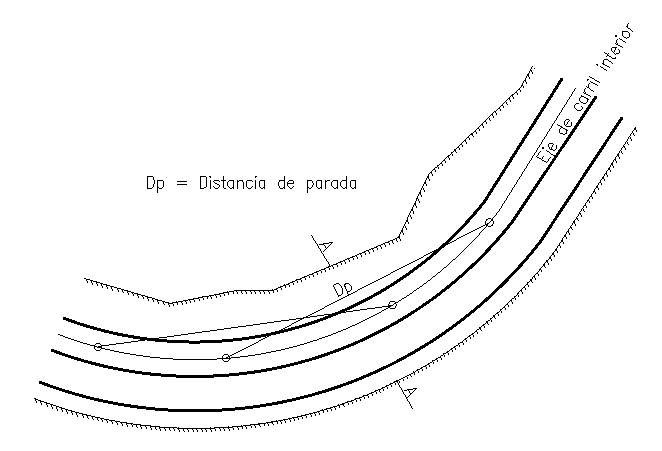
M = Ordenada media o ancho mínimo libre.

R = Radio de la curva horizontal.

S = Distancia de visibilidad.

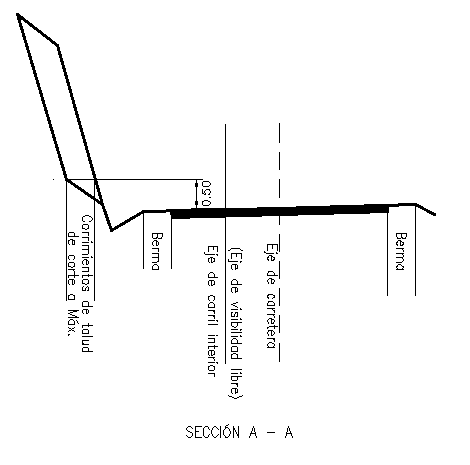
Cuando no es posible aumentar el radio de la curva, se recurrirá la procedimiento de la figura.

**Figura 2.2:** Visibilidad en curvas horizontales



**Fuente:**  (DG-2018, 2018), p.167.

**Figura 2.3:** Seccion A-A de visibilidad de curvas horizontales



**Fuente:**  (DG-2018, 2018), p.167.

* + 1. **Alineamiento vertical**

El diseño geométrico en perfil o alineamiento vertical, está constituido por una serie de rectas enlazadas por curvas verticales parabólicas, a los cuales dichas rectas son tangentes; en cuyo desarrollo, el sentido de las pendientes se define según el avance del kilometraje, en positivas, aquéllas que implican un aumento de cotas y negativas las que producen una disminución de cotas.

El alineamiento vertical deberá permitir la operación ininterrumpida de los vehículos, tratando de conservar la misma velocidad de diseño en la mayor longitud de carretera que sea posible. En general, el relieve del terreno es el elemento de control del radio de las curvas verticales que pueden ser cóncavas o convexas, y el de la velocidad de diseño y a su vez, controla la distancia de visibilidad.

Las curvas verticales entre dos pendientes sucesivas permiten lograr una transición paulatina entre pendientes de distinta magnitud y/o sentido, eliminando el quiebre de la rasante. El adecuado diseño de ellas asegura las distancias de visibilidad requeridas por el proyecto.

El sistema de cotas del proyecto, estarán referidos y se enlazarán con los B.M. de nivelación del Instituto Geográfico Nacional. **(DG-2018, 2018).**

* + - 1. **Pendientes**

En los tramos en corte, se evitará preferiblemente el empleo de pendientes menores a 0.5%. Podrá hacerse uso de rasantes horizontales en los casos en que las cunetas adyacentes puedan ser dotadas de la pendiente necesaria para garantizar el drenaje y la calzada cuente con un bombeo igual o superior a 2%.

En general, se considera deseable no sobrepasar los límites máximos de pendiente que están indicados en el cuadro 2.6.

En tramos carreteros con altitudes superiores a los 3,000 msnm, los valores máximos del cuadro 2.6 para terreno montañoso o terreno escarpados se reducirán en 1%.

Los límites máximos de pendiente se establecerán teniendo en cuenta la seguridad de la circulación de los vehículos más pesados en las condiciones más desfavorables.

En el caso de ascenso continuo y cuando la pendiente sea mayor del 5%, se proyectará, más o menos, cada tres kilómetros, un tramo de descanso de una longitud no menor de 500m con pendiente no mayor de 2%. Se determinará la frecuencia y la ubicación de estos tramos de descanso de manera que se consigan las mayores ventajas y los menores incrementos del costo de construcción.

En general, cuando en la construcción de carreteras se emplee pendientes mayores a 10%, el tramo con esta pendiente no debe exceder a 180 m.

Es deseable que la máxima pendiente promedio en tramos de longitud mayor a 2000m no supere el 6%, las pendientes máximas que se indican en el cuadro 2.6 son aplicables.

En curvas con radios menores a 50 debe evitarse pendientes en exceso a 8%, debido a que la pendiente en el lado interior de la curva se incrementa muy significativamente. **(MDCNPBVT, 2008).**

**Tabla 2.6:** Pendientes Máximas (%)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Orografía tipo  Velocidad de diseño | Terreno plano | Terreno ondulado | Terreno montañoso | Terreno escarpado |
| 20 | 8 | 9 | 10 | 12 |
| 30 | 8 | 9 | 10 | 12 |
| 40 | 8 | 9 | 10 | 10 |
| 50 | 8 | 8 | 8 | 8 |
| 60 | 8 | 8 | 8 | 8 |

Fuente: (MDCNPBVT, 2008), p. 56

* + - 1. **Curvas verticales**

Los tramos consecutivos de rasante serán enlazados con curvas verticales parabólicas cuando la diferencia algebraica de sus pendientes sea mayor a 1%, para carreteras pavimentadas y mayor a 2% para las afirmadas.

Las curvas verticales serán proyectadas de modo que permitan, cuando menos, la visibilidad en una distancia igual a la de visibilidad mínima de parada y cuando sea razonable una visibilidad mayor a la distancia de visibilidad de paso. **(MDCNPBVT, 2008)**.

Para la determinación el índice k se realiza con la siguiente fórmula:

donde:

K : Parámetro de curvatura

L : Longitud de la curva vertical

A : Valor Absoluto de la diferencia algebraica de las pendientes

**Tabla 2.7:** Valor del índice K para el cálculo de la longitud de curva vertical convexa

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Velocidad Directriz (Km/h) | Longitud controlada por visibilidad de frenado | | Longitud controlada por visibilidad de adelantamiento | |
| Distancia de visibilidad de frenado (m) | Índice de curvatura K | Distancia de visibilidad de adelantamiento | Índice de curvatura K |
| 20 | 20 | 0.6 |  |  |
| 30 | 35 | 1.9 | 200 | 46 |
| 40 | 50 | 3.8 | 270 | 84 |
| 50 | 65 | 6.4 | 345 | 138 |
| 60 | 85 | 11 | 410 | 195 |

El índice de curvatura es la longitud (L) de la curva de las pendientes (A) K = L/A por el porcentaje de la diferencia algebraica.

Fuente: (MDCNPBVT, 2008), p. 55.

**Tabla 2.8:** Valor del índice K para el cálculo de la longitud de curva vertical cóncava

|  |  |  |
| --- | --- | --- |
| Velocidad Directriz (Km/h) | Distancia de visibilidad de frenado (m) | Índice de curvatura K |
| 20 | 20 | 2.1 |
| 30 | 35 | 5.1 |
| 40 | 50 | 8.5 |
| 50 | 65 | 12.2 |
| 60 | 85 | 17.3 |

El índice de curvatura es la longitud (L) de la curva de las pendientes (A) K = L/A por el porcentaje de la diferencia algebraica.

Fuente: (MDCNPBVT, 2008), p. 56.

1. **Tipos de curva vertical**

* Curvas cóncavas y convexas
* Curvas simétricas y asimétricas

**a.1). Longitud de curva convexa**

* Para contar con la visibilidad de parada (Dp).
* Cuando Dp < L;

* Cuando Dp > L;

donde, para todos los casos:

L : Longitud de la curva vertical (m)

Dp : Distancia de visibilidad de parada (m)

A : Diferencia algebraica de pendientes (%)

h1 : Altura del ojo sobre la rasante (m)

h2 : Altura del objeto sobre la rasante (m)

**Caso más común: h1 = 1,07 m y h2 = 0,15 m**

* Cuando Dp < L;
* Cuando Dp > L;

**a.2). Longitud de curva cóncava**

La longitud de las curvas verticales cóncavas, se determina con las siguientes fórmulas:

* Cuando D < L;

* Cuando D > L;

donde:

D : Distancia entre el vehículo y el punto donde con un ángulo de 1º, los rayos de luz de los faros, interseca a la rasante.

* + 1. **Alineamiento transversal**

Al realizar un corte vertical normal al alineamiento horizontal, obtenemos un plano de sección trasversal en el que podemos visualizar, disponer y dimensionar cada uno de los elementos que la componen.

El elemento más importante de la sección transversal es la zona destinada a la superficie de rodadura o calzada, cuyas dimensiones deben permitir el nivel de servicio previsto en el proyecto, sin perjuicio de la importancia de los otros elementos de la sección transversal, tales como bermas, aceras, cunetas, taludes y elementos complementarios **(DG-2018, 2018).**

* + - 1. **Calzada**

En el diseño de carreteras de muy bajo volumen de tráfico IMDA < 50, la calzada podrá estar dimensionada para un solo carril. En los demás casos, la calzada se dimensionará para dos carriles.

En el cuadro 2.9, se indican los valores apropiados del ancho de la calzada en tramos rectos para cada velocidad directriz en relación al tráfico previsto y a la importancia de la carretera.

En los tramos en recta, la sección transversal de la calzada presentará inclinaciones transversales (bombeo) desde el centro hacia cada uno de los bordes para facilitar el drenaje superficial y evitar el empozamiento del agua.

Las carreteras no pavimentadas estarán provistas de bombeo con valores entre 2% y 3%. En los tramos en curva, el bombeo será sustituido por el peralte. En las carreteras de bajo volumen de tránsito con IMDA inferior a 200 veh/día, se puede sustituir el bombeo por una inclinación transversal de la superficie de rodadura de 2.5% a 3% hacia uno de los lados de la calzada. **(MDCNPBVT, 2008)**,

**Tabla 2.9:** Ancho mínimo deseable de la calzada en tangente (en metros)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Tráfico IMDA Velocidad Km/h | < 15 \* | 16 a 50 | | 51 a 100 | | 101 a 200 | |
| \* | \* \* | \* | \* \* | \* | \* \* |
| 25 | 3.50 | 3.50 | 5.00 | 5.00 | 5.50 | 5.50 | 6.00 |
| 30 | 3.50 | 4.00 | 5.50 | 5.50 | 5.50 | 5.50 | 6.00 |
| 40 | 3.50 | 5.50 | 5.50 | 5.50 | 6.00 | 6.00 | 6.00 |
| 50 | 3.50 | 5.50 | 6.00 | 5.50 | 6.00 | 6.00 | 6.00 |
| 60 |  | 5.50 | 6.00 | 5.50 | 6.00 | 6.00 | 6.00 |

\* Calzada de un sólo carril, con plazoleta de cruce y/o adelantamiento

\*\* Carreteras con predominio de tráfico pesado.

Fuente: (MDCNPBVT, 2008), p. 60.

* + - 1. **Bermas**

A cada lado de la calzada, se proveerán bermas con un ancho mínimo de 0.50m. Este ancho deberá permanecer libre de todo obstáculo incluyendo señales y guardavías. Cuando se coloque guardavías se construirá un sobre ancho de min. 0.50 m.

En los tramos en tangentes las bermas tendrán una pendiente de 4% hacia el exterior de la plataforma.

La berma situada en el lado inferior del peralte seguirá la inclinación de este cuando su valor sea superior a 4%. En caso contrario, la inclinación de la berma será igual al 4%.

La berma situada en la parte superior del peralte tendrá en lo posible una inclinación en sentido contrario al peralte igual a 4%, de modo que escurra hacia la cuneta.

La diferencia algebraica entre las pendientes transversales de la berma superior y la calzada será siempre igual o menor a 7%. Esto significa que cuando la inclinación del peralte es igual a 7%, la sección transversal de la berma será horizontal y cuando el peralte sea mayor a 7%, la berma superior quedará inclinada hacia la calzada con una inclinación igual a la inclinación del peralte menos 7%. **(MDCNPBVT, 2008)**.

* + - 1. **Bombeo.**

Las carreteras no pavimentadas estarán provistas de bombeo con valores entre 2% y 3%. En los tramos en curva, el bombeo será sustituido por el peralte. En los caminos de bajo volumen de tránsito con IMDA inferior a 200 veh/día se puede sustituir el bombeo por una inclinación transversal de la superficie de rodadura de 2.5% a 3% hacia uno de los lados de la calzada. **(MDCNPBVT, 2008)**.

* + - 1. **Ancho de la plataforma**

El ancho de la corona a rasante terminada resulta de la suma del ancho de la calzada y del ancho de las bermas.

La plataforma de la subrasante tendrá un ancho necesario para recibir sobre ella la capa o capas integrantes del pavimento, y la cuneta de drenaje. **(MDCNPBVT, 2008)**.

* + - 1. **Taludes**

Los taludes de corte dependerán de la naturaleza del terreno y de su estabilidad, pudiendo utilizarse (a modo referencial) las relaciones de corte en talud siguientes los que son apropiados para los tipos de materiales (rocas y suelos). **(MDCNPBVT, 2008)**.

**Tabla 2.10:** Taludes de corte

| TALUDES DE CORTE | | | |
| --- | --- | --- | --- |
| CLASE DE TERRENO | TALUD ( V : H ) | | |
| H < 5.00 | 5 < H < 10 | H > 10 |
| Roca Fija | 10 : 1 | (\*) | (\*) |
| Roca Suelta | 6 : 1 - 4 : 1 | (\*) | (\*) |
| Conglomerados Cementados | 4 : 1 | (\*) | (\*) |
| Suelos Consolidados Compactos | 4 : 1 | (\*) | (\*) |
| Conglomerados Comunes | 3 : 1 | (\*) | (\*) |
| Tierra Compacta | 2 : 1 - 1 : 1 | (\*) | (\*) |
| Tierra Suelta | 1 : 1 | (\*) | (\*) |
| Arenas Sueltas | 1 : 2 | (\*) | (\*) |
| Zonas blandas con abundante arcillas o zonas humedecidas por filtraciones | 1 : 2  hasta 1 : 3 | (\*) | (\*) |

(\*) Requiere Banqueta o análisis de estabilidad.

Fuente: (MDCNPBVT, 2008), p. 114.

Los taludes de relleno, igualmente, estarán en función de los materiales empleados, los siguientes taludes que son apropiados para los tipos de material. **(MDCNPBVT, 2008)**.

**Tabla 2.11:** Taludes de relleno

|  |  |  |  |
| --- | --- | --- | --- |
| TALUDES DE RELLENO | | | |
| MATERIALES | TALUD ( V : H ) | | |
| H < 5 | 5 < H < 10 | H >10 |
| Enrocado | 1 : 1 | (\*) | (\*) |
| Suelos diversos compactados (mayoría de suelos) | 1 : 1.5 | (\*) | (\*) |
| Arena Compactada | 1 : 2 | (\*) | (\*) |

(\*) Requiere Banqueta o análisis de estabilidad.

Fuente: (MDCNPBVT, 2008) p. 115

* + - 1. **Cunetas**

Las cunetas tendrán, en general, sección triangular y se proyectarán para todos los tramos al pie de los taludes de corte. Sus dimensiones serán fijadas de acuerdo a las condiciones pluviométricas, siendo las dimensiones mínimas aquellas indicadas en el tabla 2.12**. (MDCNPBVT, 2008)**.

**Tabla 2.12:** Dimensiones mínimas de cunetas

|  |  |  |
| --- | --- | --- |
| Región | Profundidad(m) | Ancho(m) |
| Seca | 0.20 | 0.50 |
| Lluviosa | 0.30 | 0.75 |
| Muy lluviosa | 0.50 | 1.00 |

Fuente: (MDCNPBVT, 2008) p. 80

* + 1. **Definiciones varias**
       1. **Estación total**

Se denomina estación total a un aparato electro-óptico utilizado en [topografía](https://es.wikipedia.org/wiki/Topograf%C3%ADa), cuyo funcionamiento se apoya en la [tecnología](https://es.wikipedia.org/wiki/Tecnolog%C3%ADa) [electrónica](https://es.wikipedia.org/wiki/Electr%C3%B3nica" \o "Electrónica), consiste en la incorporación de un [distanciómetro](https://es.wikipedia.org/wiki/Distanci%C3%B3metro" \o "Distanciómetro) y un [microprocesador](https://es.wikipedia.org/wiki/Microprocesador) a un [teodolito](https://es.wikipedia.org/wiki/Teodolito) electrónico. Algunas de las características que incorpora, y con las cuales no cuentan los teodolitos, son una pantalla alfanumérica de [cristal líquido](https://es.wikipedia.org/wiki/Cristal_l%C3%ADquido)(LCD), iluminación independiente de la [luz solar](https://es.wikipedia.org/wiki/Luz_solar), calculadora, distanciómetro, trackeador (seguidor de trayectoria) y en formato electrónico, lo cual permite utilizarla posteriormente en [ordenadores personales](https://es.wikipedia.org/wiki/Ordenador). **(GEOTOP, 2006)**

**Figura 2.4:** Leica Geosystems TS-06



* + - 1. **GPS**

El sistema de posicionamiento global (GPS) es un sistema que permite determinar en toda latierra la posición de un objeto (una persona, un vehículo) con una precisión de hasta centímetros (si se utiliza GPS diferencial), aunque lo habitual son unos pocos metros de precisión.

Para la presente investigación se utilizó el GPS Garmin eTrex Vista HCx, “Compacto, robusto y ligero, el GPS más completo de la gama eTrex es ideal para cualquier actividad al aire libre. **(GARMIN, 2015)**.

**Figura 2.5:** GPSGarmin eTrex Vista HCx



* + - 1. **Eclímetro**

Este término se refiere (en topografía) a un [instrumento](https://definiciona.com/instrumento) usado o empleado por los topógrafos para medir o calcular la inclinación de la pendiente de cualquier [terreno](https://definiciona.com/terreno), hay una variación de estos instrumentos y también tiene en cuenta los ángulos, también se le dice clinómetro **(GEOTOP, 2006)**.

**Figura 2.6:** Eclímetro



* + - 1. **Wincha topográfica**

Es una cinta métrica flexible, enrollada dentro de una caja de plástico o metal, que generalmente está graduada en centímetros en un costado de la cinta y en pulgadas en el otro. Para longitudes mayores a 10 m, existen de plástico o lona reforzada. Las más confiables son las metálicas porque no se deforman al estirarse **(MARQUEZ, 2005)**.

**Figura 2.7:** Wincha Topográfica



* 1. **Definición de términos básicos**
* **Carretera:** Camino para el tránsito de vehículos motorizados, cuyas características geométricas, tales como: pendiente longitudinal, pendiente transversal, sección transversal, superficie de rodadura y demás elementos de la misma, deben cumplir con las normas técnicas.
* **Berma:** Franja longitudinal, pavimentada o no, comprendida entre el borde exterior de la calzada y la cuneta o talud.
* **Bombeo:** Pendiente transversal de la plataforma en tramos en tangente.
* **Calzada:** Parte de la carretera destinada a la circulación de vehículos. Se compone de un cierto número de carriles.
* **Corona:** Superficie de la carretera terminada comprendida entre los bordes exteriores de las bermas.
* **Curva horizontal:** Curva circular que une los tramos rectos de una carretera en el plano horizontal.
* **Curva vertical:** Curva en elevación que enlaza dos rasantes con diferente pendiente.
* **Distancia de parada:** Es la mínima requerida para que se detenga un vehículo que viaja a la velocidad de diseño, antes de que alcance un objetivo inmóvil que se encuentra en su trayectoria.
* **Pendiente:**  Inclinación de una rasante en el sentido de avance.
* **Peralte:** Inclinación transversal de la plataforma en los tramos en curva.
* **Cuneta:** Canal generalmente triangular o rectangular localizado al lado de la berma destinada a recolectar las aguas de lluvia o de otra fuente, que caen sobre la plataforma del camino.
* **Subrasante:** Superficie del camino sobre la que se construirá la estructura del pavimento.
* **Tránsito:** Todo tipo de vehículos y sus respectivas cargas, considerados aisladamente o en conjunto, mientras utilizan cualquier camino para transporte o para viaje.

* **Cota:** Altura de un punto sobre un plano horizontal de referencia.
* **Índice medio diario anual (IMDA):** Volumen promedio del tránsito de vehículos en ambos sentidos de la carretera, durante 24 horas, para un período anual.
* **Perfil longitudinal:** Trazo del eje longitudinal de la carretera con indicación de cotas y distancias.

**CAPÍTULO III. MATERIALES Y MÉTODOS**

* 1. **Ubicación geográfica de la zona en estudio**

La carretera a evaluar une al C.P. Santa Rosa (distrito de Chota) con el C.P. Chaupelanche (distrito Chota). **(Ver plano 01 – anexos C)**

* + 1. **Ubicación geográfica, coordenadas UTM – WGS84 – zona 17S**

**Punto inicial:**

* Lugar: El Inicio en Santa Rosa:
* Coordenadas:

Este = 759972.87 m

Norte = 9273441.05 m

Cota = 2,484.19 m.s.n.m

**Punto final:**

* Lugar: El termino Chaupelanche:
* Coordenadas:

Este = 762460.67 m

Norte = 9272069.81 m

Cota = 2767.03 m.s.n.m

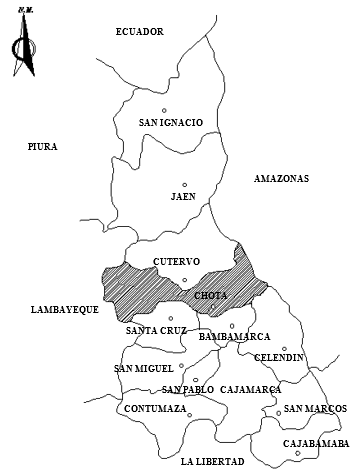
* + 1. **Ubicación política**
* País : Perú.
* Región : Cajamarca.
* Departamento : Cajamarca.
* Provincia : Chota
* Distrito : Chota

**Figura 3.1:** Mapa político del Perú



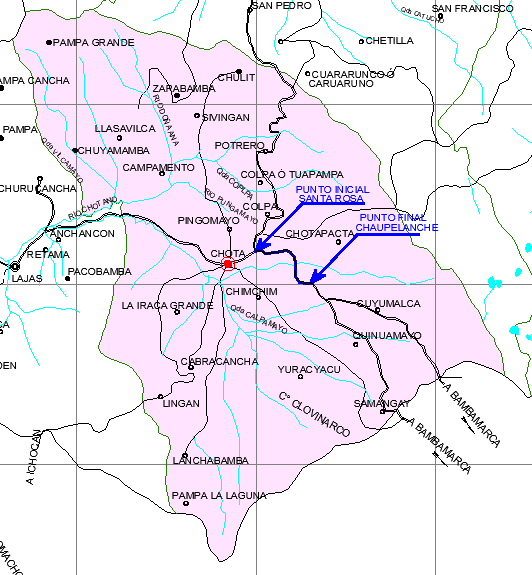
**Fuente:** https://www.google.com.pe/ [www.slideshare.net](http://www.slideshare.net)

**Figura 3.2:** Departamento de Cajamarca



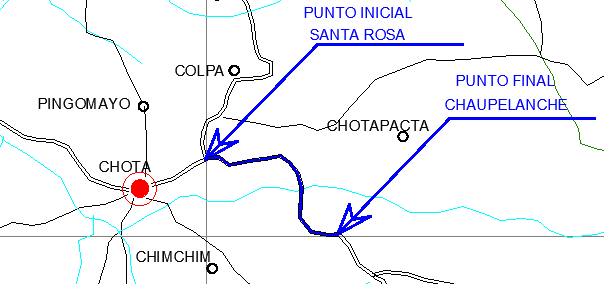
**Fuente:** <https://www.google.com.pe/perutoptours.com>

**Figura 3.3:** Distrito de Chota



**Fuente:** <https://www.google.com.pe/perutoptours.com>

**Figura 3.4:** Zona de trabajo



**Fuente:** <https://www.google.com.pe/perutoptours.com>

* + 1. **Duración de la investigación**

La investigación ha tenido un periodo de elaboración de un año y ocho meses desde la aprobación del plan de tesis.

* 1. **Procedimiento** 
     1. **Reconocimiento de la zona**

Antes de iniciar con el levantamiento topográfico se realizó un recorrido en toda la vía en estudio para poder conocer en qué situación se encuentra esta, como también determinar las posibles ubicaciones de las estaciones.

* + 1. **Levantamiento topográfico de la carretera**

Primero se ubicó la estación donde se pudo radiar la mayor cantidad de puntos; este punto se ha identificado con clavos y pintura.

Segundo se ha considerado el punto de referencia al borde de la vía; este punto se ha identificado con clavos y pintura.

Con el uso del GPS se tomó las coordenadas de la primera estación y punto de referencia; estas coordenadas se ingresan en la estación total; una vez hecho esto, el prisma se ubicó en el punto de referencia para luego visarlo con la estación total. De esta manera la estación estará referenciada, procediéndose luego a la radiación.

* + 1. **Toma de datos**

Luego de haber estacionado y referenciado el equipo se procedió a la toma de datos de la carretera como son el eje, bordes de la carretera, cunetas, obras de arte, bordes de viviendas y puntos de relleno.

El conteo del aforo vehicular se realizó de manera manual de lunes a viernes desde, las 8:00 am. hasta las 5 pm. durante un periodo de dos semanas.

* + 1. **Trabajo de gabinete**
* Se procesó los datos del levantamiento topográfico en el software AutoCAD Civil 3D 2016.
* Se dibujó los planos tanto en planta, perfil y secciones transversales.

* Con el programa Excel se realizó el análisis y la comparación de las características geométricas del camino vecinal en estudio con las especificaciones y normas estipuladas en el manual de diseño de carreteras no pavimentadas de bajo volumen de tránsito (MDCNPBVT).
  1. **Tratamiento y análisis y presentación de resultados**
     1. **Análisis de datos**
        1. **Datos topográficos**

El camino vecinal Santa Rosa - Chaupelanche,están ubicada al este del Distrito de Chota, dentro de la meseta de Akunta a una altitud media de 2388 msnm.

Punto de partida está ubicado en Santa Rosa a 2484.19 m.s.n.m.m, cuyas coordenadas UTM son: 759,972.87 m E y 9´273,441.05 m N.

Punto de llegada está ubicado en Chaupelanche a 2767.03 m.s.n.m.m, cuyas coordenadas UTM son: 762,460.67 m E y 9´272,069.81 m N.

* + - 1. **Datos del aforo vehicular**

El conteo del aforo vehicular se realizó de manera manual de lunes a viernes desde, las 8:00 am. hasta las 5 pm. durante un periodo de dos semanas. Los vehículos contabilizados son camionetas pick up, camiones 2 ejes tipo C2, autos y combis.

**Tabla 3.1:** Conteo vehicular primeras semana.

| Primera semana | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| Carretera: Santa Rosa – Chaupelanche | | | | | | |
| Día | Sentido | Pick Up | Camión 2 ejes | Auto | Combi | Total |
| Domingo | Santa R. – Ch. | 5 | 4 | 3 | 3 | 15 |
| Ch. – Santa R. | 4 | 6 | 3 | 5 | 18 |
| Ambos sentidos | 12 | 10 | 6 | 7 | 35 |
| Lunes | Santa R. – Ch. | 5 | 3 | 3 | 3 | 14 |
| Ch. – Santa R. | 5 | 3 | 3 | 3 | 14 |
| Ambos sentidos | 10 | 6 | 6 | 6 | 28 |
| Martes | Santa R. – Ch. | 6 | 3 | 3 | 3 | 15 |
| Ch. – Santa R. | 6 | 4 | 3 | 3 | 16 |
| Ambos sentidos | 12 | 7 | 6 | 6 | 31 |
| Miércoles | Santa R. – Ch. | 5 | 3 | 3 | 3 | 14 |
| Ch. – Santa R. | 5 | 3 | 3 | 3 | 14 |
| Ambos sentidos | 10 | 6 | 6 | 6 | 28 |
| Jueves | Santa R. – Ch. | 6 | 3 | 4 | 3 | 16 |
| Ch. – Santa R. | 6 | 5 | 3 | 3 | 17 |
| Ambos sentidos | 12 | 8 | 7 | 6 | 33 |
| Vienes | Santa R. – Ch. | 5 | 2 | 3 | 3 | 13 |
| Ch. – Santa R. | 5 | 3 | 3 | 3 | 14 |
| Ambos sentidos | 10 | 5 | 6 | 6 | 27 |
| Sábado | Santa R. – Ch. | 3 | 2 | 2 | 2 | 9 |
| Ch. – Santa R. | 3 | 4 | 2 | 3 | 12 |
| Ambos sentidos | 6 | 6 | 4 | 5 | 21 |

**Fuente:** Elaboración propia.

**Tabla 3.2:** Conteo vehicularsegunda semana.

| Segunda Semana | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| Carretera: Santa Rosa – Chaupelanche | | | | | | |
| Día | Sentido | Pick Up | Camión 2 ejes | Auto | Combi | Total |
| Domingo | Santa R. – Ch. | 6 | 3 | 3 | 4 | 17 |
| Ch. – Santa R. | 6 | 4 | 3 | 3 | 16 |
| Ambos sentidos | 12 | 8 | 6 | 7 | 33 |
| Lunes | Santa R. – Ch. | 5 | 3 | 3 | 3 | 14 |
| Ch. – Santa R. | 6 | 3 | 3 | 3 | 15 |
| Ambos sentidos | 11 | 6 | 6 | 6 | 29 |
| Martes | Santa R. – Ch. | 5 | 3 | 3 | 3 | 14 |
| Ch. – Santa R. | 5 | 3 | 3 | 3 | 14 |
| Ambos sentidos | 10 | 6 | 6 | 6 | 28 |
| Miércoles | Santa R. – Ch. | 5 | 3 | 3 | 3 | 14 |
| Ch. – Santa R. | 5 | 3 | 3 | 3 | 14 |
| Ambos sentidos | 10 | 6 | 6 | 6 | 28 |
| Jueves | Santa R. – Ch. | 6 | 3 | 3 | 3 | 15 |
| Ch. – Santa R. | 5 | 3 | 3 | 3 | 14 |
| Ambos sentidos | 11 | 6 | 6 | 6 | 29 |
| Vienes | Santa R. – Ch. | 5 | 3 | 3 | 3 | 14 |
| Ch. – Santa R. | 5 | 3 | 3 | 3 | 14 |
| Ambos sentidos | 10 | 6 | 6 | 6 | 28 |
| Sábado | Santa R. – Ch. | 3 | 2 | 2 | 2 | 9 |
| Ch. – Santa R. | 3 | 2 | 2 | 2 | 9 |
| Ambos sentidos | 6 | 4 | 4 | 4 | 18 |

**Fuente:** Elaboración propia.

* + - 1. **Cálculo del valor del promedio semanal**

El valor del promedio semanal se obtiene del volumen del valor del tráfico diario en un tramo de la red durante 7 días.

donde:

N: Promedio del trafico Semanal

**Tabla 3.3:** Valor del promedio semanal

|  |  |  |  |
| --- | --- | --- | --- |
| Promedio  Semana 1 | Promedio  Semana 2 | Promedio de las dos semanas | Promedio de las dos semanas |
| 29 | 27.57 | 28.29 | 28 |

**Fuente:** Elaboración propia.

* + 1. **Listado de parámetros de evaluación**

**Tabla 3.4.** Presentación de resultados.

|  |  |  |
| --- | --- | --- |
| N° | Parámetros | Unidad |
| 1 | Velocidad de diseño (V). | Km/h |
| 2 | Radio mínimo. | m. |
| 3 | Elementos de curva. | Tabla valores |
| 4 | Sobreancho. | m. |
| 5 | Longitud de tramos en tangente. | m. |
| 6 | Longitud de curva horizontal. | m. |
| 7 | Distancia de visibilidad en curva horizontal | m. |
| 8 | Peralte. | % |
| 9 | Longitud de curva vertical. | m. |
| 10 | Pendiente. | % |
| 11 | Ancho de Calzada. | m. |
| 12 | Ancho de berma. | m. |

**Fuente:** Elaboración propia

**Tabla 3.5.** Resultados.

| Parámetros | Km 00+000 – 05+000 | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Cumple | | % | No cumple | | % | Norma |
| Longitud en tramos en tangente | 32 | | 32 | 68 | | 68 | DG - 2018 |
| Radios | 100 | | 100 | 0 | | 0 | MDCNPBVT |
| Longitud de curvas horizontales | 1 | | 1 | 99 | | 99 | MDCNPBVT |
| Distancia de visibilidad en curvas horizontales | 38 | | 86 | 6 | | 14 | MDCNPBVT |
| Sobreanchos | 54 | | 54 | 46 | | 46 | MDCNPBVT |
| Pendientes | 23 | | 79 | 6 | | 21 | MDCNPBVT |
| Longitud de curvas verticales | 28 | | 100 | 0 | | 0 | DG - 2018 |
| Anchos de bermas y calzada (corona) |  | 87 | 35 |  | 164 | 65 | MDCNPBVT |
| Peraltes | 41 | | 41 | 59 | | 59 | MDCNPBVT |
| Taludes de corte | 245 | | 97 | 7 | | 3 | MDCNPBVT |
| Taludes de relleno | 238 | | 95 |  | 12 | 5 | MDCNPBVT |
| Cunetas | 0 | | 0 |  | 251 | 100 | MDCNPBVT |

**Fuente:** Elaboración propia



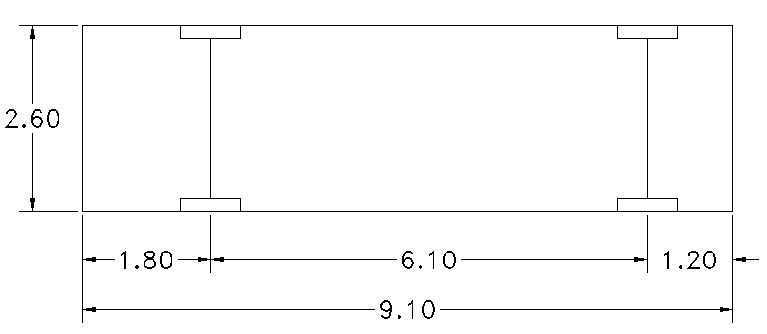
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**CAPÍTULO IV. ANÁLISIS Y DISCUSIÓN DE RESULTADOS.**

* 1. **Evaluación geométrica**
     1. **Elección del vehículo de diseño**

* Vehículo de Diseño: C2
* Longitud: 9.10 m
* Alto Total: 4.10m
* Ancho Total: 2.60m
* Longitud entre ejes: 6.10m
* Radio mínimo rueda externa delantera: 12.80m
* Radio mínima rueda interna trasera: 8.50m

**Figura 4.1:** Vehículo de diseño tipo C2



**Fuente:** Elaboración propia.

**4.1.2. Clasificación de la vía**

**4.1.2.1. Clasificación por su función.**

El camino vecinal Santa Rosa-Chaupelanche, forma parte de la red vial rural o vecinal.

**4.1.2.2. Según su demanda.**

El IMDA del camino vecinal Santa Rosa – Chaupelanche fue menor a 200 Veh/día; por lo tanto es una vía de bajo volumen de tránsito.

**4.1.2.3. Clasificación por orografía.**

De acuerdo a la tabla 4.1, tabla 4.2 y tabla 4.3. El terreno presenta una orografía ondulada (Tipo 2), puesto que tiene pendientes transversales al eje de la vía entre 11% y el 50%.

**Tabla 4.1:** Pendientes transversales de la carretera.

| Progresiva | Pendiente transversal -izquierda (%) | | Pendiente transversal - derecha (%) | | Tipo |
| --- | --- | --- | --- | --- | --- |
| 0+00 | 5.44 | plano | 35.24 | ondulado | II |
| 0+20 | 16.31 | ondulado | 12.00 | ondulado | II |
| 0+40 | 22.16 | ondulado | 69.40 | accidentado | III |
| 0+60 | 34.59 | ondulado | 70.59 | accidentado | III |
| 0+80 | 61.06 | accidentado | 31.07 | ondulado | III |
| 0+100 | 58.07 | accidentado | 25.55 | ondulado | III |
| 0+120 | 43.57 | ondulado | 17.96 | ondulado | II |
| 0+140 | 37.07 | ondulado | 59.52 | accidentado | III |
| 0+160 | 37.91 | ondulado | 113.45 | accidentado | III |
| 0+180 | 44.84 | ondulado | 59.31 | accidentado | III |
| 0+200 | 19.88 | ondulado | 81.96 | accidentado | III |
| 0+220 | 29.77 | ondulado | 90.12 | accidentado | III |
| 0+240 | 38.90 | ondulado | 75.00 | accidentado | III |
| 0+260 | 23.15 | ondulado | 27.84 | ondulado | II |
| 0+280 | 34.88 | ondulado | 18.47 | ondulado | II |
| 0+300 | 62.63 | accidentado | 37.66 | ondulado | III |
| 0+320 | 44.07 | ondulado | 74.56 | accidentado | III |
| 0+340 | 39.38 | ondulado | 118.23 | accidentado | III |
| 0+360 | 27.42 | ondulado | 47.51 | ondulado | II |
| 0+380 | 50.22 | accidentado | 75.36 | accidentado | III |
| 0+400 | 36.32 | ondulado | 38.80 | ondulado | II |
| 0+420 | 30.71 | ondulado | 66.22 | accidentado | III |
| 0+440 | 7.77 | plano | 98.04 | accidentado | III |
| 0+460 | 19.27 | ondulado | 10.44 | ondulado | II |
| 0+480 | 9.25 | plano | 10.90 | ondulado | II |
| 0+500 | 13.29 | ondulado | 23.11 | ondulado | II |
| 0+520 | 4.87 | plano | 18.62 | ondulado | II |
| 0+540 | 34.67 | ondulado | 70.32 | accidentado | III |
| 0+560 | 4.23 | plano | 21.98 | ondulado | II |
| 0+580 | 6.55 | plano | 16.51 | ondulado | II |
| 0+600 | 0.56 | plano | 5.36 | plano | I |
| 0+620 | 23.21 | ondulado | 30.73 | ondulado | II |
| 0+640 | 19.06 | ondulado | 48.00 | ondulado | II |
| 0+660 | 21.97 | ondulado | 46.87 | ondulado | II |
| 0+680 | 39.94 | ondulado | 80.51 | accidentado | III |
| 0+700 | 39.04 | ondulado | 31.75 | ondulado | II |
| 0+720 | 33.08 | ondulado | 43.31 | ondulado | II |
| 0+740 | 39.93 | ondulado | 22.20 | ondulado | II |
| 0+760 | 13.06 | ondulado | 12.72 | ondulado | II |
| 0+780 | 9.76 | plano | 68.67 | accidentado | III |
| 0+800 | 22.13 | ondulado | 9.01 | plano | II |
| 0+820 | 26.00 | ondulado | 1.86 | plano | II |
| 0+840 | 6.40 | plano | 13.64 | ondulado | II |
| 0+860 | 20.17 | ondulado | 10.00 | ondulado | II |
| 0+880 | 98.88 | accidentado | 26.11 | ondulado | III |
| 0+900 | 36.96 | ondulado | 28.57 | ondulado | II |
| 0+920 | 39.23 | ondulado | 27.72 | ondulado | II |
| 0+940 | 48.53 | ondulado | 27.62 | ondulado | II |
| 0+960 | 30.73 | ondulado | 19.91 | ondulado | II |
| 0+980 | 31.29 | ondulado | 22.82 | ondulado | II |
| 0+1000 | 72.41 | accidentado | 20.88 | ondulado | III |
| 0+1020 | 24.33 | ondulado | 41.30 | ondulado | II |
| 0+1040 | 54.48 | accidentado | 15.35 | ondulado | III |
| 0+1060 | 24.57 | ondulado | 24.40 | ondulado | II |
| 0+1080 | 20.27 | ondulado | 10.80 | ondulado | II |
| 0+1100 | 14.74 | ondulado | 7.33 | plano | II |
| 0+1120 | 14.00 | ondulado | 13.03 | ondulado | II |
| 0+1140 | 20.19 | ondulado | 23.36 | ondulado | II |
| 0+1160 | 22.80 | ondulado | 27.51 | ondulado | II |
| 0+1180 | 23.19 | ondulado | 15.71 | ondulado | II |
| 0+1200 | 4.51 | plano | 32.88 | ondulado | II |
| 0+1220 | 9.82 | plano | 11.51 | ondulado | II |
| 0+1240 | 12.20 | ondulado | 11.43 | ondulado | II |
| 0+1260 | 13.12 | ondulado | 7.09 | plano | II |
| 0+1280 | 17.30 | ondulado | 13.40 | ondulado | II |
| 0+1300 | 22.38 | ondulado | 18.62 | ondulado | II |
| 0+1320 | 28.18 | ondulado | 22.98 | ondulado | II |
| 0+1340 | 35.35 | ondulado | 9.39 | plano | II |
| 0+1360 | 39.60 | ondulado | 4.81 | plano | II |
| 0+1380 | 11.92 | ondulado | 2.95 | plano | II |
| 0+1400 | 9.96 | plano | 23.86 | ondulado | II |
| 0+1420 | 17.48 | ondulado | 20.80 | ondulado | II |
| 0+1440 | 25.56 | ondulado | 14.87 | ondulado | II |
| 0+1460 | 8.79 | plano | 25.79 | ondulado | II |
| 0+1480 | 17.20 | ondulado | 4.92 | plano | II |
| 0+1500 | 16.88 | ondulado | 65.03 | accidentado | III |
| 0+1520 | 18.96 | ondulado | 66.88 | accidentado | III |
| 0+1540 | 31.47 | ondulado | 78.51 | accidentado | III |
| 0+1560 | 28.15 | ondulado | 43.73 | ondulado | II |
| 0+1580 | 39.11 | ondulado | 63.48 | accidentado | III |
| 0+1600 | 58.20 | accidentado | 82.91 | accidentado | III |
| 0+1620 | 50.00 | ondulado | 94.09 | accidentado | III |
| 0+1640 | 25.20 | ondulado | 34.23 | ondulado | II |
| 0+1660 | 28.83 | ondulado | 71.09 | accidentado | III |
| 0+1680 | 84.66 | accidentado | 55.71 | accidentado | III |
| 0+1700 | 14.13 | ondulado | 57.98 | accidentado | III |
| 0+1720 | 4.86 | plano | 68.71 | accidentado | III |
| 0+1740 | 12.90 | ondulado | 10.26 | ondulado | II |
| 0+1760 | 10.74 | ondulado | 15.36 | ondulado | II |
| 0+1780 | 66.37 | accidentado | 27.31 | ondulado | II |
| 0+1800 | 35.00 | ondulado | 38.00 | ondulado | II |
| 0+1820 | 59.73 | accidentado | 12.34 | ondulado | III |
| 0+1840 | 40.51 | ondulado | 17.48 | ondulado | II |
| 0+1860 | 70.47 | accidentado | 39.80 | ondulado | III |
| 0+1880 | 19.40 | ondulado | 40.26 | ondulado | II |
| 0+1900 | 12.82 | ondulado | 52.34 | accidentado | III |
| 0+1920 | 88.46 | accidentado | 66.74 | accidentado | III |
| 0+1940 | 2.10 | plano | 41.35 | ondulado | II |
| 0+1960 | 69.94 | accidentado | 44.30 | ondulado | III |
| 0+1980 | 8.64 | plano | 3.10 | plano | I |
| 0+2000 | 3.98 | plano | 16.54 | ondulado | II |
| 0+2020 | 6.17 | plano | 50.23 | accidentado | III |
| 0+2040 | 9.59 | plano | 28.38 | ondulado | II |
| 0+2060 | 14.36 | ondulado | 27.13 | ondulado | II |
| 0+2080 | 48.58 | ondulado | 24.83 | ondulado | II |
| 0+2100 | 41.30 | ondulado | 62.29 | accidentado | III |
| 0+2120 | 137.02 | accidentado | 6.00 | plano | III |
| 0+2140 | 32.27 | ondulado | 17.85 | ondulado | II |
| 0+2160 | 22.39 | ondulado | 21.71 | ondulado | II |
| 0+2180 | 25.11 | ondulado | 18.41 | ondulado | II |
| 0+2200 | 88.62 | accidentado | 20.59 | ondulado | III |
| 0+2220 | 92.44 | accidentado | 37.65 | ondulado | III |
| 0+2240 | 21.47 | ondulado | 11.11 | ondulado | II |
| 0+2260 | 19.07 | ondulado | 19.16 | ondulado | II |
| 0+2280 | 20.03 | ondulado | 15.20 | ondulado | II |
| 0+2300 | 42.12 | ondulado | 18.90 | ondulado | II |
| 0+2320 | 36.45 | ondulado | 18.47 | ondulado | II |
| 0+2340 | 56.68 | accidentado | 26.64 | ondulado | III |
| 0+2360 | 21.00 | ondulado | 27.92 | ondulado | II |
| 0+2380 | 39.89 | ondulado | 57.11 | accidentado | III |
| 0+2400 | 68.06 | accidentado | 35.57 | ondulado | III |
| 0+2420 | 14.84 | ondulado | 14.39 | ondulado | II |
| 0+2440 | 9.84 | plano | 8.19 | plano | I |
| 0+2460 | 6.12 | plano | 24.87 | ondulado | II |
| 0+2480 | 6.87 | plano | 23.74 | ondulado | II |
| 0+2500 | 1.18 | plano | 26.75 | ondulado | II |
| 0+2520 | 6.44 | plano | 21.76 | ondulado | II |
| 0+2540 | 1.68 | plano | 7.43 | plano | I |
| 0+2560 | 17.88 | ondulado | 11.96 | ondulado | II |
| 0+2580 | 125.00 | accidentado | 0.67 | plano | III |
| 0+2600 | 25.26 | ondulado | 26.78 | ondulado | II |
| 0+2620 | 27.02 | ondulado | 34.66 | ondulado | II |
| 0+2640 | 46.76 | ondulado | 51.29 | accidentado | III |
| 0+2660 | 59.18 | accidentado | 34.80 | ondulado | III |
| 0+2680 | 92.64 | accidentado | 41.96 | ondulado | III |
| 0+2700 | 27.83 | ondulado | 10.80 | ondulado | II |
| 0+2720 | 24.30 | ondulado | 21.11 | ondulado | II |
| 0+2740 | 50.00 | ondulado | 26.34 | ondulado | II |
| 0+2760 | 36.74 | ondulado | 31.46 | ondulado | II |
| 0+2780 | 47.25 | ondulado | 55.92 | accidentado | III |
| 0+2800 | 22.24 | ondulado | 33.06 | ondulado | II |
| 0+2820 | 19.29 | ondulado | 24.90 | ondulado | II |
| 0+2840 | 18.75 | ondulado | 34.59 | ondulado | II |
| 0+2860 | 58.72 | accidentado | 46.34 | ondulado | III |
| 0+2880 | 63.83 | accidentado | 46.86 | ondulado | III |
| 0+2900 | 45.79 | ondulado | 26.46 | ondulado | II |
| 0+2920 | 42.36 | ondulado | 25.10 | ondulado | II |
| 0+2940 | 27.64 | ondulado | 21.70 | ondulado | II |
| 0+2960 | 20.79 | ondulado | 12.90 | ondulado | II |
| 0+2980 | 8.98 | plano | 21.99 | ondulado | II |
| 0+3000 | 27.79 | ondulado | 25.00 | ondulado | II |
| 0+3020 | 57.64 | accidentado | 31.06 | ondulado | III |
| 0+3040 | 21.67 | ondulado | 18.50 | ondulado | II |
| 0+3060 | 29.22 | ondulado | 25.00 | ondulado | II |
| 0+3080 | 40.38 | ondulado | 25.70 | ondulado | II |
| 0+3100 | 30.13 | ondulado | 27.89 | ondulado | II |
| 0+3120 | 62.00 | accidentado | 27.74 | ondulado | III |
| 0+3140 | 22.18 | ondulado | 22.74 | ondulado | II |
| 0+3160 | 22.05 | ondulado | 27.30 | ondulado | II |
| 0+3180 | 19.65 | ondulado | 25.64 | ondulado | II |
| 0+3200 | 7.60 | plano | 35.19 | ondulado | II |
| 0+3220 | 11.33 | ondulado | 2.99 | plano | II |
| 0+3240 | 23.99 | ondulado | 1.60 | plano | II |
| 0+3260 | 7.27 | plano | 5.98 | plano | I |
| 0+3280 | 2.92 | plano | 9.72 | plano | I |
| 0+3300 | 66.72 | accidentado | 63.82 | accidentado | III |
| 0+3320 | 66.73 | accidentado | 66.62 | accidentado | III |
| 0+3340 | 66.60 | accidentado | 66.67 | accidentado | III |
| 0+3360 | 33.26 | ondulado | 4.01 | plano | II |
| 0+3380 | 14.71 | ondulado | 4.83 | plano | II |
| 0+3400 | 73.01 | accidentado | 8.31 | plano | III |
| 0+3420 | 19.87 | ondulado | 66.67 | accidentado | III |
| 0+3440 | 18.93 | ondulado | 10.89 | ondulado | II |
| 0+3460 | 24.28 | ondulado | 58.10 | accidentado | III |
| 0+3480 | 13.13 | ondulado | 2.77 | plano | II |
| 0+3500 | 9.38 | plano | 19.83 | ondulado | II |
| 0+3520 | 15.35 | ondulado | 19.81 | ondulado | II |
| 0+3540 | 23.99 | ondulado | 17.13 | ondulado | II |
| 0+3560 | 30.29 | ondulado | 26.12 | ondulado | II |
| 0+3580 | 24.35 | ondulado | 28.64 | ondulado | II |
| 0+3600 | 21.40 | ondulado | 30.13 | ondulado | II |
| 0+3620 | 25.17 | ondulado | 9.60 | plano | II |
| 0+3640 | 20.62 | ondulado | 14.29 | ondulado | II |
| 0+3660 | 22.37 | ondulado | 10.18 | ondulado | II |
| 0+3680 | 28.20 | ondulado | 23.82 | ondulado | II |
| 0+3700 | 43.39 | ondulado | 23.41 | ondulado | II |
| 0+3720 | 99.36 | accidentado | 21.64 | ondulado | III |
| 0+3740 | 60.63 | accidentado | 34.77 | ondulado | III |
| 0+3760 | 65.64 | accidentado | 30.02 | ondulado | III |
| 0+3780 | 45.86 | ondulado | 12.76 | ondulado | II |
| 0+3800 | 18.29 | ondulado | 5.54 | plano | II |
| 0+3820 | 30.51 | ondulado | 18.32 | ondulado | II |
| 0+3840 | 26.43 | ondulado | 34.39 | ondulado | II |
| 0+3860 | 34.20 | ondulado | 49.20 | ondulado | II |
| 0+3880 | 49.12 | ondulado | 18.01 | ondulado | II |
| 0+3900 | 25.00 | ondulado | 25.27 | ondulado | II |
| 0+3920 | 30.61 | ondulado | 22.51 | ondulado | II |
| 0+3940 | 32.01 | ondulado | 20.48 | ondulado | II |
| 0+3960 | 20.68 | ondulado | 20.40 | ondulado | II |
| 0+3980 | 20.72 | ondulado | 43.97 | ondulado | II |
| 0+4000 | 25.35 | ondulado | 25.40 | ondulado | II |
| 0+4020 | 68.18 | accidentado | 18.69 | ondulado | III |
| 0+4040 | 37.97 | ondulado | 28.99 | ondulado | II |
| 0+4060 | 16.28 | ondulado | 17.53 | ondulado | II |
| 0+4080 | 30.10 | ondulado | 45.65 | ondulado | II |
| 0+4100 | 40.75 | ondulado | 54.76 | accidentado | III |
| 0+4120 | 28.33 | ondulado | 24.00 | ondulado | II |
| 0+4140 | 20.04 | ondulado | 31.73 | ondulado | II |
| 0+4160 | 42.09 | ondulado | 66.61 | accidentado | II |
| 0+4180 | 72.41 | accidentado | 66.81 | accidentado | III |
| 0+4200 | 21.24 | ondulado | 26.30 | ondulado | II |
| 0+4220 | 63.41 | accidentado | 66.79 | accidentado | III |
| 0+4240 | 35.38 | ondulado | 66.76 | accidentado | III |
| 0+4260 | 37.85 | ondulado | 29.44 | ondulado | II |
| 0+4280 | 48.85 | ondulado | 28.41 | ondulado | II |
| 0+4300 | 64.29 | accidentado | 87.80 | accidentado | III |
| 0+4320 | 15.19 | ondulado | 40.68 | ondulado | II |
| 0+4340 | 1.90 | plano | 32.58 | ondulado | II |
| 0+4360 | 1.87 | plano | 26.81 | ondulado | II |
| 0+4380 | 5.72 | plano | 0.76 | plano | I |
| 0+4400 | 7.88 | plano | 2.42 | plano | I |
| 0+4420 | 7.61 | plano | 66.78 | accidentado | III |
| 0+4440 | 7.88 | plano | 2.42 | plano | I |
| 0+4460 | 1.96 | plano | 3.29 | plano | I |
| 0+4480 | 12.05 | ondulado | 5.11 | plano | II |
| 0+4500 | 25.92 | ondulado | 10.20 | ondulado | II |
| 0+4520 | 15.07 | ondulado | 6.13 | plano | II |
| 0+4540 | 13.13 | ondulado | 6.84 | plano | II |
| 0+4560 | 14.66 | ondulado | 4.76 | plano | II |
| 0+4580 | 11.70 | ondulado | 3.72 | plano | II |
| 0+4600 | 8.17 | plano | 67.03 | accidentado | III |
| 0+4620 | 7.95 | plano | 6.62 | plano | I |
| 0+4640 | 8.03 | plano | 4.12 | plano | I |
| 0+4660 | 4.21 | plano | 1.04 | plano | I |
| 0+4680 | 8.46 | plano | 12.20 | ondulado | II |
| 0+4700 | 23.40 | ondulado | 12.20 | ondulado | II |
| 0+4720 | 40.53 | ondulado | 16.60 | ondulado | II |
| 0+4740 | 66.89 | accidentado | 85.76 | accidentado | III |
| 0+4760 | 76.48 | accidentado | 76.66 | accidentado | III |
| 0+4780 | 110.90 | accidentado | 66.54 | accidentado | III |
| 0+4800 | 35.11 | ondulado | 40.91 | ondulado | II |
| 0+4820 | 26.28 | ondulado | 12.23 | ondulado | II |
| 0+4840 | 25.40 | ondulado | 21.23 | ondulado | II |
| 0+4860 | 52.20 | ondulado | 18.95 | ondulado | II |
| 0+4880 | 35.59 | ondulado | 19.42 | ondulado | II |
| 0+4900 | 151.79 | accidentado | 9.54 | plano | III |
| 0+4920 | 42.52 | ondulado | 25.30 | ondulado | II |
| 0+4940 | 25.37 | ondulado | 52.33 | accidentado | III |
| 0+4960 | 66.43 | accidentado | 25.00 | ondulado | III |
| 0+4980 | 33.82 | ondulado | 22.50 | ondulado | II |
| 0+5000 | 24.93 | ondulado | 18.69 | ondulado | II |

**Fuente:** Elaboración propia.

**Tabla 4.2:** Resumen de la orografía.

|  |  |
| --- | --- |
| SUPERFICIE | PENDIENTE |
| Plano  Ondulado  Accidentado  Muy accidentado  Total | 5.2%  64.4%  30.4%  0.00  100% |

**Tabla 4.3:** Pendientes transversales de la carretera.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CLASIFICACIÓN POR OROGRAFÍA | | | | |
| PENDIENTE | TIPO 1 | **TIPO 2** | TIPO 3 | TIPO 4 |
| TERRENO | PLANO | **ONDULADO** | ACCIDENTADO | ESCARPADO |
| i% LONGITUDINAL | < 3% | **3 Y 11** | 6 Y 8 | > 8% |
| i% TRANSVERSAL | < O = A 10% | **11 Y 50** | 51 Y 100 | > 100 % |

**Fuente:** Elaboración propia.

De acuerdo a la siguiente tabla, tenemos una carretera **tipo 2**, clasificada por su orografía

**4.1.3. Velocidad de directriz (V)**

Puesto que el tráfico fue Imds. = 28 vehículos y por tener una orografía mayormente ondulado la velocidad directriz se consideró de 20km/h.

**4.1.4.** **Alineamiento horizontal**

**4.1.4.1. Características de las curvas horizontales**

Para conocer las características geométricas de las curvas circulares, se importaron los puntos del levantamiento topográfico al software autocad Civil3d; una vez identificados los puntos que correspondían al eje, se trazó la poligonal abierta, y posteriormente se dibujaron las curvas con sus respectivos radios que definían a la actual carretera.

Una vez conocidos los radios y ángulos de deflexión de las curvas existentes, se determinaron sus respectivos elementos de curva, para que luego se pueda evaluar los parámetros de diseño.

**Tabla 4.4:** Elementos de curva.

| N° Curva | Sentido | R (m.) | Angulo | Lc (m.) | T (m.) | E (m.) | Sa (m.) | P(%) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| C1 | I | 36.00 | 31°56'21" | 20.07 | 10.30 | 1.45 | 1.21 | 2.67 |
| C2 | D | 65.00 | 25°45'53" | 29.23 | 14.87 | 1.68 | 0.73 | 1.48 |
| C3 | I | 70.00 | 4°55'39" | 6.02 | 3.01 | 0.06 | 0.69 | 1.37 |
| C4 | D | 50.00 | 31°07'58" | 27.17 | 13.93 | 1.90 | 0.91 | 1.92 |
| C5 | D | 75.00 | 31°12'22" | 40.85 | 20.94 | 2.87 | 0.65 | 1.28 |
| C6 | I | 35.00 | 27°49'41" | 17.00 | 8.67 | 1.06 | 1.24 | 2.74 |
| C7 | D | 105.00 | 6°35'23" | 12.08 | 6.04 | 0.17 | 0.49 | 0.91 |
| C8 | I | 40.00 | 30°14'12" | 21.11 | 10.81 | 1.43 | 1.10 | 2.40 |
| C9 | D | 35.00 | 57°15'01" | 34.97 | 19.10 | 4.87 | 1.24 | 2.74 |
| C10 | I | 95.00 | 15°59'12" | 26.51 | 13.34 | 0.93 | 0.53 | 1.01 |
| C11 | I | 23.00 | 27°29'19" | 11.03 | 5.63 | 0.68 | 1.82 | 4.17 |
| C12 | I | 16.00 | 56°51'16" | 15.88 | 8.66 | 2.19 | 2.59 | 6.00 |
| C13 | I | 130.00 | 8°55'13" | 20.24 | 10.14 | 0.39 | 0.42 | 0.74 |
| C14 | D | 43.00 | 83°47'11" | 62.88 | 38.57 | 14.77 | 1.04 | 2.23 |
| C15 | I | 25.00 | 74°51'46" | 32.67 | 19.14 | 6.48 | 1.68 | 3.84 |
| C16 | D | 38.00 | 35°49'11" | 23.76 | 12.28 | 1.94 | 1.15 | 2.53 |
| C17 | D | 16.00 | 118°37'15" | 33.13 | 26.96 | 15.35 | 2.59 | 6.00 |
| C18 | I | 39.00 | 44°52'06" | 30.54 | 16.10 | 3.19 | 1.13 | 2.46 |
| C19 | I | 153.00 | 6°10'12" | 16.48 | 8.25 | 0.22 | 0.37 | 0.63 |
| C20 | D | 32.00 | 48°55'54" | 27.33 | 14.56 | 3.16 | 1.34 | 3.00 |
| C21 | D | 38.00 | 23°16'14" | 15.43 | 7.82 | 0.80 | 1.15 | 2.53 |
| C22 | I | 45.00 | 19°05'45" | 15.00 | 7.57 | 0.63 | 1.00 | 2.13 |
| C23 | I | 53.00 | 38°34'44" | 35.69 | 18.55 | 3.15 | 0.87 | 1.81 |
| C24 | I | 17.00 | 118°55'00" | 35.28 | 28.81 | 16.45 | 2.43 | 5.65 |
| C25 | D | 19.00 | 102°11'04" | 33.89 | 23.54 | 11.25 | 2.18 | 5.05 |
| C26 | I | 42.00 | 61°30'29" | 45.09 | 24.99 | 6.87 | 1.06 | 2.29 |
| C27 | I | 76.00 | 6°49'02" | 9.04 | 4.53 | 0.13 | 0.64 | 1.26 |
| C28 | I | 93.00 | 11°14'07" | 18.24 | 9.15 | 0.45 | 0.54 | 1.03 |
| C29 | D | 52.00 | 22°18'12" | 20.24 | 10.25 | 1.00 | 0.88 | 1.85 |
| C30 | D | 51.00 | 19°36'10" | 17.45 | 8.81 | 0.76 | 0.90 | 1.88 |
| C31 | I | 37.00 | 19°25'27" | 12.54 | 6.33 | 0.54 | 1.18 | 2.59 |
| C32 | D | 63.00 | 25°37'38" | 28.18 | 14.33 | 1.61 | 0.75 | 1.52 |
| C33 | I | 83.00 | 7°44'22" | 11.21 | 5.61 | 0.19 | 0.60 | 1.16 |
| C34 | D | 45.00 | 7°33'17" | 5.93 | 2.97 | 0.10 | 1.00 | 2.13 |
| C35 | I | 25.00 | 33°57'16" | 14.82 | 7.63 | 1.14 | 1.68 | 3.84 |
| C36 | D | 16.00 | 86°47'18" | 24.24 | 15.13 | 6.02 | 2.59 | 6.00 |
| C37 | D | 48.00 | 26°34'40" | 22.27 | 11.34 | 1.32 | 0.94 | 2.00 |
| C38 | D | 20.00 | 23°42'01" | 8.27 | 4.20 | 0.44 | 2.07 | 4.80 |
| C39 | I | 17.00 | 112°56'58" | 33.51 | 25.66 | 13.78 | 2.43 | 5.65 |
| C40 | D | 47.00 | 33°16'24" | 27.29 | 14.04 | 2.05 | 0.96 | 2.04 |
| C41 | D | 36.00 | 27°30'23" | 17.28 | 8.81 | 1.06 | 1.21 | 2.67 |
| C42 | I | 15.00 | 131°21'36" | 34.39 | 33.19 | 21.42 | 2.77 | 6.40 |
| C43 | D | 40.00 | 21°02'07" | 14.69 | 7.43 | 0.68 | 1.10 | 2.40 |
| C44 | D | 25.00 | 26°13'11" | 11.44 | 5.82 | 0.67 | 1.68 | 3.84 |
| C45 | I | 46.00 | 23°49'57" | 19.13 | 9.71 | 1.01 | 0.98 | 2.09 |
| C46 | D | 26.00 | 89°30'15" | 40.62 | 25.78 | 10.61 | 1.62 | 3.69 |
| C47 | D | 51.00 | 22°44'04" | 20.24 | 10.25 | 1.02 | 0.90 | 1.88 |
| C48 | I | 30.00 | 43°44'23" | 22.90 | 12.04 | 2.33 | 1.42 | 3.20 |
| C49 | I | 60.00 | 27°26'46" | 28.74 | 14.65 | 1.76 | 0.78 | 1.60 |
| C50 | I | 54.00 | 22°13'27" | 20.95 | 10.61 | 1.03 | 0.85 | 1.78 |
| C51 | D | 36.00 | 29°54'06" | 18.79 | 9.61 | 1.26 | 1.21 | 2.67 |
| C52 | I | 37.00 | 33°43'20" | 21.78 | 11.21 | 1.66 | 1.18 | 2.59 |
| C53 | D | 46.00 | 17°26'23" | 14.00 | 7.06 | 0.54 | 0.98 | 2.09 |
| C54 | I | 23.00 | 37°27'03" | 15.03 | 7.80 | 1.29 | 1.82 | 4.17 |
| C55 | D | 39.00 | 10°02'05" | 6.83 | 3.42 | 0.15 | 1.13 | 2.46 |
| C56 | I | 54.00 | 15°10'29" | 14.30 | 7.19 | 0.48 | 0.85 | 1.78 |
| C57 | D | 16.00 | 135°10'27" | 37.75 | 38.79 | 25.96 | 2.59 | 6.00 |
| C58 | I | 37.00 | 12°55'23" | 8.35 | 4.19 | 0.24 | 1.18 | 2.59 |
| C59 | I | 33.00 | 13°18'35" | 7.67 | 3.85 | 0.22 | 1.31 | 2.91 |
| C60 | I | 32.00 | 31°40'48" | 17.69 | 9.08 | 1.26 | 1.34 | 3.00 |
| C61 | D | 31.00 | 25°39'09" | 13.88 | 7.06 | 0.79 | 1.38 | 3.10 |
| C62 | D | 44.00 | 15°59'18" | 12.28 | 6.18 | 0.43 | 1.02 | 2.18 |
| C63 | D | 26.00 | 24°48'37" | 11.26 | 5.72 | 0.62 | 1.62 | 3.69 |
| C64 | I | 33.00 | 16°53'49" | 9.73 | 4.90 | 0.36 | 1.31 | 2.91 |
| C65 | D | 33.00 | 16°16'22" | 9.37 | 4.72 | 0.34 | 1.31 | 2.91 |
| C66 | I | 20.00 | 76°26'54" | 26.69 | 15.75 | 5.46 | 2.07 | 4.80 |
| C67 | D | 163.00 | 6°21'33" | 18.09 | 9.05 | 0.25 | 0.35 | 0.59 |
| C68 | D | 16.00 | 65°23'09" | 18.26 | 10.27 | 3.01 | 2.59 | 6.00 |
| C69 | I | 17.00 | 69°38'33" | 20.66 | 11.82 | 3.71 | 2.43 | 5.65 |
| C70 | D | 16.00 | 22°34'39" | 6.30 | 3.19 | 0.32 | 2.59 | 6.00 |
| C71 | D | 17.00 | 63°22'51" | 18.81 | 10.50 | 2.98 | 2.43 | 5.65 |
| C72 | I | 38.00 | 36°43'31" | 24.36 | 12.61 | 2.04 | 1.15 | 2.53 |
| C73 | D | 43.00 | 21°08'17" | 15.86 | 8.02 | 0.74 | 1.04 | 2.23 |
| C74 | I | 118.00 | 5°45'13" | 11.85 | 5.93 | 0.15 | 0.45 | 0.81 |
| C75 | D | 48.00 | 11°25'15" | 9.57 | 4.80 | 0.24 | 0.94 | 2.00 |
| C76 | I | 38.00 | 13°52'42" | 9.20 | 4.62 | 0.28 | 1.15 | 2.53 |
| C77 | I | 63.00 | 8°55'42" | 9.82 | 4.92 | 0.19 | 0.75 | 1.52 |
| C78 | D | 21.00 | 25°34'47" | 9.38 | 4.77 | 0.53 | 1.98 | 4.57 |
| C79 | I | 22.00 | 70°12'23" | 26.96 | 15.46 | 4.89 | 1.89 | 4.36 |
| C80 | D | 26.00 | 49°39'28" | 22.53 | 12.03 | 2.65 | 1.62 | 3.69 |
| C81 | D | 39.00 | 19°07'26" | 13.02 | 6.57 | 0.55 | 1.13 | 2.46 |
| C82 | I | 124.00 | 4°16'45" | 9.26 | 4.63 | 0.09 | 0.43 | 0.77 |
| C83 | D | 54.00 | 10°00'15" | 9.43 | 4.73 | 0.21 | 0.85 | 1.78 |
| C84 | D | 20.00 | 99°04'17" | 34.58 | 23.45 | 10.82 | 2.07 | 4.80 |
| C85 | I | 32.00 | 28°30'06" | 15.92 | 8.13 | 1.02 | 1.34 | 3.00 |
| C86 | I | 39.00 | 15°44'24" | 10.71 | 5.39 | 0.37 | 1.13 | 2.46 |
| C87 | I | 20.00 | 52°07'40" | 18.20 | 9.78 | 2.26 | 2.07 | 4.80 |
| C88 | I | 37.00 | 25°01'08" | 16.16 | 8.21 | 0.90 | 1.18 | 2.59 |
| C89 | D | 18.00 | 64°38'41" | 20.31 | 11.39 | 3.30 | 2.30 | 5.33 |
| C90 | I | 23.00 | 80°00'00" | 32.11 | 19.30 | 7.02 | 1.82 | 4.17 |
| C91 | D | 96.00 | 7°26'39" | 12.47 | 6.25 | 0.20 | 0.53 | 1.00 |
| C92 | D | 30.00 | 26°02'44" | 13.64 | 6.94 | 0.79 | 1.42 | 3.20 |
| C93 | D | 39.00 | 62°47'19" | 42.74 | 23.80 | 6.69 | 1.13 | 2.46 |
| C94 | D | 78.00 | 4°48'56" | 6.56 | 3.28 | 0.07 | 0.63 | 1.23 |
| C95 | I | 37.00 | 12°58'01" | 8.37 | 4.20 | 0.24 | 1.18 | 2.59 |
| C96 | D | 67.00 | 6°03'24" | 7.08 | 3.54 | 0.09 | 0.71 | 1.43 |
| C97 | I | 32.00 | 68°49'30" | 38.44 | 21.92 | 6.79 | 1.34 | 3.00 |
| C98 | I | 105.00 | 9°05'34" | 16.66 | 8.35 | 0.33 | 0.49 | 0.91 |
| C99 | I | 25.00 | 35°33'32" | 15.52 | 8.02 | 1.25 | 1.68 | 3.84 |
| C100 | I | 35.00 | 39°04'01" | 23.86 | 12.42 | 2.14 | 1.24 | 2.74 |

**Fuente:** Elaboración propia

**4.1.4.2. Tramos en tangente**

Para obtener las longitudes de tramos en tangente adecuadas se utilizó las siguientes ecuaciones:

* Longitud recta mínima entre dos curvas de sentido contrario “S”

1.39\*20

* Longitud recta mínima entre dos curvas en el mismo sentido “O”

2.78\*20

56.00 m.

* Longitud máxima de tramo recto.

16.70\*20

**Tabla 4.5:** Evaluación de la longitud en tramos en tangente.

| N° P.I. | Radio  (m) | Deflexión | Sent. | L.T.T.  medido (m) | Clasificación s, o. | L.T.T. calculado  (m) | Evaluación |
| --- | --- | --- | --- | --- | --- | --- | --- |
|
|  |
| 1 | 36 | 31°56'21" | I | 50.44 | Lmin.s | 28 | Cumple |
| 2 | 65 | 25°45'53" | D | 15.8 | Lmin.s | 28 | No cumple |
| 3 | 70 | 4°55'39" | I | 19.81 | Lmin.s | 28 | No cumple |
| 4 | 50 | 31°07'58" | D | 21.15 | Lmin.o | 56 | No cumple |
| 5 | 75 | 31°12'22" | D | 20.13 | Lmin.s | 28 | No cumple |
| 6 | 35 | 27°49'41" | I | 19.31 | Lmin.s | 28 | No cumple |
| 7 | 105 | 6°35'23" | D | 11.75 | Lmin.s | 28 | No cumple |
| 8 | 40 | 30°14'12" | I | 52.18 | Lmin.s | 28 | Cumple |
| 9 | 35 | 57°15'01" | D | 13.94 | Lmin.s | 28 | No cumple |
| 10 | 95 | 15°59'12" | I | 39.58 | Lmin.o | 56 | No cumple |
| 11 | 23 | 27°29'19" | I | 8.23 | Lmin.o | 56 | No cumple |
| 12 | 16 | 56°51'16" | I | 14.52 | Lmin.o | 56 | No cumple |
| 13 | 130 | 8°55'13" | I | 15.5 | Lmin.s | 28 | No cumple |
| 14 | 43 | 83°47'11" | D | 12.69 | Lmin.s | 28 | No cumple |
| 15 | 25 | 74°51'46" | I | 12.58 | Lmin.s | 28 | No cumple |
| 16 | 38 | 35°49'11" | D | 22.38 | Lmin.o | 56 | No cumple |
| 17 | 16 | 118°37'15" | D | 83.7 | Lmin.s | 28 | Cumple |
| 18 | 39 | 44°52'06" | I | 17.79 | Lmin.o | 56 | No cumple |
| 19 | 153 | 6°10'12" | I | 32.18 | Lmin.s | 28 | Cumple |
| 20 | 32 | 48°55'54" | D | 22.73 | Lmin.o | 56 | No cumple |
| 21 | 38 | 23°16'14" | D | 61.34 | Lmin.s | 28 | Cumple |
| 22 | 45 | 19°05'45" | I | 7.31 | Lmin.o | 56 | No cumple |
| 23 | 53 | 38°34'44" | I | 13.29 | Lmin.o | 56 | No cumple |
| 24 | 17 | 118°55'00" | I | 135.58 | Lmin.s | 28 | Cumple |
| 25 | 19 | 102°11'04" | D | 41.42 | Lmin.o | 56 | No cumple |
| 26 | 42 | 61°30'29" | I | 26.28 | Lmin.o | 56 | No cumple |
| 27 | 76 | 6°49'02" | I | 26.18 | Lmin.o | 56 | No cumple |
| 28 | 93 | 11°14'07" | I | 19.5 | Lmin.s | 28 | No cumple |
| 29 | 52 | 22°18'12" | D | 36.73 | Lmin.o | 56 | No cumple |
| 30 | 51 | 19°36'10" | D | 22.51 | Lmin.s | 28 | No cumple |
| 31 | 37 | 19°25'27" | I | 47.65 | Lmin.s | 28 | Cumple |
| 32 | 63 | 25°37'38" | D | 36.85 | Lmin.s | 28 | Cumple |
| 33 | 83 | 7°44'22" | I | 27.11 | Lmin.s | 28 | No cumple |
| 34 | 45 | 7°33'17" | D | 12.56 | Lmin.s | 28 | No cumple |
| 35 | 25 | 33°57'16" | I | 14.96 | Lmin.s | 28 | No cumple |
| 36 | 16 | 86°47'18" | D | 7 | Lmin.o | 56 | No cumple |
| 37 | 48 | 26°34'40" | D | 4.3 | Lmin.o | 56 | No cumple |
| 38 | 20 | 23°42'01" | D | 13.42 | Lmin.s | 28 | No cumple |
| 39 | 17 | 112°56'58" | I | 37.73 | Lmin.s | 28 | Cumple |
| 40 | 47 | 33°16'24" | D | 13.35 | Lmin.o | 56 | No cumple |
| 41 | 36 | 27°30'23" | D | 11.09 | Lmin.s | 28 | No cumple |
| 42 | 15 | 131°21'36" | I | 5 | Lmin.o | 56 | No cumple |
| 43 | 40 | 21°02'07" | D | 21.45 | Lmin.o | 56 | No cumple |
| 44 | 25 | 26°13'11" | D | 29.6 | Lmin.s | 28 | Cumple |
| 45 | 46 | 23°49'57" | I | 47.66 | Lmin.s | 28 | Cumple |
| 46 | 26 | 89°30'15" | D | 24.55 | Lmin.o | 56 | No cumple |
| 47 | 51 | 22°44'04" | D | 21.23 | Lmin.s | 28 | No cumple |
| 48 | 30 | 43°44'23" | I | 39.48 | Lmin.o | 56 | No cumple |
| 49 | 60 | 27°26'46" | I | 8.22 | Lmin.o | 56 | No cumple |
| 50 | 54 | 22°13'27" | I | 39.3 | Lmin.s | 28 | Cumple |
| 51 | 36 | 29°54'06" | D | 13.58 | Lmin.s | 28 | No cumple |
| 52 | 37 | 33°43'20" | I | 6.62 | Lmin.s | 28 | No cumple |
| 53 | 46 | 17°26'23" | D | 18.79 | Lmin.s | 28 | No cumple |
| 54 | 23 | 37°27'03" | I | 11.49 | Lmin.s | 28 | No cumple |
| 55 | 39 | 10°02'05" | D | 30.07 | Lmin.s | 28 | Cumple |
| 56 | 54 | 15°10'29" | I | 30.12 | Lmin.s | 28 | Cumple |
| 57 | 16 | 135°10'27" | D | 38.48 | Lmin.s | 28 | Cumple |
| 58 | 37 | 12°55'23" | I | 23.79 | Lmin.o | 56 | No cumple |
| 59 | 33 | 13°18'35" | I | 14.59 | Lmin.o | 56 | No cumple |
| 60 | 32 | 31°40'48" | I | 49.97 | Lmin.s | 28 | Cumple |
| 61 | 31 | 25°39'09" | D | 13.26 | Lmin.o | 56 | No cumple |
| 62 | 44 | 15°59'18" | D | 58.17 | Lmin.o | 56 | Cumple |
| 63 | 26 | 24°48'37" | D | 28.64 | Lmin.s | 28 | Cumple |
| 64 | 33 | 16°53'49" | I | 33.14 | Lmin.s | 28 | Cumple |
| 65 | 33 | 16°16'22" | D | 55.67 | Lmin.s | 28 | Cumple |
| 66 | 20 | 76°26'54" | I | 45.97 | Lmin.s | 28 | Cumple |
| 67 | 163 | 6°21'33" | D | 62.93 | Lmin.o | 56 | Cumple |
| 68 | 16 | 65°23'09" | D | 13.29 | Lmin.s | 28 | No cumple |
| 69 | 17 | 69°38'33" | I | 11.68 | Lmin.s | 28 | No cumple |
| 70 | 16 | 22°34'39" | D | 8.14 | Lmin.o | 56 | No cumple |
| 71 | 17 | 63°22'51" | D | 28.11 | Lmin.s | 28 | Cumple |
| 72 | 38 | 36°43'31" | I | 50.26 | Lmin.s | 28 | Cumple |
| 73 | 43 | 21°08'17" | D | 15.9 | Lmin.s | 28 | No cumple |
| 74 | 118 | 5°45'13" | I | 13.33 | Lmin.s | 28 | No cumple |
| 75 | 48 | 11°25'15" | D | 23.64 | Lmin.s | 28 | No cumple |
| 76 | 38 | 13°52'42" | I | 65.74 | Lmin.o | 56 | Cumple |
| 77 | 63 | 8°55'42" | I | 12.24 | Lmin.s | 28 | No cumple |
| 78 | 21 | 25°34'47" | D | 22.11 | Lmin.s | 28 | No cumple |
| 79 | 22 | 70°12'23" | I | 18.89 | Lmin.s | 28 | No cumple |
| 80 | 26 | 49°39'28" | D | 31.96 | Lmin.o | 56 | No cumple |
| 81 | 39 | 19°07'26" | D | 16.78 | Lmin.s | 28 | No cumple |
| 82 | 124 | 4°16'45" | I | 117.11 | Lmin.s | 28 | Cumple |
| 83 | 54 | 10°00'15" | D | 16.78 | Lmin.o | 56 | No cumple |
| 84 | 20 | 99°04'17" | D | 17.82 | Lmin.s | 28 | No cumple |
| 85 | 32 | 28°30'06" | I | 17.19 | Lmin.o | 56 | No cumple |
| 86 | 39 | 15°44'24" | I | 21.15 | Lmin.o | 56 | No cumple |
| 87 | 20 | 52°07'40" | I | 19.73 | Lmin.o | 56 | No cumple |
| 88 | 37 | 25°01'08" | I | 58.75 | Lmin.s | 28 | Cumple |
| 89 | 18 | 64°38'41" | D | 41.54 | Lmin.s | 28 | Cumple |
| 90 | 23 | 80°00'00" | I | 23.12 | Lmin.s | 28 | No cumple |
| 91 | 96 | 7°26'39" | D | 64.68 | Lmin.o | 56 | Cumple |
| 92 | 30 | 26°02'44" | D | 77.85 | Lmin.o | 56 | Cumple |
| 93 | 39 | 62°47'19" | D | 79.03 | Lmin.o | 56 | Cumple |
| 94 | 78 | 4°48'56" | D | 17.9 | Lmin.s | 28 | No cumple |
| 95 | 37 | 12°58'01" | I | 10.57 | Lmin.s | 28 | No cumple |
| 96 | 67 | 6°03'24" | D | 68.36 | Lmin.s | 28 | Cumple |
| 97 | 32 | 68°49'30" | I | 7.15 | Lmin.o | 56 | No cumple |
| 98 | 105 | 9°05'34" | I | 25.49 | Lmin.o | 56 | No cumple |
| 99 | 25 | 35°33'32" | I | 28.6 | Lmin.o | 56 | No cumple |
| 100 | 35 | 39°04'01" | I | 39.32 | Lmin.o | 56 | No cumple |

**Fuente:** Elaboración propia.

**4.1.4.3. Curvas circulares**

Para la evaluación de curvas horizontales circulares se tuvo en cuenta el radio mínimo.

**4.1.4.3.1. Radios mínimos**

Haciendo uso de la velocidad de diseño: 20 Km/h, peralte máximo: 8% y valor máximo de fricción: 0.18; obtenemos:

Rmín = 12.11 m.

Teniendo en cuenta la **Tabla 2.5**, se asume el valor de:

Rmín = 12 m.

* Para curvas de vuelta se asume la siguiente formula:

Rm =Rmín + (Ancho de calzada / 2)

Ancho de calzada = 3.5 m

Rm =8 +

Entonces para curvas de vuelta es:

Rmin = 10 m.

**Tabla 4.6:** Evaluación de los radios.

| N° de curva | Progresiva | Radio medido | Radio mín. calculado | Evaluación |
| --- | --- | --- | --- | --- |
| C1 | 0+026.78 | 36 | 12 | Cumple |
| C2 | 0+101.86 | 65 | 12 | Cumple |
| C3 | 0+135.04 | 70 | 12 | Cumple |
| C4 | 0+171.78 | 50 | 12 | Cumple |
| C5 | 0+227.12 | 75 | 12 | Cumple |
| C6 | 0+275.82 | 35 | 12 | Cumple |
| C7 | 0+309.50 | 105 | 12 | Cumple |
| C8 | 0+338.09 | 40 | 12 | Cumple |
| C9 | 0+419.67 | 35 | 12 | Cumple |
| C10 | 0+462.82 | 95 | 12 | Cumple |
| C11 | 0+521.20 | 23 | 12 | Cumple |
| C12 | 0+543.50 | 16 | 12 | Cumple |
| C13 | 0+575.38 | 130 | 12 | Cumple |
| C14 | 0+639.55 | 43 | 12 | Cumple |
| C15 | 0+695.68 | 25 | 12 | Cumple |
| C16 | 0+734.07 | 38 | 12 | Cumple |
| C17 | 0+794.88 | 16 | 12 | Cumple |
| C18 | 0+900.85 | 39 | 12 | Cumple |
| C19 | 0+941.32 | 153 | 12 | Cumple |
| C20 | 0+996.29 | 32 | 12 | Cumple |
| C21 | 1+039.61 | 38 | 12 | Cumple |
| C22 | 1+116.13 | 45 | 12 | Cumple |
| C23 | 1+149.42 | 53 | 12 | Cumple |
| C24 | 1+208.66 | 17 | 12 | Cumple |
| C25 | 1+374.25 | 19 | 12 | Cumple |
| C26 | 1+451.00 | 42 | 12 | Cumple |
| C27 | 1+501.90 | 76 | 12 | Cumple |
| C28 | 1+541.74 | 93 | 12 | Cumple |
| C29 | 1+580.58 | 52 | 12 | Cumple |
| C30 | 1+636.11 | 51 | 12 | Cumple |
| C31 | 1+673.60 | 37 | 12 | Cumple |
| C32 | 1+741.78 | 63 | 12 | Cumple |
| C33 | 1+798.10 | 83 | 12 | Cumple |
| C34 | 1+833.78 | 45 | 12 | Cumple |
| C35 | 1+856.94 | 25 | 12 | Cumple |
| C36 | 1+894.21 | 16 | 12 | Cumple |
| C37 | 1+921.65 | 48 | 12 | Cumple |
| C38 | 1+941.08 | 20 | 12 | Cumple |
| C39 | 1+984.24 | 17 | 12 | Cumple |
| C40 | 2+043.86 | 47 | 12 | Cumple |
| C41 | 2+079.27 | 36 | 12 | Cumple |
| C42 | 2+132.02 | 15 | 12 | Cumple |
| C43 | 2+145.65 | 40 | 12 | Cumple |
| C44 | 2+180.18 | 25 | 12 | Cumple |
| C45 | 2+225.11 | 46 | 12 | Cumple |
| C46 | 2+307.97 | 26 | 12 | Cumple |
| C47 | 2+357.62 | 51 | 12 | Cumple |
| C48 | 2+400.88 | 30 | 12 | Cumple |
| C49 | 2+465.87 | 60 | 12 | Cumple |
| C50 | 2+498.79 | 54 | 12 | Cumple |
| C51 | 2+558.04 | 36 | 12 | Cumple |
| C52 | 2+592.01 | 37 | 12 | Cumple |
| C53 | 2+616.25 | 46 | 12 | Cumple |
| C54 | 2+649.78 | 23 | 12 | Cumple |
| C55 | 2+671.93 | 39 | 12 | Cumple |
| C56 | 2+712.61 | 54 | 12 | Cumple |
| C57 | 2+788.63 | 16 | 12 | Cumple |
| C58 | 2+830.26 | 37 | 12 | Cumple |
| C59 | 2+862.05 | 33 | 12 | Cumple |
| C60 | 2+889.54 | 32 | 12 | Cumple |
| C61 | 2+955.18 | 31 | 12 | Cumple |
| C62 | 2+981.44 | 44 | 12 | Cumple |
| C63 | 3+051.43 | 26 | 12 | Cumple |
| C64 | 3+090.51 | 33 | 12 | Cumple |
| C65 | 3+133.20 | 33 | 12 | Cumple |
| C66 | 3+209.27 | 20 | 12 | Cumple |
| C67 | 3+275.23 | 163 | 12 | Cumple |
| C68 | 3+357.46 | 16 | 12 | Cumple |
| C69 | 3+390.57 | 17 | 12 | Cumple |
| C70 | 3+414.28 | 16 | 12 | Cumple |
| C71 | 3+436.03 | 17 | 12 | Cumple |
| C72 | 3+485.06 | 38 | 12 | Cumple |
| C73 | 3+555.09 | 43 | 12 | Cumple |
| C74 | 3+584.76 | 118 | 12 | Cumple |
| C75 | 3+608.81 | 48 | 12 | Cumple |
| C76 | 3+641.84 | 38 | 12 | Cumple |
| C77 | 3+717.08 | 63 | 12 | Cumple |
| C78 | 3+738.99 | 21 | 12 | Cumple |
| C79 | 3+781.17 | 22 | 12 | Cumple |
| C80 | 3+823.59 | 26 | 12 | Cumple |
| C81 | 3+872.62 | 39 | 12 | Cumple |
| C82 | 3+900.48 | 124 | 12 | Cumple |
| C83 | 4+026.95 | 54 | 12 | Cumple |
| C84 | 4+071.87 | 20 | 12 | Cumple |
| C85 | 4+108.96 | 32 | 12 | Cumple |
| C86 | 4+139.32 | 39 | 12 | Cumple |
| C87 | 4+175.58 | 20 | 12 | Cumple |
| C88 | 4+211.93 | 37 | 12 | Cumple |
| C89 | 4+290.02 | 18 | 12 | Cumple |
| C90 | 4+359.78 | 23 | 12 | Cumple |
| C91 | 4+401.96 | 96 | 12 | Cumple |
| C92 | 4+479.80 | 30 | 12 | Cumple |
| C93 | 4+588.15 | 39 | 12 | Cumple |
| C94 | 4+689.39 | 78 | 12 | Cumple |
| C95 | 4+714.78 | 37 | 12 | Cumple |
| C96 | 4+733.06 | 67 | 12 | Cumple |
| C97 | 4+826.88 | 32 | 12 | Cumple |
| C98 | 4+858.89 | 105 | 12 | Cumple |
| C99 | 4+900.71 | 25 | 12 | Cumple |
| C100 | 4+949.23 | 35 | 12 | Cumple |

**Fuente:** Elaboración propia.

**4.1.4.4. Longitud de curva horizontal**

Si la velocidad directriz es menor a 50 Km/h y el ángulo de deflexión es mayor a 5° (∆≤ 5) se considera como longitud de curva mínima deseada la longitud obtenida de la siguiente expresión L=3V (L= longitud de curva en metros y V= velocidad en Km/hora).

Puesto que la velocidad directriz es 20 k/h; nuestra longitud mínima de curva será:

L = 3 V => L = 3 x 20 = 60

Para ∆≤ 5° la longitud de curva será:

𝐿 > 30(10 − ∆)

**Tabla 4.7***:* Evaluación de las longitudes de curvas horizontales.

| N° de curva | Progresiva | Long. de curva horizontal medido | Angulo de deflexión en grados (°) | Long. de curva horizontal calculado | Evaluación de Long. de curva |
| --- | --- | --- | --- | --- | --- |
|
|  |
| C1 | 0+026.78 | 20.07 | 31.94 | 60 | No cumple |
| C2 | 0+101.86 | 29.23 | 25.77 | 60 | No cumple |
| C3 | 0+135.04 | 6.02 | 4.93 | 152.18 | No cumple |
| C4 | 0+171.78 | 27.17 | 31.13 | 60 | No cumple |
| C5 | 0+227.12 | 40.85 | 31.21 | 60 | No cumple |
| C6 | 0+275.82 | 17.00 | 27.83 | 60 | No cumple |
| C7 | 0+309.50 | 12.08 | 6.59 | 60 | No cumple |
| C8 | 0+338.09 | 21.11 | 30.24 | 60 | No cumple |
| C9 | 0+419.67 | 34.97 | 57.25 | 60 | No cumple |
| C10 | 0+462.82 | 26.51 | 15.99 | 60 | No cumple |
| C11 | 0+521.20 | 11.03 | 27.49 | 60 | No cumple |
| C12 | 0+543.50 | 15.88 | 56.85 | 60 | No cumple |
| C13 | 0+575.38 | 20.24 | 8.92 | 60 | No cumple |
| C14 | 0+639.55 | 62.88 | 83.79 | 60 | Cumple |
| C15 | 0+695.68 | 32.67 | 74.86 | 60 | No cumple |
| C16 | 0+734.07 | 23.76 | 35.82 | 60 | No cumple |
| C17 | 0+794.88 | 33.13 | 118.62 | 60 | No cumple |
| C18 | 0+900.85 | 30.54 | 44.87 | 60 | No cumple |
| C19 | 0+941.32 | 16.48 | 6.17 | 60 | No cumple |
| C20 | 0+996.29 | 27.33 | 48.93 | 60 | No cumple |
| C21 | 1+039.61 | 15.43 | 23.27 | 60 | No cumple |
| C22 | 1+116.13 | 15.00 | 19.10 | 60 | No cumple |
| C23 | 1+149.42 | 35.69 | 38.58 | 60 | No cumple |
| C24 | 1+208.66 | 35.28 | 118.92 | 60 | No cumple |
| C25 | 1+374.25 | 33.89 | 102.18 | 60 | No cumple |
| C26 | 1+451.00 | 45.09 | 61.51 | 60 | No cumple |
| C27 | 1+501.90 | 9.04 | 6.82 | 60 | No cumple |
| C28 | 1+541.74 | 18.24 | 11.24 | 60 | No cumple |
| C29 | 1+580.58 | 20.24 | 22.30 | 60 | No cumple |
| C30 | 1+636.11 | 17.45 | 19.60 | 60 | No cumple |
| C31 | 1+673.60 | 12.54 | 19.42 | 60 | No cumple |
| C32 | 1+741.78 | 28.18 | 25.63 | 60 | No cumple |
| C33 | 1+798.10 | 11.21 | 7.74 | 60 | No cumple |
| C34 | 1+833.78 | 5.93 | 7.56 | 60 | No cumple |
| C35 | 1+856.94 | 14.82 | 33.95 | 60 | No cumple |
| C36 | 1+894.21 | 24.24 | 86.79 | 60 | No cumple |
| C37 | 1+921.65 | 22.27 | 26.58 | 60 | No cumple |
| C38 | 1+941.08 | 8.27 | 23.70 | 60 | No cumple |
| C39 | 1+984.24 | 33.51 | 112.95 | 60 | No cumple |
| C40 | 2+043.86 | 27.29 | 33.27 | 60 | No cumple |
| C41 | 2+079.27 | 17.28 | 27.51 | 60 | No cumple |
| C42 | 2+132.02 | 34.39 | 131.36 | 60 | No cumple |
| C43 | 2+145.65 | 14.69 | 21.04 | 60 | No cumple |
| C44 | 2+180.18 | 11.44 | 26.22 | 60 | No cumple |
| C45 | 2+225.11 | 19.13 | 23.83 | 60 | No cumple |
| C46 | 2+307.97 | 40.62 | 89.50 | 60 | No cumple |
| C47 | 2+357.62 | 20.24 | 22.73 | 60 | No cumple |
| C48 | 2+400.88 | 22.90 | 43.74 | 60 | No cumple |
| C49 | 2+465.87 | 28.74 | 27.45 | 60 | No cumple |
| C50 | 2+498.79 | 20.95 | 22.22 | 60 | No cumple |
| C51 | 2+558.04 | 18.79 | 29.90 | 60 | No cumple |
| C52 | 2+592.01 | 21.78 | 33.72 | 60 | No cumple |
| C53 | 2+616.25 | 14.00 | 17.44 | 60 | No cumple |
| C54 | 2+649.78 | 15.03 | 37.45 | 60 | No cumple |
| C55 | 2+671.93 | 6.83 | 10.04 | 60 | No cumple |
| C56 | 2+712.61 | 14.30 | 15.18 | 60 | No cumple |
| C57 | 2+788.63 | 37.75 | 135.17 | 60 | No cumple |
| C58 | 2+830.26 | 8.35 | 12.92 | 60 | No cumple |
| C59 | 2+862.05 | 7.67 | 13.31 | 60 | No cumple |
| C60 | 2+889.54 | 17.69 | 31.68 | 60 | No cumple |
| C61 | 2+955.18 | 13.88 | 25.65 | 60 | No cumple |
| C62 | 2+981.44 | 12.28 | 15.99 | 60 | No cumple |
| C63 | 3+051.43 | 11.26 | 24.81 | 60 | No cumple |
| C64 | 3+090.51 | 9.73 | 16.90 | 60 | No cumple |
| C65 | 3+133.20 | 9.37 | 16.27 | 60 | No cumple |
| C66 | 3+209.27 | 26.69 | 76.45 | 60 | No cumple |
| C67 | 3+275.23 | 18.09 | 6.36 | 60 | No cumple |
| C68 | 3+357.46 | 18.26 | 65.39 | 60 | No cumple |
| C69 | 3+390.57 | 20.66 | 69.64 | 60 | No cumple |
| C70 | 3+414.28 | 6.30 | 22.58 | 60 | No cumple |
| C71 | 3+436.03 | 18.81 | 63.38 | 60 | No cumple |
| C72 | 3+485.06 | 24.36 | 36.73 | 60 | No cumple |
| C73 | 3+555.09 | 15.86 | 21.14 | 60 | No cumple |
| C74 | 3+584.76 | 11.85 | 5.75 | 60 | No cumple |
| C75 | 3+608.81 | 9.57 | 11.42 | 60 | No cumple |
| C76 | 3+641.84 | 9.20 | 13.88 | 60 | No cumple |
| C77 | 3+717.08 | 9.82 | 8.93 | 60 | No cumple |
| C78 | 3+738.99 | 9.38 | 25.58 | 60 | No cumple |
| C79 | 3+781.17 | 26.96 | 70.21 | 60 | No cumple |
| C80 | 3+823.59 | 22.53 | 49.66 | 60 | No cumple |
| C81 | 3+872.62 | 13.02 | 19.12 | 60 | No cumple |
| C82 | 3+900.48 | 9.26 | 4.28 | 171.6 | No cumple |
| C83 | 4+026.95 | 9.43 | 10.00 | 60 | No cumple |
| C84 | 4+071.87 | 34.58 | 99.07 | 60 | No cumple |
| C85 | 4+108.96 | 15.92 | 28.50 | 60 | No cumple |
| C86 | 4+139.32 | 10.71 | 15.74 | 60 | No cumple |
| C87 | 4+175.58 | 18.20 | 52.13 | 60 | No cumple |
| C88 | 4+211.93 | 16.16 | 25.02 | 60 | No cumple |
| C89 | 4+290.02 | 20.31 | 64.65 | 60 | No cumple |
| C90 | 4+359.78 | 32.11 | 80.00 | 60 | No cumple |
| C91 | 4+401.96 | 12.47 | 7.44 | 60 | No cumple |
| C92 | 4+479.80 | 13.64 | 26.05 | 60 | No cumple |
| C93 | 4+588.15 | 42.74 | 62.79 | 60 | No cumple |
| C94 | 4+689.39 | 6.56 | 4.82 | 155.5 | No cumple |
| C95 | 4+714.78 | 8.37 | 12.97 | 60 | No cumple |
| C96 | 4+733.06 | 7.08 | 6.06 | 60 | No cumple |
| C97 | 4+826.88 | 38.44 | 68.83 | 60 | No cumple |
| C98 | 4+858.89 | 16.66 | 9.09 | 60 | No cumple |
| C99 | 4+900.71 | 15.52 | 35.56 | 60 | No cumple |
| C100 | 4+949.23 | 23.86 | 39.07 | 60 | No cumple |

**Fuente:** Elaboración propia

**4.1.4.5. Distancia de visibilidad en curvas horizontales**

En las curvas horizontales, la línea de visibilidad debe ser por lo menos igual a la distancia de parada y se mide a lo largo del eje central del carril. El mínimo ancho que deberá quedar libre de obstrucciones a la visibilidad, se obtiene de la siguiente formula:

donde:

M: Ordenada media o ancho mínimo libre (m).

R = Radio de la curva horizontal (m).

S = Distancia de visibilidad (m).

**Tabla 4.8.** Distancia de visibilidad en curvas horizontales.

| N° de curva | Progresiva | Radio(m) | Ancho mínimo libre calculado. | Ancho mínimo libre medido. | Verificación |
| --- | --- | --- | --- | --- | --- |
| C1 | 0+026.78 | 36 | 1.380 | ∞ | No necesita |
| C2 | 0+101.86 | 65 | 0.768 | 2.520 | No necesita |
| C3 | 0+135.04 | 70 | 0.713 | ∞ | No necesita |
| C4 | 0+171.78 | 50 | 0.997 | 2.260 | No necesita |
| C5 | 0+227.12 | 75 | 0.666 | 2.740 | No necesita |
| C6 | 0+275.82 | 35 | 1.419 | ∞ | No necesita |
| C7 | 0+309.50 | 105 | 0.476 | 2.800 | No necesita |
| C8 | 0+338.09 | 40 | 1.244 | ∞ | No necesita |
| C9 | 0+419.67 | 35 | 1.419 | 2.520 | No necesita |
| C10 | 0+462.82 | 95 | 0.526 | ∞ | No necesita |
| C11 | 0+521.20 | 23 | 2.140 | ∞ | No necesita |
| C12 | 0+543.50 | 16 | 3.025 | ∞ | No necesita |
| C13 | 0+575.38 | 130 | 0.384 | ∞ | No necesita |
| C14 | 0+639.55 | 43 | 1.158 | 2.560 | No necesita |
| C15 | 0+695.68 | 25 | 1.974 | ∞ | No necesita |
| C16 | 0+734.07 | 38 | 1.308 | ∞ | No necesita |
| C17 | 0+794.88 | 16 | 3.025 | 2.250 | Necesita |
| C18 | 0+900.85 | 39 | 1.275 | 2.500 | No necesita |
| C19 | 0+941.32 | 153 | 0.327 | ∞ | No necesita |
| C20 | 0+996.29 | 32 | 1.550 | ∞ | No necesita |
| C21 | 1+039.61 | 38 | 1.308 | ∞ | No necesita |
| C22 | 1+116.13 | 45 | 1.107 | 2.170 | No necesita |
| C23 | 1+149.42 | 53 | 0.941 | 2.170 | No necesita |
| C24 | 1+208.66 | 17 | 2.858 | 2.750 | Necesita |
| C25 | 1+374.25 | 19 | 2.572 | 2.500 | Necesita |
| C26 | 1+451.00 | 42 | 1.185 | ∞ | No necesita |
| C27 | 1+501.90 | 76 | 0.657 | ∞ | No necesita |
| C28 | 1+541.74 | 93 | 0.537 | ∞ | No necesita |
| C29 | 1+580.58 | 52 | 0.959 | 1.950 | No necesita |
| C30 | 1+636.11 | 51 | 0.977 | ∞ | No necesita |
| C31 | 1+673.60 | 37 | 1.343 | 2.220 | No necesita |
| C32 | 1+741.78 | 63 | 0.792 | ∞ | No necesita |
| C33 | 1+798.10 | 83 | 0.602 | ∞ | No necesita |
| C34 | 1+833.78 | 45 | 1.107 | ∞ | No necesita |
| C35 | 1+856.94 | 25 | 1.974 | 2.500 | No necesita |
| C36 | 1+894.21 | 16 | 3.025 | ∞ | No necesita |
| C37 | 1+921.65 | 48 | 1.038 | ∞ | No necesita |
| C38 | 1+941.08 | 20 | 2.449 | ∞ | No necesita |
| C39 | 1+984.24 | 17 | 2.858 | 2.100 | Necesita |
| C40 | 2+043.86 | 47 | 1.060 | ∞ | No necesita |
| C41 | 2+079.27 | 36 | 1.380 | ∞ | No necesita |
| C42 | 2+132.02 | 15 | 3.212 | 3.100 | Necesita |
| C43 | 2+145.65 | 40 | 1.244 | ∞ | No necesita |
| C44 | 2+180.18 | 25 | 1.974 | ∞ | No necesita |
| C45 | 2+225.11 | 46 | 1.083 | 2.240 | No necesita |
| C46 | 2+307.97 | 26 | 1.900 | ∞ | No necesita |
| C47 | 2+357.62 | 51 | 0.977 | ∞ | No necesita |
| C48 | 2+400.88 | 30 | 1.652 | 1.820 | No necesita |
| C49 | 2+465.87 | 60 | 0.832 | 2.940 | No necesita |
| C50 | 2+498.79 | 54 | 0.923 | 2.150 | No necesita |
| C51 | 2+558.04 | 36 | 1.380 | ∞ | No necesita |
| C52 | 2+592.01 | 37 | 1.343 | 2.500 | No necesita |
| C53 | 2+616.25 | 46 | 1.083 | ∞ | No necesita |
| C54 | 2+649.78 | 23 | 2.140 | 2.560 | No necesita |
| C55 | 2+671.93 | 39 | 1.275 | ∞ | No necesita |
| C56 | 2+712.61 | 54 | 0.923 | 2.560 | No necesita |
| C57 | 2+788.63 | 16 | 3.025 | ∞ | No necesita |
| C58 | 2+830.26 | 37 | 1.343 | 1.660 | No necesita |
| C59 | 2+862.05 | 33 | 1.504 | 2.560 | No necesita |
| C60 | 2+889.54 | 32 | 1.550 | 2.600 | No necesita |
| C61 | 2+955.18 | 31 | 1.599 | ∞ | No necesita |
| C62 | 2+981.44 | 44 | 1.132 | ∞ | No necesita |
| C63 | 3+051.43 | 26 | 1.900 | ∞ | No necesita |
| C64 | 3+090.51 | 33 | 1.504 | 2.110 | No necesita |
| C65 | 3+133.20 | 33 | 1.504 | ∞ | No necesita |
| C66 | 3+209.27 | 20 | 2.449 | 3.010 | No necesita |
| C67 | 3+275.23 | 163 | 0.307 | ∞ | No necesita |
| C68 | 3+357.46 | 16 | 3.025 | ∞ | No necesita |
| C69 | 3+390.57 | 17 | 2.858 | 3.200 | No necesita |
| C70 | 3+414.28 | 16 | 3.025 | ∞ | No necesita |
| C71 | 3+436.03 | 17 | 2.858 | ∞ | No necesita |
| C72 | 3+485.06 | 38 | 1.308 | 2.970 | No necesita |
| C73 | 3+555.09 | 43 | 1.158 | ∞ | No necesita |
| C74 | 3+584.76 | 118 | 0.424 | ∞ | No necesita |
| C75 | 3+608.81 | 48 | 1.038 | ∞ | No necesita |
| C76 | 3+641.84 | 38 | 1.308 | 2.260 | No necesita |
| C77 | 3+717.08 | 63 | 0.792 | ∞ | No necesita |
| C78 | 3+738.99 | 21 | 2.337 | ∞ | No necesita |
| C79 | 3+781.17 | 22 | 2.234 | 2.100 | Necesita |
| C80 | 3+823.59 | 26 | 1.900 | ∞ | No necesita |
| C81 | 3+872.62 | 39 | 1.275 | ∞ | No necesita |
| C82 | 3+900.48 | 124 | 0.403 | ∞ | No necesita |
| C83 | 4+026.95 | 54 | 0.923 | ∞ | No necesita |
| C84 | 4+071.87 | 20 | 2.449 | 2.510 | No necesita |
| C85 | 4+108.96 | 32 | 1.550 | 2.320 | No necesita |
| C86 | 4+139.32 | 39 | 1.275 | 2.600 | No necesita |
| C87 | 4+175.58 | 20 | 2.449 | 2.520 | No necesita |
| C88 | 4+211.93 | 37 | 1.343 | 2.320 | No necesita |
| C89 | 4+290.02 | 18 | 2.707 | ∞ | No necesita |
| C90 | 4+359.78 | 23 | 2.140 | 2.500 | No necesita |
| C91 | 4+401.96 | 96 | 0.520 | ∞ | No necesita |
| C92 | 4+479.80 | 30 | 1.652 | ∞ | No necesita |
| C93 | 4+588.15 | 39 | 1.275 | ∞ | No necesita |
| C94 | 4+689.39 | 78 | 0.640 | ∞ | No necesita |
| C95 | 4+714.78 | 37 | 1.343 | 2.030 | No necesita |
| C96 | 4+733.06 | 67 | 0.745 | ∞ | No necesita |
| C97 | 4+826.88 | 32 | 1.550 | 2.360 | No necesita |
| C98 | 4+858.89 | 105 | 0.476 | 2.220 | No necesita |
| C99 | 4+900.71 | 25 | 1.974 | 2.050 | No necesita |
| C100 | 4+949.23 | 35 | 1.419 | 2.730 | No necesita |

**Fuente:** Elaboración propia.

**4.1.4.6. Sobreancho**

El valor del sobreancho variará en función del tipo de vehículo, del radio de la curva y de la velocidad de diseño.

Se utiliza la siguiente formula:

donde:

Sa = Sobreancho (m).

n = Número de carriles, n=1

R = Radio (m).

L = Distancia entre el eje posterior y parte frontal del vehículo tipo C2 (m), L= 7.9

V = Velocidad de diseño (km/h), V=20

**Tabla 4.9:** Evaluación de sobreancho.

| N° de curva | Progresiva | Sobreancho medido (m) | Sobreancho calculado (m) | Evaluación |
| --- | --- | --- | --- | --- |
| C1 | 0+026.78 | 1.8 | 1.21 | Cumple |
| C2 | 0+101.86 | 1.1 | 0.73 | Cumple |
| C3 | 0+135.04 | 1.35 | 0.69 | Cumple |
| C4 | 0+171.78 | 0.65 | 0.91 | No cumple |
| C5 | 0+227.12 | 0.45 | 0.65 | No cumple |
| C6 | 0+275.82 | 0.45 | 1.24 | No cumple |
| C7 | 0+309.50 | 0.9 | 0.49 | Cumple |
| C8 | 0+338.09 | 1.8 | 1.10 | Cumple |
| C9 | 0+419.67 | 0.75 | 1.24 | No cumple |
| C10 | 0+462.82 | 0.75 | 0.53 | Cumple |
| C11 | 0+521.20 | 1.2 | 1.82 | No cumple |
| C12 | 0+543.50 | 0.65 | 2.59 | No cumple |
| C13 | 0+575.38 | 0.75 | 0.42 | Cumple |
| C14 | 0+639.55 | 1.1 | 1.04 | Cumple |
| C15 | 0+695.68 | 1.15 | 1.68 | No cumple |
| C16 | 0+734.07 | 1.25 | 1.15 | Cumple |
| C17 | 0+794.88 | 0.9 | 2.59 | No cumple |
| C18 | 0+900.85 | 1.25 | 1.13 | Cumple |
| C19 | 0+941.32 | 1.25 | 0.37 | Cumple |
| C20 | 0+996.29 | 0.9 | 1.34 | No cumple |
| C21 | 1+039.61 | 0.9 | 1.15 | No cumple |
| C22 | 1+116.13 | 1.35 | 1.00 | Cumple |
| C23 | 1+149.42 | 0.9 | 0.87 | Cumple |
| C24 | 1+208.66 | 1 | 2.43 | No cumple |
| C25 | 1+374.25 | 1.35 | 2.18 | No cumple |
| C26 | 1+451.00 | 1.35 | 1.06 | Cumple |
| C27 | 1+501.90 | 0.65 | 0.64 | Cumple |
| C28 | 1+541.74 | 0.75 | 0.54 | Cumple |
| C29 | 1+580.58 | 0.85 | 0.88 | No cumple |
| C30 | 1+636.11 | 0.75 | 0.90 | No cumple |
| C31 | 1+673.60 | 0.75 | 1.18 | No cumple |
| C32 | 1+741.78 | 0.95 | 0.75 | Cumple |
| C33 | 1+798.10 | 0.98 | 0.60 | Cumple |
| C34 | 1+833.78 | 0.9 | 1.00 | No cumple |
| C35 | 1+856.94 | 0.9 | 1.68 | No cumple |
| C36 | 1+894.21 | 1.05 | 2.59 | No cumple |
| C37 | 1+921.65 | 0.9 | 0.94 | No cumple |
| C38 | 1+941.08 | 1.35 | 2.07 | No cumple |
| C39 | 1+984.24 | 2.25 | 2.43 | No cumple |
| C40 | 2+043.86 | 1.5 | 0.96 | Cumple |
| C41 | 2+079.27 | 1.25 | 1.21 | Cumple |
| C42 | 2+132.02 | 1.8 | 2.77 | No cumple |
| C43 | 2+145.65 | 0.9 | 1.10 | No cumple |
| C44 | 2+180.18 | 0.9 | 1.68 | No cumple |
| C45 | 2+225.11 | 0.45 | 0.98 | No cumple |
| C46 | 2+307.97 | 1.25 | 1.62 | No cumple |
| C47 | 2+357.62 | 1.35 | 0.90 | Cumple |
| C48 | 2+400.88 | 0.9 | 1.42 | No cumple |
| C49 | 2+465.87 | 1.8 | 0.78 | Cumple |
| C50 | 2+498.79 | 0.9 | 0.85 | Cumple |
| C51 | 2+558.04 | 0.9 | 1.21 | No cumple |
| C52 | 2+592.01 | 1.25 | 1.18 | Cumple |
| C53 | 2+616.25 | 1.25 | 0.98 | Cumple |
| C54 | 2+649.78 | 1.35 | 1.82 | No cumple |
| C55 | 2+671.93 | 1 | 1.13 | No cumple |
| C56 | 2+712.61 | 1.25 | 0.85 | Cumple |
| C57 | 2+788.63 | 0.85 | 2.59 | No cumple |
| C58 | 2+830.26 | 0.9 | 1.18 | No cumple |
| C59 | 2+862.05 | 2.25 | 1.31 | Cumple |
| C60 | 2+889.54 | 1.35 | 1.34 | Cumple |
| C61 | 2+955.18 | 2.55 | 1.38 | Cumple |
| C62 | 2+981.44 | 2.25 | 1.02 | Cumple |
| C63 | 3+051.43 | 0.95 | 1.62 | No cumple |
| C64 | 3+090.51 | 1 | 1.31 | No cumple |
| C65 | 3+133.20 | 0.5 | 1.31 | No cumple |
| C66 | 3+209.27 | 1.85 | 2.07 | No cumple |
| C67 | 3+275.23 | 1.95 | 0.35 | Cumple |
| C68 | 3+357.46 | 0.65 | 2.59 | No cumple |
| C69 | 3+390.57 | 1.45 | 2.43 | No cumple |
| C70 | 3+414.28 | 1.05 | 2.59 | No cumple |
| C71 | 3+436.03 | 2 | 2.43 | No cumple |
| C72 | 3+485.06 | 3.25 | 1.15 | Cumple |
| C73 | 3+555.09 | 2.55 | 1.04 | Cumple |
| C74 | 3+584.76 | 0.95 | 0.45 | Cumple |
| C75 | 3+608.81 | 3 | 0.94 | Cumple |
| C76 | 3+641.84 | 2.2 | 1.15 | Cumple |
| C77 | 3+717.08 | 1.8 | 0.75 | Cumple |
| C78 | 3+738.99 | 1.8 | 1.98 | No cumple |
| C79 | 3+781.17 | 0.75 | 1.89 | No cumple |
| C80 | 3+823.59 | 2.25 | 1.62 | Cumple |
| C81 | 3+872.62 | 2.35 | 1.13 | Cumple |
| C82 | 3+900.48 | 1.8 | 0.43 | Cumple |
| C83 | 4+026.95 | 3.25 | 0.85 | Cumple |
| C84 | 4+071.87 | 1.35 | 2.07 | No cumple |
| C85 | 4+108.96 | 1.8 | 1.34 | Cumple |
| C86 | 4+139.32 | 2.9 | 1.13 | Cumple |
| C87 | 4+175.58 | 2.45 | 2.07 | Cumple |
| C88 | 4+211.93 | 2.25 | 1.18 | Cumple |
| C89 | 4+290.02 | 1.05 | 2.30 | No cumple |
| C90 | 4+359.78 | 2.25 | 1.82 | Cumple |
| C91 | 4+401.96 | 0.9 | 0.53 | Cumple |
| C92 | 4+479.80 | 1.8 | 1.42 | Cumple |
| C93 | 4+588.15 | 0.95 | 1.13 | No cumple |
| C94 | 4+689.39 | 1.65 | 0.63 | Cumple |
| C95 | 4+714.78 | 0.9 | 1.18 | No cumple |
| C96 | 4+733.06 | 2.05 | 0.71 | Cumple |
| C97 | 4+826.88 | 2.05 | 1.34 | Cumple |
| C98 | 4+858.89 | 0.9 | 0.49 | Cumple |
| C99 | 4+900.71 | 2.25 | 1.68 | Cumple |
| C100 | 4+949.23 | 1.35 | 1.24 | Cumple |

**Fuente:** Elaboración propia.

**4.1.5.** **Alineamiento vertical**

**4.1.5.1. Pendiente**

De acuerdo al manual de diseño de carreteras no pavimentadas de bajo volumen de tránsito (MDCNPBVT), los parámetros de la pendiente serán:

* Pendiente mínima no deberá ser menor que 0.5%.
* Pendiente máxima no deberá ser mayor que 9%.

**Tabla 4.10:** Evaluación de pendientes.

| Punto inicial | Punto final | Pendiente medida | Pendiente máxima - norma | Pendiente mínima - norma | Evaluación de pendiente |
| --- | --- | --- | --- | --- | --- |
| 0+000.00 | 0+018.04 | 9.57% | 9% | 0.50% | No cumple |
| 0+112.12 | 0+196.18 | 8.15% | 9% | 0.50% | Cumple |
| 0+246.18 | 0+291.56 | 9.73% | 9% | 0.50% | No cumple |
| 0+341.56 | 0+411.64 | 9.71% | 9% | 0.50% | No cumple |
| 0+570.41 | 0+611.69 | 6.89% | 9% | 0.50% | Cumple |
| 0+640.73 | 0+680.70 | 9.49% | 9% | 0.50% | No cumple |
| 0+791.87 | 0+969.77 | 7.29% | 9% | 0.50% | Cumple |
| 1+132.76 | 1+163.03 | 4.01% | 9% | 0.50% | Cumple |
| 1+180.08 | 1+201.26 | 8.66% | 9% | 0.50% | Cumple |
| 1+325.86 | 1+340.51 | 6.01% | 9% | 0.50% | Cumple |
| 1+357.59 | 1+367.97 | 9.75% | 9% | 0.50% | No cumple |
| 1+501.75 | 1+518.48 | 7.48% | 9% | 0.50% | Cumple |
| 1+534.89 | 1+578.75 | 10.43% | 9% | 0.50% | No cumple |
| 1+901.25 | 2+007.40 | 4.02% | 9% | 0.50% | Cumple |
| 2+048.93 | 2+128.84 | 6.55% | 9% | 0.50% | Cumple |
| 2+195.34 | 2+220.88 | 7.10% | 9% | 0.50% | Cumple |
| 2+379.12 | 2+461.84 | 4.08% | 9% | 0.50% | Cumple |
| 2+530.16 | 2+621.97 | 7.30% | 9% | 0.50% | Cumple |
| 2+795.21 | 2+830.73 | 4.75% | 9% | 0.50% | Cumple |
| 2+853.72 | 2+900.26 | 7.73% | 9% | 0.50% | Cumple |
| 3+172.39 | 3+264.14 | 4.76% | 9% | 0.50% | Cumple |
| 3+437.11 | 3+453.98 | 1.54% | 9% | 0.50% | Cumple |
| 3+473.45 | 3+517.89 | 6.32% | 9% | 0.50% | Cumple |
| 3+549.42 | 3+799.95 | 6.25% | 9% | 0.50% | Cumple |
| 3+892.24 | 4+215.34 | 4.93% | 9% | 0.50% | Cumple |
| 4+398.02 | 4+593.44 | 1.11% | 9% | 0.50% | Cumple |
| 4+749.62 | 4+780.80 | 1.11% | 9% | 0.50% | Cumple |
| 4+871.44 | 4+884.93 | 3.08% | 9% | 0.50% | Cumple |
| 4+922.47 | 5+000.00 | 0.68% | 9% | 0.50% | Cumple |

**Fuente:** Elaboración propia.

**4.1.5.2. Curvas verticales**

Con el programa AUTOCAD CIVIL 3D, se diseñó curvas verticales cóncavas y convexas. Donde se debe tratar en lo posible que el perfil del terreno sea igual al perfil de la subrasante.

**4.1.5.2.1. Calculo de índice de curvatura**

Para conocer las características de las curvas verticales, se hizo el perfil, a partir del diseño en planta que se había hecho del levantamiento topográfico, de esta forma se recreó las características de las curvas verticales, como las pendientes, longitud de curva, índices de curvatura.

A continuación, se presenta el cálculo de los índices de curvatura a partir de las longitudes de curva vertical y pendientes actuales; la cual si se despeja K tendríamos que:

K = L/ A

**Tabla 4.11:**Índice de curvatura

| Nº de curva | Tipo de curva | Pendiente de entrada | Pendiente de salida | Diferencia algebraica de pendientes (a) | Longitud de la curva medido (m) | k(m) |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | CONVEXA | 9.57% | 8.15% | 1.41% | 94.09 | 66.59 |
| 2 | CONCAVA | 8.15% | 9.73% | 1.57% | 50.00 | 31.75 |
| 3 | CONVEXA | 9.73% | 9.71% | 0.02% | 50.00 | 2296.10 |
| 4 | CONVEXA | 9.71% | 6.89% | 2.81% | 158.78 | 56.42 |
| 5 | CONCAVA | 6.89% | 9.49% | 2.59% | 29.04 | 11.20 |
| 6 | CONVEXA | 9.49% | 7.29% | 2.20% | 111.17 | 50.55 |
| 7 | CONVEXA | 7.29% | 4.01% | 3.28% | 162.99 | 49.75 |
| 8 | CONCAVA | 4.01% | 8.66% | 4.65% | 17.04 | 3.66 |
| 9 | CONVEXA | 8.66% | 6.01% | 2.66% | 124.60 | 46.93 |
| 10 | CONCAVA | 6.01% | 9.75% | 3.74% | 17.08 | 4.56 |
| 11 | CONVEXA | 9.75% | 7.48% | 2.27% | 133.78 | 58.83 |
| 12 | CONCAVA | 7.48% | 10.43% | 2.95% | 16.41 | 5.56 |
| 13 | CONVEXA | 10.43% | 4.02% | 6.41% | 322.50 | 50.29 |
| 14 | CONCAVA | 4.02% | 6.55% | 2.53% | 41.53 | 16.39 |
| 15 | CONCAVA | 6.55% | 7.10% | 0.55% | 66.49 | 120.85 |
| 16 | CONVEXA | 7.10% | 4.08% | 3.02% | 158.24 | 52.44 |
| 17 | CONCAVA | 4.08% | 7.30% | 3.22% | 68.32 | 21.22 |
| 18 | CONVEXA | 7.30% | 4.75% | 2.55% | 173.24 | 67.97 |
| 19 | CONCAVA | 4.75% | 7.73% | 2.98% | 22.99 | 7.73 |
| 20 | CONVEXA | 7.73% | 4.76% | 2.97% | 272.13 | 91.74 |
| 21 | CONVEXA | 4.76% | 1.54% | 3.22% | 172.97 | 53.69 |
| 22 | CONCAVA | 1.54% | 6.32% | 4.78% | 19.47 | 4.08 |
| 23 | CONVEXA | 6.32% | 6.25% | 0.07% | 31.53 | 466.47 |
| 24 | CONVEXA | 6.25% | 4.93% | 1.31% | 92.29 | 70.19 |
| 25 | CONVEXA | 4.93% | 1.11% | 3.82% | 182.68 | 47.82 |
| 26 | CONVEXA | 1.11% | -1.11% | 2.23% | 156.18 | 70.06 |
| 27 | CONVEXA | -1.11% | -3.08% | 1.96% | 90.64 | 46.18 |
| 28 | CONCAVA | -3.08% | 0.68% | 3.75% | 37.54 | 10.00 |

**Fuente:** Elaboración propia

**4.1.5.2.2. Evaluación de las curvas verticales.**

La evaluación de la longitud de curvas verticales se determina en función a la distancia de visibilidad de parada.

Para determinar la longitud de curvas verticales se van a usar las ecuaciones 2.10, 2.11, 2.12, 2.13.

**Tabla 4.12.**Evaluación de longitudes de curvas verticales.

| N° de curva vertical | Progresiva | Longitud de curva vertical calculada(m) | Longitud de curva vertical medido (m) | Evaluación de longitud de curva vertical |
| --- | --- | --- | --- | --- |
| 1 | 0+065.08 | 2.58 | 94.09 | Cumple |
| 2 | 0+221.18 | 6.37 | 50.00 | Cumple |
| 3 | 0+316.56 | 0.04 | 50.00 | Cumple |
| 4 | 0+491.02 | 4.46 | 158.78 | Cumple |
| 5 | 0+626.21 | 10.20 | 29.04 | Cumple |
| 6 | 0+736.29 | 3.63 | 111.17 | Cumple |
| 7 | 1+051.27 | 4.06 | 162.99 | Cumple |
| 8 | 1+171.55 | 16.70 | 17.04 | Cumple |
| 9 | 1+263.56 | 3.86 | 124.60 | Cumple |
| 10 | 1+349.05 | 15.11 | 17.08 | Cumple |
| 11 | 1+434.86 | 3.82 | 133.78 | Cumple |
| 12 | 1+526.68 | 12.97 | 16.41 | Cumple |
| 13 | 1+740.00 | 7.94 | 322.50 | Cumple |
| 14 | 2+028.17 | 7.56 | 41.53 | Cumple |
| 15 | 2+162.09 | 1.72 | 66.49 | Cumple |
| 16 | 2+300.00 | 3.76 | 158.24 | Cumple |
| 17 | 2+496.00 | 10.21 | 68.32 | Cumple |
| 18 | 2+708.59 | 3.34 | 173.24 | Cumple |
| 19 | 2+842.23 | 9.80 | 22.99 | Cumple |
| 20 | 3+036.33 | 3.89 | 272.13 | Cumple |
| 21 | 3+350.62 | 3.41 | 172.97 | Cumple |
| 22 | 3+463.71 | 14.03 | 19.47 | Cumple |
| 23 | 3+533.66 | 0.10 | 31.53 | Cumple |
| 24 | 3+799.95 | 1.75 | 92.29 | Cumple |
| 25 | 4+215.34 | 3.96 | 182.68 | Cumple |
| 26 | 4+593.44 | 2.06 | 156.18 | Cumple |
| 27 | 4+780.80 | 1.68 | 90.64 | Cumple |
| 28 | 4+884.93 | 8.05 | 37.54 | Cumple |

**Fuente:** Elaboración propia.

**4.1.6.** **Sección transversal**

**4.1.6.1. Calzada o superficie de rodadura**

De acuerdo a la **Tabla 2.9**, el ancho mínimo para esta clase de vía es de 3.5m.

**4.1.6.2. Bermas**

El ancho de bermas de acuerdo al manual de diseño de carreteras no pavimentadas de bajo volumen de tránsito (MDCNPBVT), es de 0.5m.

La tabla 4.13 verifica los 02 parámetros anteriores.

**Tabla 4.13:** Evaluación de anchos de calzada y bermas (corona) (m).

| Progresiva | Ancho de corona medido (m) | Ancho de corona según norma (m) | Evaluación |
| --- | --- | --- | --- |
| 0+000.00 | 7.0 | 4.5 | Cumple |
| 0+020.00 | 6.9 | 4.5 | Cumple |
| 0+040.00 | 6.2 | 4.5 | Cumple |
| 0+060.00 | 5.4 | 4.5 | Cumple |
| 0+080.00 | 6.8 | 4.5 | Cumple |
| 0+100.00 | 6.8 | 4.5 | Cumple |
| 0+120.00 | 6.5 | 4.5 | Cumple |
| 0+140.00 | 6.3 | 4.5 | Cumple |
| 0+160.00 | 5.8 | 4.5 | Cumple |
| 0+180.00 | 4.5 | 4.5 | No cumple |
| 0+200.00 | 5.6 | 4.5 | Cumple |
| 0+220.00 | 6.2 | 4.5 | Cumple |
| 0+240.00 | 5.4 | 4.5 | Cumple |
| 0+260.00 | 5.9 | 4.5 | Cumple |
| 0+280.00 | 4.6 | 4.5 | Cumple |
| 0+300.00 | 5.9 | 4.5 | Cumple |
| 0+320.00 | 6.0 | 4.5 | Cumple |
| 0+340.00 | 6.4 | 4.5 | Cumple |
| 0+360.00 | 5.5 | 4.5 | Cumple |
| 0+380.00 | 5.7 | 4.5 | Cumple |
| 0+400.00 | 6.4 | 4.5 | Cumple |
| 0+420.00 | 7.0 | 4.5 | Cumple |
| 0+440.00 | 4.4 | 4.5 | No cumple |
| 0+460.00 | 4.4 | 4.5 | No cumple |
| 0+480.00 | 4.7 | 4.5 | Cumple |
| 0+500.00 | 4.6 | 4.5 | Cumple |
| 0+520.00 | 4.7 | 4.5 | Cumple |
| 0+540.00 | 5.0 | 4.5 | Cumple |
| 0+560.00 | 4.0 | 4.5 | No cumple |
| 0+580.00 | 4.8 | 4.5 | Cumple |
| 0+600.00 | 4.7 | 4.5 | Cumple |
| 0+620.00 | 4.8 | 4.5 | Cumple |
| 0+640.00 | 5.0 | 4.5 | Cumple |
| 0+660.00 | 4.0 | 4.5 | No cumple |
| 0+680.00 | 4.4 | 4.5 | No cumple |
| 0+700.00 | 4.1 | 4.5 | No cumple |
| 0+720.00 | 4.8 | 4.5 | Cumple |
| 0+740.00 | 5.7 | 4.5 | Cumple |
| 0+760.00 | 4.7 | 4.5 | Cumple |
| 0+780.00 | 5.7 | 4.5 | Cumple |
| 0+800.00 | 5.7 | 4.5 | Cumple |
| 0+820.00 | 4.4 | 4.5 | No cumple |
| 0+840.00 | 6.0 | 4.5 | Cumple |
| 0+860.00 | 4.9 | 4.5 | Cumple |
| 0+880.00 | 5.5 | 4.5 | Cumple |
| 0+900.00 | 5.3 | 4.5 | Cumple |
| 0+920.00 | 3.9 | 4.5 | No cumple |
| 0+940.00 | 4.6 | 4.5 | Cumple |
| 0+960.00 | 4.0 | 4.5 | No cumple |
| 0+980.00 | 4.4 | 4.5 | No cumple |
| 1+000.00 | 5.3 | 4.5 | Cumple |
| 1+020.00 | 4.7 | 4.5 | Cumple |
| 1+040.00 | 4.5 | 4.5 | Cumple |
| 1+060.00 | 5.5 | 4.5 | Cumple |
| 1+080.00 | 5.6 | 4.5 | Cumple |
| 1+100.00 | 6.9 | 4.5 | Cumple |
| 1+120.00 | 4.4 | 4.5 | No cumple |
| 1+140.00 | 5.5 | 4.5 | Cumple |
| 1+160.00 | 4.9 | 4.5 | Cumple |
| 1+180.00 | 4.4 | 4.5 | No cumple |
| 1+200.00 | 4.9 | 4.5 | Cumple |
| 1+220.00 | 4.9 | 4.5 | Cumple |
| 1+240.00 | 5.3 | 4.5 | Cumple |
| 1+260.00 | 4.9 | 4.5 | Cumple |
| 1+280.00 | 4.4 | 4.5 | No cumple |
| 1+300.00 | 5.1 | 4.5 | Cumple |
| 1+320.00 | 4.3 | 4.5 | No cumple |
| 1+340.00 | 4.9 | 4.5 | Cumple |
| 1+360.00 | 5.6 | 4.5 | Cumple |
| 1+380.00 | 5.1 | 4.5 | Cumple |
| 1+400.00 | 4.8 | 4.5 | Cumple |
| 1+420.00 | 4.5 | 4.5 | No cumple |
| 1+440.00 | 5.0 | 4.5 | Cumple |
| 1+460.00 | 4.8 | 4.5 | Cumple |
| 1+480.00 | 4.5 | 4.5 | No cumple |
| 1+500.00 | 5.3 | 4.5 | Cumple |
| 1+520.00 | 5.0 | 4.5 | Cumple |
| 1+540.00 | 6.0 | 4.5 | Cumple |
| 1+560.00 | 5.5 | 4.5 | Cumple |
| 1+580.00 | 5.3 | 4.5 | Cumple |
| 1+600.00 | 5.5 | 4.5 | Cumple |
| 1+620.00 | 5.7 | 4.5 | Cumple |
| 1+640.00 | 4.5 | 4.5 | Cumple |
| 1+660.00 | 4.6 | 4.5 | Cumple |
| 1+680.00 | 4.4 | 4.5 | No cumple |
| 1+700.00 | 5.2 | 4.5 | Cumple |
| 1+720.00 | 5.4 | 4.5 | Cumple |
| 1+740.00 | 5.0 | 4.5 | Cumple |
| 1+760.00 | 4.1 | 4.5 | No cumple |
| 1+780.00 | 4.4 | 4.5 | No cumple |
| 1+800.00 | 4.4 | 4.5 | No cumple |
| 1+820.00 | 4.3 | 4.5 | No cumple |
| 1+840.00 | 4.4 | 4.5 | No cumple |
| 1+860.00 | 4.7 | 4.5 | Cumple |
| 1+880.00 | 4.9 | 4.5 | Cumple |
| 1+900.00 | 5.6 | 4.5 | Cumple |
| 1+920.00 | 4.7 | 4.5 | Cumple |
| 1+940.00 | 4.6 | 4.5 | Cumple |
| 1+960.00 | 4.5 | 4.5 | No cumple |
| 1+980.00 | 6.0 | 4.5 | Cumple |
| 2+000.00 | 4.6 | 4.5 | Cumple |
| 2+020.00 | 4.8 | 4.5 | Cumple |
| 2+040.00 | 4.7 | 4.5 | Cumple |
| 2+060.00 | 4.3 | 4.5 | No cumple |
| 2+080.00 | 4.2 | 4.5 | No cumple |
| 2+100.00 | 4.4 | 4.5 | No cumple |
| 2+120.00 | 5.2 | 4.5 | Cumple |
| 2+140.00 | 3.9 | 4.5 | No cumple |
| 2+160.00 | 4.1 | 4.5 | No cumple |
| 2+180.00 | 4.1 | 4.5 | No cumple |
| 2+200.00 | 4.5 | 4.5 | No cumple |
| 2+220.00 | 4.2 | 4.5 | No cumple |
| 2+240.00 | 3.9 | 4.5 | No cumple |
| 2+260.00 | 3.7 | 4.5 | No cumple |
| 2+280.00 | 4.4 | 4.5 | No cumple |
| 2+300.00 | 4.7 | 4.5 | Cumple |
| 2+320.00 | 5.0 | 4.5 | Cumple |
| 2+340.00 | 3.5 | 4.5 | No cumple |
| 2+360.00 | 4.9 | 4.5 | Cumple |
| 2+380.00 | 4.2 | 4.5 | No cumple |
| 2+400.00 | 4.2 | 4.5 | No cumple |
| 2+420.00 | 4.6 | 4.5 | Cumple |
| 2+440.00 | 4.7 | 4.5 | Cumple |
| 2+460.00 | 4.7 | 4.5 | Cumple |
| 2+480.00 | 4.3 | 4.5 | No cumple |
| 2+500.00 | 4.1 | 4.5 | No cumple |
| 2+520.00 | 4.7 | 4.5 | Cumple |
| 2+540.00 | 3.6 | 4.5 | No cumple |
| 2+560.00 | 4.1 | 4.5 | No cumple |
| 2+580.00 | 4.1 | 4.5 | No cumple |
| 2+600.00 | 4.4 | 4.5 | No cumple |
| 2+620.00 | 4.6 | 4.5 | Cumple |
| 2+640.00 | 5.0 | 4.5 | Cumple |
| 2+660.00 | 4.7 | 4.5 | Cumple |
| 2+680.00 | 4.0 | 4.5 | No cumple |
| 2+700.00 | 5.0 | 4.5 | Cumple |
| 2+720.00 | 4.2 | 4.5 | No cumple |
| 2+740.00 | 3.1 | 4.5 | No cumple |
| 2+760.00 | 4.7 | 4.5 | Cumple |
| 2+780.00 | 4.3 | 4.5 | No cumple |
| 2+800.00 | 5.5 | 4.5 | Cumple |
| 2+820.00 | 4.4 | 4.5 | No cumple |
| 2+840.00 | 3.9 | 4.5 | No cumple |
| 2+860.00 | 4.8 | 4.5 | Cumple |
| 2+880.00 | 4.2 | 4.5 | No cumple |
| 2+900.00 | 5.0 | 4.5 | Cumple |
| 2+920.00 | 5.7 | 4.5 | Cumple |
| 2+940.00 | 6.4 | 4.5 | Cumple |
| 2+960.00 | 4.7 | 4.5 | Cumple |
| 2+980.00 | 4.1 | 4.5 | No cumple |
| 3+000.00 | 4.6 | 4.5 | Cumple |
| 3+020.00 | 4.3 | 4.5 | No cumple |
| 3+040.00 | 4.1 | 4.5 | No cumple |
| 3+060.00 | 4.7 | 4.5 | Cumple |
| 3+080.00 | 4.5 | 4.5 | No cumple |
| 3+100.00 | 4.6 | 4.5 | Cumple |
| 3+120.00 | 5.9 | 4.5 | Cumple |
| 3+140.00 | 4.5 | 4.5 | No cumple |
| 3+160.00 | 4.8 | 4.5 | Cumple |
| 3+180.00 | 5.2 | 4.5 | Cumple |
| 3+200.00 | 5.1 | 4.5 | Cumple |
| 3+220.00 | 6.3 | 4.5 | Cumple |
| 3+240.00 | 4.4 | 4.5 | No cumple |
| 3+260.00 | 4.8 | 4.5 | Cumple |
| 3+280.00 | 4.9 | 4.5 | Cumple |
| 3+300.00 | 5.1 | 4.5 | Cumple |
| 3+320.00 | 4.5 | 4.5 | Cumple |
| 3+340.00 | 5.0 | 4.5 | Cumple |
| 3+360.00 | 6.3 | 4.5 | Cumple |
| 3+380.00 | 6.3 | 4.5 | Cumple |
| 3+400.00 | 6.9 | 4.5 | Cumple |
| 3+420.00 | 3.7 | 4.5 | No cumple |
| 3+440.00 | 5.7 | 4.5 | Cumple |
| 3+460.00 | 6.6 | 4.5 | Cumple |
| 3+480.00 | 7.3 | 4.5 | Cumple |
| 3+500.00 | 4.9 | 4.5 | Cumple |
| 3+520.00 | 5.2 | 4.5 | Cumple |
| 3+540.00 | 4.0 | 4.5 | No cumple |
| 3+560.00 | 4.2 | 4.5 | No cumple |
| 3+580.00 | 3.6 | 4.5 | No cumple |
| 3+600.00 | 4.9 | 4.5 | Cumple |
| 3+620.00 | 4.3 | 4.5 | No cumple |
| 3+640.00 | 4.5 | 4.5 | No cumple |
| 3+660.00 | 4.5 | 4.5 | Cumple |
| 3+680.00 | 5.7 | 4.5 | Cumple |
| 3+700.00 | 6.0 | 4.5 | Cumple |
| 3+720.00 | 4.7 | 4.5 | Cumple |
| 3+740.00 | 6.7 | 4.5 | Cumple |
| 3+760.00 | 7.0 | 4.5 | Cumple |
| 3+780.00 | 7.1 | 4.5 | Cumple |
| 3+800.00 | 5.3 | 4.5 | Cumple |
| 3+820.00 | 6.7 | 4.5 | Cumple |
| 3+840.00 | 5.4 | 4.5 | Cumple |
| 3+860.00 | 3.7 | 4.5 | No cumple |
| 3+880.00 | 4.4 | 4.5 | No cumple |
| 3+900.00 | 5.8 | 4.5 | Cumple |
| 3+920.00 | 5.3 | 4.5 | Cumple |
| 3+940.00 | 5.2 | 4.5 | Cumple |
| 3+960.00 | 4.5 | 4.5 | No cumple |
| 3+980.00 | 4.0 | 4.5 | No cumple |
| 4+000.00 | 4.9 | 4.5 | Cumple |
| 4+020.00 | 4.7 | 4.5 | Cumple |
| 4+040.00 | 4.8 | 4.5 | Cumple |
| 4+060.00 | 6.5 | 4.5 | Cumple |
| 4+080.00 | 3.5 | 4.5 | No cumple |
| 4+100.00 | 4.6 | 4.5 | Cumple |
| 4+120.00 | 5.2 | 4.5 | Cumple |
| 4+140.00 | 5.9 | 4.5 | Cumple |
| 4+160.00 | 4.1 | 4.5 | No cumple |
| 4+180.00 | 6.0 | 4.5 | Cumple |
| 4+200.00 | 4.3 | 4.5 | No cumple |
| 4+220.00 | 4.8 | 4.5 | Cumple |
| 4+240.00 | 5.1 | 4.5 | Cumple |
| 4+260.00 | 4.6 | 4.5 | Cumple |
| 4+280.00 | 5.3 | 4.5 | Cumple |
| 4+300.00 | 4.5 | 4.5 | Cumple |
| 4+320.00 | 4.8 | 4.5 | Cumple |
| 4+340.00 | 4.9 | 4.5 | Cumple |
| 4+360.00 | 4.9 | 4.5 | Cumple |
| 4+380.00 | 4.6 | 4.5 | Cumple |
| 4+400.00 | 4.3 | 4.5 | No cumple |
| 4+420.00 | 4.7 | 4.5 | Cumple |
| 4+440.00 | 4.4 | 4.5 | No cumple |
| 4+460.00 | 4.5 | 4.5 | Cumple |
| 4+480.00 | 4.6 | 4.5 | Cumple |
| 4+500.00 | 3.9 | 4.5 | No cumple |
| 4+520.00 | 4.7 | 4.5 | Cumple |
| 4+540.00 | 4.7 | 4.5 | Cumple |
| 4+560.00 | 4.8 | 4.5 | Cumple |
| 4+580.00 | 4.5 | 4.5 | Cumple |
| 4+600.00 | 4.2 | 4.5 | No cumple |
| 4+620.00 | 5.0 | 4.5 | Cumple |
| 4+640.00 | 4.5 | 4.5 | Cumple |
| 4+660.00 | 4.2 | 4.5 | No cumple |
| 4+680.00 | 3.7 | 4.5 | No cumple |
| 4+700.00 | 3.3 | 4.5 | No cumple |
| 4+720.00 | 4.3 | 4.5 | No cumple |
| 4+740.00 | 3.7 | 4.5 | No cumple |
| 4+760.00 | 3.7 | 4.5 | No cumple |
| 4+780.00 | 5.0 | 4.5 | Cumple |
| 4+800.00 | 5.1 | 4.5 | Cumple |
| 4+820.00 | 4.5 | 4.5 | No cumple |
| 4+840.00 | 4.9 | 4.5 | Cumple |
| 4+860.00 | 4.2 | 4.5 | No cumple |
| 4+880.00 | 4.4 | 4.5 | No cumple |
| 4+900.00 | 4.1 | 4.5 | No cumple |
| 4+920.00 | 3.7 | 4.5 | No cumple |
| 4+940.00 | 5.3 | 4.5 | Cumple |
| 4+960.00 | 4.6 | 4.5 | Cumple |
| 4+980.00 | 3.2 | 4.5 | No cumple |
| 5+000.00 | 3.6 | 4.5 | No cumple |

**Fuente:** Elaboración propia

**4.1.6.3. Bombeo**

Las carreteras no pavimentadas estarán provistas de bombeos de 2% y 3%, para carreteras con IMDA inferior a 200 veh/día, se puede sustituir por una inclinación transversal de la superficie de rodadura de 2.5% a 3% hacia uno de los lados de la calzada.

**4.1.6.4. Peralte**

Para determinar el peralte se ha tenido en cuenta el radio mínimo, el radio existentes y el valor del peralte máximo. El peralte máximo tendrá como valor máximo normal 8%. El cálculo del peralte se realizó mediante la siguiente fórmula:

donde:

p : Peralte (%)

R : Radio (m)

Rmin. : Radio mínimo absoluto (m), Rmin =12

pmáx. : Peralte máximo (%), pmáx.= 8%

Para determinar los peraltes existentes se ha hecho uso del eclímetro. En la tabla 4.14 se evaluó los peraltes calculados y medidos.

**Tabla 4.14:** Evaluación dePeraltes.

| Progresiva | N° de curva | Peralte calculado (%) | Peralte medido (%) | Evaluación de peralte |
| --- | --- | --- | --- | --- |
| 0+026.78 | C1 | 2.67 | 8.75 | No cumple |
| 0+101.86 | C2 | 1.48 | 4.85 | Cumple |
| 0+135.04 | C3 | 1.37 | 4.50 | Cumple |
| 0+171.78 | C4 | 1.92 | 6.30 | Cumple |
| 0+227.12 | C5 | 1.28 | 4.20 | Cumple |
| 0+275.82 | C6 | 2.74 | 9.00 | No cumple |
| 0+309.50 | C7 | 0.91 | 3.00 | Cumple |
| 0+338.09 | C8 | 2.40 | 7.87 | Cumple |
| 0+419.67 | C9 | 2.74 | 9.00 | No cumple |
| 0+462.82 | C10 | 1.01 | 3.32 | Cumple |
| 0+521.20 | C11 | 4.17 | 13.69 | No cumple |
| 0+543.50 | C12 | 6.00 | 19.69 | No cumple |
| 0+575.38 | C13 | 0.74 | 2.42 | Cumple |
| 0+639.55 | C14 | 2.23 | 7.32 | Cumple |
| 0+695.68 | C15 | 3.84 | 12.60 | No cumple |
| 0+734.07 | C16 | 2.53 | 8.29 | No cumple |
| 0+794.88 | C17 | 6.00 | 19.69 | No cumple |
| 0+900.85 | C18 | 2.46 | 8.08 | No cumple |
| 0+941.32 | C19 | 0.63 | 2.06 | Cumple |
| 0+996.29 | C20 | 3.00 | 9.84 | No cumple |
| 1+039.61 | C21 | 2.53 | 8.29 | No cumple |
| 1+116.13 | C22 | 2.13 | 7.00 | Cumple |
| 1+149.42 | C23 | 1.81 | 5.94 | Cumple |
| 1+208.66 | C24 | 5.65 | 18.53 | No cumple |
| 1+374.25 | C25 | 5.05 | 16.58 | No cumple |
| 1+451.00 | C26 | 2.29 | 7.50 | Cumple |
| 1+501.90 | C27 | 1.26 | 4.14 | Cumple |
| 1+541.74 | C28 | 1.03 | 3.39 | Cumple |
| 1+580.58 | C29 | 1.85 | 6.06 | Cumple |
| 1+636.11 | C30 | 1.88 | 6.18 | Cumple |
| 1+673.60 | C31 | 2.59 | 8.51 | No cumple |
| 1+741.78 | C32 | 1.52 | 5.00 | Cumple |
| 1+798.10 | C33 | 1.16 | 3.79 | Cumple |
| 1+833.78 | C34 | 2.13 | 7.00 | Cumple |
| 1+856.94 | C35 | 3.84 | 12.60 | No cumple |
| 1+894.21 | C36 | 6.00 | 19.69 | No cumple |
| 1+921.65 | C37 | 2.00 | 6.56 | Cumple |
| 1+941.08 | C38 | 4.80 | 15.75 | No cumple |
| 1+984.24 | C39 | 5.65 | 18.53 | No cumple |
| 2+043.86 | C40 | 2.04 | 6.70 | Cumple |
| 2+079.27 | C41 | 2.67 | 8.75 | No cumple |
| 2+132.02 | C42 | 6.40 | 21.00 | No cumple |
| 2+145.65 | C43 | 2.40 | 7.87 | Cumple |
| 2+180.18 | C44 | 3.84 | 12.60 | No cumple |
| 2+225.11 | C45 | 2.09 | 6.85 | Cumple |
| 2+307.97 | C46 | 3.69 | 12.11 | No cumple |
| 2+357.62 | C47 | 1.88 | 6.18 | Cumple |
| 2+400.88 | C48 | 3.20 | 10.50 | No cumple |
| 2+465.87 | C49 | 1.60 | 5.25 | Cumple |
| 2+498.79 | C50 | 1.78 | 5.83 | Cumple |
| 2+558.04 | C51 | 2.67 | 8.75 | No cumple |
| 2+592.01 | C52 | 2.59 | 8.51 | No cumple |
| 2+616.25 | C53 | 2.09 | 6.85 | Cumple |
| 2+649.78 | C54 | 4.17 | 13.69 | No cumple |
| 2+671.93 | C55 | 2.46 | 8.08 | No cumple |
| 2+712.61 | C56 | 1.78 | 5.83 | Cumple |
| 2+788.63 | C57 | 6.00 | 19.69 | No cumple |
| 2+830.26 | C58 | 2.59 | 8.51 | No cumple |
| 2+862.05 | C59 | 2.91 | 9.54 | No cumple |
| 2+889.54 | C60 | 3.00 | 9.84 | No cumple |
| 2+955.18 | C61 | 3.10 | 10.16 | No cumple |
| 2+981.44 | C62 | 2.18 | 7.16 | Cumple |
| 3+051.43 | C63 | 3.69 | 12.11 | No cumple |
| 3+090.51 | C64 | 2.91 | 9.54 | No cumple |
| 3+133.20 | C65 | 2.91 | 9.54 | No cumple |
| 3+209.27 | C66 | 4.80 | 15.75 | No cumple |
| 3+275.23 | C67 | 0.59 | 1.93 | Cumple |
| 3+357.46 | C68 | 6.00 | 19.69 | No cumple |
| 3+390.57 | C69 | 5.65 | 18.53 | No cumple |
| 3+414.28 | C70 | 6.00 | 19.69 | No cumple |
| 3+436.03 | C71 | 5.65 | 18.53 | No cumple |
| 3+485.06 | C72 | 2.53 | 8.29 | No cumple |
| 3+555.09 | C73 | 2.23 | 7.32 | Cumple |
| 3+584.76 | C74 | 0.81 | 2.67 | Cumple |
| 3+608.81 | C75 | 2.00 | 6.56 | Cumple |
| 3+641.84 | C76 | 2.53 | 8.29 | No cumple |
| 3+717.08 | C77 | 1.52 | 5.00 | Cumple |
| 3+738.99 | C78 | 4.57 | 15.00 | No cumple |
| 3+781.17 | C79 | 4.36 | 14.32 | No cumple |
| 3+823.59 | C80 | 3.69 | 12.11 | No cumple |
| 3+872.62 | C81 | 2.46 | 8.08 | No cumple |
| 3+900.48 | C82 | 0.77 | 2.54 | Cumple |
| 4+026.95 | C83 | 1.78 | 5.83 | Cumple |
| 4+071.87 | C84 | 4.80 | 15.75 | No cumple |
| 4+108.96 | C85 | 3.00 | 9.84 | No cumple |
| 4+139.32 | C86 | 2.46 | 8.08 | No cumple |
| 4+175.58 | C87 | 4.80 | 15.75 | No cumple |
| 4+211.93 | C88 | 2.59 | 8.51 | No cumple |
| 4+290.02 | C89 | 5.33 | 17.50 | No cumple |
| 4+359.78 | C90 | 4.17 | 13.69 | No cumple |
| 4+401.96 | C91 | 1.00 | 3.28 | Cumple |
| 4+479.80 | C92 | 3.20 | 10.50 | No cumple |
| 4+588.15 | C93 | 2.46 | 8.08 | No cumple |
| 4+689.39 | C94 | 1.23 | 4.04 | Cumple |
| 4+714.78 | C95 | 2.59 | 8.51 | No cumple |
| 4+733.06 | C96 | 1.43 | 4.70 | Cumple |
| 4+826.88 | C97 | 3.00 | 9.84 | No cumple |
| 4+858.89 | C98 | 0.91 | 3.00 | Cumple |
| 4+900.71 | C99 | 3.84 | 12.60 | No cumple |
| 4+949.23 | C100 | 2.74 | 9.00 | No cumple |

**Fuente:** Elaboración propia.

**4.1.6.5. Taludes**

De acuerdo al material del terreno ubicado y las tablas **Tabla 2.10** y Tabla **2.11**.

Talud de corte (H:V) : 1:1 (Para material limo arcilloso o arcilla)

Talud de relleno (H:V) : 1.5:1 (Gravas, limo arenoso y arcilla)

**Tabla 4.15:** Evaluación de talud de corte y relleno.

| Progresiva | Talud de relleno medido | Talud de relleno de acuerdo a la norma | Evaluación del talud de relleno | Talud de corte medido | Talud de corte de acuerdo a la norma. | Evaluación del talud de corte |
| --- | --- | --- | --- | --- | --- | --- |
|
|  |
| 0+000.00 | 3.598 | 1.5 | Cumple | 2.84 | 1 | Cumple |
| 0+020.00 | 5.316 | 1.5 | Cumple | 8.33 | 1 | Cumple |
| 0+040.00 | 4.514 | 1.5 | Cumple | 1.44 | 1 | Cumple |
| 0+060.00 | 2.891 | 1.5 | Cumple | 1.42 | 1 | Cumple |
| 0+080.00 | 1.638 | 1.5 | Cumple | 3.22 | 1 | Cumple |
| 0+100.00 | 1.722 | 1.5 | Cumple | 3.91 | 1 | Cumple |
| 0+120.00 | 2.295 | 1.5 | Cumple | 5.57 | 1 | Cumple |
| 0+140.00 | 2.698 | 1.5 | Cumple | 1.68 | 1 | Cumple |
| 0+160.00 | 2.638 | 1.5 | Cumple | 0.88 | 1 | No cumple |
| 0+180.00 | 2.230 | 1.5 | Cumple | 1.69 | 1 | Cumple |
| 0+200.00 | 5.029 | 1.5 | Cumple | 0.93 | 1 | No cumple |
| 0+220.00 | 3.359 | 1.5 | Cumple | 1.11 | 1 | Cumple |
| 0+240.00 | 2.571 | 1.5 | Cumple | 1.33 | 1 | Cumple |
| 0+260.00 | 4.320 | 1.5 | Cumple | 3.59 | 1 | Cumple |
| 0+280.00 | 2.867 | 1.5 | Cumple | 5.41 | 1 | Cumple |
| 0+300.00 | 1.597 | 1.5 | Cumple | 2.66 | 1 | Cumple |
| 0+320.00 | 2.269 | 1.5 | Cumple | 1.34 | 1 | Cumple |
| 0+340.00 | 2.539 | 1.5 | Cumple | 0.85 | 1 | No cumple |
| 0+360.00 | 3.648 | 1.5 | Cumple | 2.10 | 1 | Cumple |
| 0+380.00 | 1.991 | 1.5 | Cumple | 1.33 | 1 | Cumple |
| 0+400.00 | 2.753 | 1.5 | Cumple | 2.58 | 1 | Cumple |
| 0+420.00 | 3.257 | 1.5 | Cumple | 1.51 | 1 | Cumple |
| 0+440.00 | 12.868 | 1.5 | Cumple | 1.02 | 1 | Cumple |
| 0+460.00 | 5.190 | 1.5 | Cumple | 9.58 | 1 | Cumple |
| 0+480.00 | 10.808 | 1.5 | Cumple | 9.18 | 1 | Cumple |
| 0+500.00 | 7.522 | 1.5 | Cumple | 4.33 | 1 | Cumple |
| 0+520.00 | 20.552 | 1.5 | Cumple | 5.37 | 1 | Cumple |
| 0+540.00 | 2.885 | 1.5 | Cumple | 1.42 | 1 | Cumple |
| 0+560.00 | 17.024 | 1.5 | Cumple | 4.55 | 1 | Cumple |
| 0+580.00 | 58.727 | 1 | Cumple | 6.06 | 1 | Cumple |
| 0+600.00 | 4.979 | 1.5 | Cumple | 18.67 | 1 | Cumple |
| 0+620.00 | 4.308 | 1.5 | Cumple | 3.25 | 1 | Cumple |
| 0+640.00 | 5.246 | 1.5 | Cumple | 2.08 | 1 | Cumple |
| 0+660.00 | 4.552 | 1.5 | Cumple | 2.13 | 1 | Cumple |
| 0+680.00 | 2.504 | 1.5 | Cumple | 1.24 | 1 | Cumple |
| 0+700.00 | 2.561 | 1.5 | Cumple | 3.15 | 1 | Cumple |
| 0+720.00 | 3.023 | 1.5 | Cumple | 2.31 | 1 | Cumple |
| 0+740.00 | 2.504 | 1.5 | Cumple | 4.50 | 1 | Cumple |
| 0+760.00 | 7.658 | 1.5 | Cumple | 7.86 | 1 | Cumple |
| 0+780.00 | 9.29 | 1 | Cumple | 45.23 | 1 | Cumple |
| 0+800.00 | 11.10 | 1.5 | Cumple | 4.52 | 1 | Cumple |
| 0+820.00 | 53.80 | 1.5 | Cumple | 3.85 | 1 | Cumple |
| 0+840.00 | 7.33 | 1.5 | Cumple | 15.62 | 1 | Cumple |
| 0+860.00 | 10.00 | 1.5 | Cumple | 4.96 | 1 | Cumple |
| 0+880.00 | 3.83 | 1.5 | Cumple | 1.01 | 1 | Cumple |
| 0+900.00 | 3.50 | 1.5 | Cumple | 2.71 | 1 | Cumple |
| 0+920.00 | 3.61 | 1.5 | Cumple | 2.55 | 1 | Cumple |
| 0+940.00 | 3.62 | 1.5 | Cumple | 2.06 | 1 | Cumple |
| 0+960.00 | 5.02 | 1.5 | Cumple | 3.25 | 1 | Cumple |
| 0+980.00 | 4.38 | 1.5 | Cumple | 3.20 | 1 | Cumple |
| 1+000.00 | 4.79 | 1.5 | Cumple | 1.38 | 1 | Cumple |
| 1+020.00 | 2.42 | 1.5 | Cumple | 4.11 | 1 | Cumple |
| 1+040.00 | 6.52 | 1.5 | Cumple | 1.84 | 1 | Cumple |
| 1+060.00 | 4.10 | 1.5 | Cumple | 4.07 | 1 | Cumple |
| 1+080.00 | 9.26 | 1.5 | Cumple | 4.93 | 1 | Cumple |
| 1+100.00 | 13.64 | 1.5 | Cumple | 6.78 | 1 | Cumple |
| 1+120.00 | 7.68 | 1.5 | Cumple | 7.14 | 1 | Cumple |
| 1+140.00 | 4.952 | 1.5 | Cumple | 4.28 | 1 | Cumple |
| 1+160.00 | 4.386 | 1.5 | Cumple | 3.63 | 1 | Cumple |
| 1+180.00 | 4.313 | 1.5 | Cumple | 6.36 | 1 | Cumple |
| 1+200.00 | 22.160 | 1.5 | Cumple | 3.04 | 1 | Cumple |
| 1+220.00 | 10.180 | 1.5 | Cumple | 8.69 | 1 | Cumple |
| 1+240.00 | 8.197 | 1.5 | Cumple | 8.75 | 1 | Cumple |
| 1+260.00 | 7.620 | 1.5 | Cumple | 14.10 | 1 | Cumple |
| 1+280.00 | 5.779 | 1.5 | Cumple | 7.46 | 1 | Cumple |
| 1+300.00 | 4.469 | 1.5 | Cumple | 5.37 | 1 | Cumple |
| 1+320.00 | 3.548 | 1.5 | Cumple | 4.35 | 1 | Cumple |
| 1+340.00 | 2.829 | 1.5 | Cumple | 10.65 | 1 | Cumple |
| 1+360.00 | 2.525 | 1.5 | Cumple | 20.80 | 1 | Cumple |
| 1+380.00 | 8.391 | 1.5 | Cumple | 33.86 | 1 | Cumple |
| 1+400.00 | 9.259 | 1.5 | Cumple | 4.19 | 1 | Cumple |
| 1+420.00 | 5.722 | 1.5 | Cumple | 4.81 | 1 | Cumple |
| 1+440.00 | 3.913 | 1.5 | Cumple | 6.72 | 1 | Cumple |
| 1+460.00 | 11.377 | 1.5 | Cumple | 3.88 | 1 | Cumple |
| 1+480.00 | 5.814 | 1.5 | Cumple | 20.32 | 1 | Cumple |
| 1+500.00 | 5.926 | 1.5 | Cumple | 1.54 | 1 | Cumple |
| 1+520.00 | 5.274 | 1.5 | Cumple | 1.50 | 1 | Cumple |
| 1+540.00 | 3.178 | 1.5 | Cumple | 1.27 | 1 | Cumple |
| 1+560.00 | 3.553 | 1.5 | Cumple | 2.29 | 1 | Cumple |
| 1+580.00 | 2.557 | 1.5 | Cumple | 1.58 | 1 | Cumple |
| 1+600.00 | 1.718 | 1.5 | Cumple | 1.21 | 1 | Cumple |
| 1+620.00 | 2.000 | 1.5 | Cumple | 1.06 | 1 | Cumple |
| 1+640.00 | 3.968 | 1.5 | Cumple | 2.92 | 1 | Cumple |
| 1+660.00 | 3.468 | 1.5 | Cumple | 1.41 | 1 | Cumple |
| 1+680.00 | 1.181 | 1.5 | No cumple | 1.79 | 1 | Cumple |
| 1+700.00 | 7.077 | 1.5 | Cumple | 1.72 | 1 | Cumple |
| 1+720.00 | 20.579 | 1.5 | Cumple | 1.46 | 1 | Cumple |
| 1+740.00 | 9.750 | 1.5 | Cumple | 7.75 | 1 | Cumple |
| 1+760.00 | 6.509 | 1.5 | Cumple | 9.31 | 1 | Cumple |
| 1+780.00 | 3.662 | 1.5 | Cumple | 1.51 | 1 | Cumple |
| 1+800.00 | 2.632 | 1.5 | Cumple | 2.86 | 1 | Cumple |
| 1+820.00 | 8.104 | 1.5 | Cumple | 1.67 | 1 | Cumple |
| 1+840.00 | 5.720 | 1.5 | Cumple | 2.47 | 1 | Cumple |
| 1+860.00 | 2.513 | 1.5 | Cumple | 1.42 | 1 | Cumple |
| 1+880.00 | 2.484 | 1.5 | Cumple | 5.15 | 1 | Cumple |
| 1+900.00 | 1.910 | 1.5 | Cumple | 7.80 | 1 | Cumple |
| 1+920.00 | 1.498 | 1.5 | No cumple | 1.13 | 1 | Cumple |
| 1+940.00 | 2.419 | 1.5 | Cumple | 47.71 | 1 | Cumple |
| 1+960.00 | 2.257 | 1.5 | Cumple | 1.43 | 1 | Cumple |
| 1+980.00 | 32.227 | 1.5 | Cumple | 11.58 | 1 | Cumple |
| 2+000.00 | 6.045 | 1.5 | Cumple | 25.14 | 1 | Cumple |
| 2+020.00 | 1.991 | 1.5 | Cumple | 16.20 | 1 | Cumple |
| 2+040.00 | 3.523 | 1.5 | Cumple | 10.42 | 1 | Cumple |
| 2+060.00 | 3.686 | 1.5 | Cumple | 6.97 | 1 | Cumple |
| 2+080.00 | 4.027 | 1.5 | Cumple | 2.06 | 1 | Cumple |
| 2+100.00 | 1.605 | 1.5 | Cumple | 2.42 | 1 | Cumple |
| 2+120.00 | 16.667 | 1.5 | Cumple | 0.73 | 1 | No cumple |
| 2+140.00 | 5.602 | 1.5 | Cumple | 3.10 | 1 | Cumple |
| 2+160.00 | 4.605 | 1.5 | Cumple | 4.47 | 1 | Cumple |
| 2+180.00 | 5.432 | 1.5 | Cumple | 3.98 | 1 | Cumple |
| 2+200.00 | 4.857 | 1.5 | Cumple | 1.13 | 1 | Cumple |
| 2+220.00 | 2.656 | 1.5 | Cumple | 1.08 | 1 | Cumple |
| 2+240.00 | 9.000 | 1.5 | Cumple | 4.66 | 1 | Cumple |
| 2+260.00 | 5.220 | 1.5 | Cumple | 5.24 | 1 | Cumple |
| 2+280.00 | 6.579 | 1.5 | Cumple | 4.99 | 1 | Cumple |
| 2+300.00 | 5.290 | 1.5 | Cumple | 2.37 | 1 | Cumple |
| 2+320.00 | 5.413 | 1.5 | Cumple | 2.74 | 1 | Cumple |
| 2+340.00 | 3.753 | 1.5 | Cumple | 1.76 | 1 | Cumple |
| 2+360.00 | 3.582 | 1.5 | Cumple | 4.76 | 1 | Cumple |
| 2+380.00 | 1.751 | 1.5 | Cumple | 2.51 | 1 | Cumple |
| 2+400.00 | 2.811 | 1.5 | Cumple | 1.47 | 1 | Cumple |
| 2+420.00 | 6.949 | 1.5 | Cumple | 6.74 | 1 | Cumple |
| 2+440.00 | 12.207 | 1.5 | Cumple | 10.16 | 1 | Cumple |
| 2+460.00 | 4.020 | 1.5 | Cumple | 16.33 | 1 | Cumple |
| 2+480.00 | 4.213 | 1.5 | Cumple | 14.56 | 1 | Cumple |
| 2+500.00 | 3.738 | 1.5 | Cumple | 84.57 | 1 | Cumple |
| 2+520.00 | 4.596 | 1.5 | Cumple | 15.53 | 1 | Cumple |
| 2+540.00 | 13.467 | 1.5 | Cumple | 59.56 | 1 | Cumple |
| 2+560.00 | 8.361 | 1.5 | Cumple | 5.59 | 1 | Cumple |
| 2+580.00 | 41.667 | 1.5 | Cumple | 0.80 | 1 | No cumple |
| 2+600.00 | 3.735 | 1.5 | Cumple | 3.96 | 1 | Cumple |
| 2+620.00 | 2.886 | 1.5 | Cumple | 3.70 | 1 | Cumple |
| 2+640.00 | 1.950 | 1.5 | Cumple | 2.14 | 1 | Cumple |
| 2+660.00 | 2.874 | 1.5 | Cumple | 1.69 | 1 | Cumple |
| 2+680.00 | 2.383 | 1.5 | Cumple | 1.08 | 1 | Cumple |
| 2+700.00 | 9.259 | 1.5 | Cumple | 3.59 | 1 | Cumple |
| 2+720.00 | 4.737 | 1.5 | Cumple | 4.11 | 1 | Cumple |
| 2+740.00 | 3.796 | 1.5 | Cumple | 2.00 | 1 | Cumple |
| 2+760.00 | 3.179 | 1.5 | Cumple | 2.72 | 1 | Cumple |
| 2+780.00 | 1.788 | 1.5 | Cumple | 2.12 | 1 | Cumple |
| 2+800.00 | 3.025 | 1.5 | Cumple | 4.50 | 1 | Cumple |
| 2+820.00 | 4.016 | 1.5 | Cumple | 5.18 | 1 | Cumple |
| 2+840.00 | 2.891 | 1.5 | Cumple | 5.33 | 1 | Cumple |
| 2+860.00 | 2.158 | 1.5 | Cumple | 1.70 | 1 | Cumple |
| 2+880.00 | 2.134 | 1.5 | Cumple | 1.57 | 1 | Cumple |
| 2+900.00 | 3.779 | 1.5 | Cumple | 2.18 | 1 | Cumple |
| 2+920.00 | 3.983 | 1.5 | Cumple | 2.36 | 1 | Cumple |
| 2+940.00 | 4.608 | 1.5 | Cumple | 3.62 | 1 | Cumple |
| 2+960.00 | 7.750 | 1.5 | Cumple | 4.81 | 1 | Cumple |
| 2+980.00 | 4.548 | 1.5 | Cumple | 11.13 | 1 | Cumple |
| 3+000.00 | 4.000 | 1.5 | Cumple | 3.60 | 1 | Cumple |
| 3+020.00 | 3.219 | 1.5 | Cumple | 1.73 | 1 | Cumple |
| 3+040.00 | 5.404 | 1.5 | Cumple | 4.61 | 1 | Cumple |
| 3+060.00 | 4.000 | 1.5 | Cumple | 3.42 | 1 | Cumple |
| 3+080.00 | 3.891 | 1.5 | Cumple | 2.48 | 1 | Cumple |
| 3+100.00 | 3.585 | 1.5 | Cumple | 3.32 | 1 | Cumple |
| 3+120.00 | 3.604 | 1.5 | Cumple | 1.61 | 1 | Cumple |
| 3+140.00 | 4.398 | 1.5 | Cumple | 4.51 | 1 | Cumple |
| 3+160.00 | 3.663 | 1.5 | Cumple | 4.54 | 1 | Cumple |
| 3+180.00 | 3.900 | 1.5 | Cumple | 5.09 | 1 | Cumple |
| 3+200.00 | 2.841 | 1.5 | Cumple | 13.16 | 1 | Cumple |
| 3+220.00 | 30.174 | 1.5 | Cumple | 8.83 | 1 | Cumple |
| 3+240.00 | 55.364 | 1.5 | Cumple | 4.17 | 1 | Cumple |
| 3+260.00 | 16.714 | 1.5 | Cumple | 13.75 | 1 | Cumple |
| 3+280.00 | 10.286 | 1.5 | Cumple | 34.10 | 1 | Cumple |
| 3+300.00 | 1.567 | 1.5 | Cumple | 1.50 | 1 | Cumple |
| 3+320.00 | 1.501 | 1.5 | Cumple | 1.50 | 1 | Cumple |
| 3+340.00 | 1.500 | 1.5 | No cumple | 1.50 | 1 | Cumple |
| 3+360.00 | 24.933 | 1.5 | Cumple | 3.01 | 1 | Cumple |
| 3+380.00 | 20.692 | 1.5 | Cumple | 6.80 | 1 | Cumple |
| 3+400.00 | 12.038 | 1.5 | Cumple | 1.37 | 1 | Cumple |
| 3+420.00 | 1.500 | 1.5 | No cumple | 5.03 | 1 | Cumple |
| 3+440.00 | 9.185 | 1.5 | Cumple | 5.28 | 1 | Cumple |
| 3+460.00 | 1.721 | 1.5 | Cumple | 4.12 | 1 | Cumple |
| 3+480.00 | 36.111 | 1.5 | Cumple | 7.62 | 1 | Cumple |
| 3+500.00 | 5.044 | 1.5 | Cumple | 10.66 | 1 | Cumple |
| 3+520.00 | 5.047 | 1.5 | Cumple | 6.51 | 1 | Cumple |
| 3+540.00 | 5.838 | 1.5 | Cumple | 4.17 | 1 | Cumple |
| 3+560.00 | 3.829 | 1.5 | Cumple | 3.30 | 1 | Cumple |
| 3+580.00 | 3.491 | 1.5 | Cumple | 4.11 | 1 | Cumple |
| 3+600.00 | 3.319 | 1.5 | Cumple | 4.67 | 1 | Cumple |
| 3+620.00 | 10.418 | 1.5 | Cumple | 3.97 | 1 | Cumple |
| 3+640.00 | 7.000 | 1.5 | Cumple | 4.85 | 1 | Cumple |
| 3+660.00 | 9.821 | 1.5 | Cumple | 4.47 | 1 | Cumple |
| 3+680.00 | 4.197 | 1.5 | Cumple | 3.55 | 1 | Cumple |
| 3+700.00 | 4.272 | 1.5 | Cumple | 2.30 | 1 | Cumple |
| 3+720.00 | 4.622 | 1.5 | Cumple | 1.01 | 1 | Cumple |
| 3+740.00 | 2.876 | 1.5 | Cumple | 1.65 | 1 | Cumple |
| 3+760.00 | 3.331 | 1.5 | Cumple | 1.52 | 1 | Cumple |
| 3+780.00 | 7.840 | 1.5 | Cumple | 2.18 | 1 | Cumple |
| 3+800.00 | 18.061 | 1.5 | Cumple | 5.47 | 1 | Cumple |
| 3+820.00 | 5.459 | 1.5 | Cumple | 3.28 | 1 | Cumple |
| 3+840.00 | 2.907 | 1.5 | Cumple | 3.78 | 1 | Cumple |
| 3+860.00 | 2.033 | 1.5 | Cumple | 2.92 | 1 | Cumple |
| 3+880.00 | 5.552 | 1.5 | Cumple | 2.04 | 1 | Cumple |
| 3+900.00 | 3.957 | 1.5 | Cumple | 4.00 | 1 | Cumple |
| 3+920.00 | 4.442 | 1.5 | Cumple | 3.27 | 1 | Cumple |
| 3+940.00 | 4.883 | 1.5 | Cumple | 3.12 | 1 | Cumple |
| 3+960.00 | 4.902 | 1.5 | Cumple | 4.83 | 1 | Cumple |
| 3+980.00 | 2.274 | 1.5 | Cumple | 4.83 | 1 | Cumple |
| 4+000.00 | 3.936 | 1.5 | Cumple | 3.95 | 1 | Cumple |
| 4+020.00 | 5.350 | 1.5 | Cumple | 1.47 | 1 | Cumple |
| 4+040.00 | 3.450 | 1.5 | Cumple | 2.63 | 1 | Cumple |
| 4+060.00 | 5.704 | 1.5 | Cumple | 6.14 | 1 | Cumple |
| 4+080.00 | 2.190 | 1.5 | Cumple | 3.32 | 1 | Cumple |
| 4+100.00 | 1.826 | 1.5 | Cumple | 2.45 | 1 | Cumple |
| 4+120.00 | 4.167 | 1.5 | Cumple | 3.53 | 1 | Cumple |
| 4+140.00 | 3.152 | 1.5 | Cumple | 4.99 | 1 | Cumple |
| 4+160.00 | 1.501 | 1.5 | Cumple | 2.38 | 1 | Cumple |
| 4+180.00 | 1.497 | 1.5 | No cumple | 1.38 | 1 | Cumple |
| 4+200.00 | 3.802 | 1.5 | Cumple | 4.71 | 1 | Cumple |
| 4+220.00 | 1.497 | 1.5 | No cumple | 1.58 | 1 | Cumple |
| 4+240.00 | 1.498 | 1.5 | No cumple | 2.83 | 1 | Cumple |
| 4+260.00 | 3.397 | 1.5 | Cumple | 2.64 | 1 | Cumple |
| 4+280.00 | 3.520 | 1.5 | Cumple | 2.05 | 1 | Cumple |
| 4+300.00 | 1.139 | 1.5 | No cumple | 1.56 | 1 | Cumple |
| 4+320.00 | 2.458 | 1.5 | Cumple | 6.58 | 1 | Cumple |
| 4+340.00 | 3.070 | 1.5 | Cumple | 52.60 | 1 | Cumple |
| 4+360.00 | 3.730 | 1.5 | Cumple | 53.62 | 1 | Cumple |
| 4+380.00 | 15.957 | 1.5 | Cumple | 17.49 | 1 | Cumple |
| 4+400.00 | 41.333 | 1.5 | Cumple | 12.68 | 1 | Cumple |
| 4+420.00 | 1.497 | 1.5 | No cumple | 13.15 | 1 | Cumple |
| 4+440.00 | 41.333 | 1.5 | Cumple | 12.68 | 1.5 | Cumple |
| 4+460.00 | 30.429 | 1.5 | Cumple | 51.00 | 1 | Cumple |
| 4+480.00 | 19.567 | 1.5 | Cumple | 8.30 | 1 | Cumple |
| 4+500.00 | 9.804 | 1.5 | Cumple | 3.86 | 1 | Cumple |
| 4+520.00 | 16.300 | 1.5 | Cumple | 6.64 | 1 | Cumple |
| 4+540.00 | 14.611 | 1.5 | Cumple | 7.61 | 1 | Cumple |
| 4+560.00 | 12.500 | 1.5 | Cumple | 6.82 | 1 | Cumple |
| 4+580.00 | 13.911 | 1.5 | Cumple | 8.55 | 1 | Cumple |
| 4+600.00 | 1.492 | 1.5 | No cumple | 12.24 | 1 | Cumple |
| 4+620.00 | 14.870 | 1.5 | Cumple | 12.57 | 1.5 | Cumple |
| 4+640.00 | 24.273 | 1.5 | Cumple | 12.46 | 1.5 | Cumple |
| 4+660.00 | 17.452 | 1.5 | Cumple | 23.78 | 1 | Cumple |
| 4+680.00 | 11.82 | 1 | Cumple | 8.197 | 1 | Cumple |
| 4+700.00 | 4.27 | 1 | Cumple | 8.197 | 1 | Cumple |
| 4+720.00 | 6.024 | 1.5 | Cumple | 2.47 | 1 | Cumple |
| 4+740.00 | 1.166 | 1.5 | No cumple | 1.49 | 1 | Cumple |
| 4+760.00 | 1.305 | 1.5 | No cumple | 1.31 | 1 | Cumple |
| 4+780.00 | 1.503 | 1.5 | Cumple | 0.90 | 1 | No cumple |
| 4+800.00 | 2.444 | 1.5 | Cumple | 2.85 | 1 | Cumple |
| 4+820.00 | 8.175 | 1.5 | Cumple | 3.81 | 1 | Cumple |
| 4+840.00 | 4.711 | 1.5 | Cumple | 3.94 | 1 | Cumple |
| 4+860.00 | 5.276 | 1.5 | Cumple | 1.92 | 1 | Cumple |
| 4+880.00 | 5.150 | 1.5 | Cumple | 2.81 | 1 | Cumple |
| 4+900.00 | 10.481 | 1.5 | Cumple | 0.66 | 1 | No cumple |
| 4+920.00 | 3.952 | 1.5 | Cumple | 2.35 | 1 | Cumple |
| 4+940.00 | 1.911 | 1.5 | Cumple | 3.94 | 1 | Cumple |
| 4+960.00 | 4.000 | 1.5 | Cumple | 1.51 | 1 | Cumple |
| 4+980.00 | 4.444 | 1.5 | Cumple | 2.96 | 1 | Cumple |
| 5+000.00 | 5.350 | 1.5 | Cumple | 4.01 | 1 | Cumple |

**Fuente:** Elaboración propia.

**4.1.6.6. Cunetas**

Las dimensiones de las cunetas para zonas lluviosas son triangulares de profundidad de 0.30 m y ancho de 0.75 m. En la vía se ha observado que las cunetas presentan dimensiones variables y no cumplen con la norma.

#### Análisis y discusión de resultados

#### Análisis de resultados

* + - 1. **Alineamiento horizontal**
         1. **Evaluación de la longitud en tramos en tangente Km 0+00 – 05+000**

**Tabla 4.16.** Resumen de la longitud de tramos en tangente

|  |  |
| --- | --- |
| LONGITUD DE TRAMOS EN TANGENTE (LTT) | |
|
| CUMPLE | NO CUMPLE |
| 14 | 86 |

**Gráfico 4.1:** Longitud en tramos en tangente.

Del gráfico 4.1, se observa que el 86% de longitudes de tramos en tangente no cumplen y tan solo un 14% llegan a cumplir. En los tramos que no cumplen se produciría un desplazamiento incómodo.

* + - * 1. **Análisis de curvas circulares.**

1. **Radios mínimos Km 00+00 – 05+000**

**Tabla 4.17.** Resumen de radios mínimos

|  |  |
| --- | --- |
| RADIOS MÍNIMOS | |
| CUMPLE | NO CUMPLE |
| 100 | 0 |

**Gráfico 4.2:** Radios mínimos.

Del gráfico 4.2, se observa que el 100% radios cumplen con lo establecido en el manual de diseño de carreteras no pavimentadas de bajo volumen de tránsito (MDCNPBVT). Por lo tanto los radio son los adecuados en todo el tramo.

* + - * 1. **Análisis de la longitud de curvas horizontales Km 00+00 – 05+000**

**Tabla 4.18.** Resumen de la longitud de curvas horizontales

|  |  |
| --- | --- |
| LONGITUD DE CURVAS HORIZONTALES | |
| CUMPLE | NO CUMPLE |
| 1 | 99 |

**Gráfico 4.3:** Longitudes de curvas horizontales

Del gráfico 4.3, se observa que el 99% de longitudes de curvas horizontales no cumplen y tan solo el 1% cumplen. Generando en la vía un desplazamiento incómodo.

* + - * 1. **Distancias de visibilidad en curvas horizontales Km 00+00 – 05+000**

**Tabla 4.19.** Resumen de distancias de visibilidad

|  |  |
| --- | --- |
| DISTANCIAS DE VISIBILIDAD | |
| NECESITA | NO NECESITA |
| 6 | 38 |

**Gráfico 4.4:** Distancias de visibilidad en curvas horizontales

Del gráfico 4.4, se observa que el 86% no necesita distancias de visibilidad en curvas horizontales y un 14% necesita.

* + - * 1. **Evaluación de Sobreanchos del Km 00+00 – 05+000**

**Tabla 4.20.** Resumen de sobreanchos

|  |  |
| --- | --- |
| SOBREANCHOS | |
| CUMPLE | NO CUMPLE |
| 54 | 46 |

**Gráfico 4.5:** Sobreanchos.

Del gráfico 4.5, se observa que el 54% de sobreanchos cumplen y un 46% no cumplen, esto generaría que el vehículo de diseño tipo C2 tenga dificultades para transitar esta vía.

* + - 1. **Alineamiento vertical**
         1. **Evaluación de pendientes Km 00+00 - 05+000**

**Tabla 4.21.** Resumen de pendientes

|  |  |
| --- | --- |
| PENDIENTES | |
| CUMPLE | NO CUMPLE |
| 23 | 6 |

**Gráfico 4.6:** Pendientes**.**

Del gráfico 4.6, se observa que el 79% de pendientes cumplen y un 21% no cumple, esto generaría en los vehículos mayores sobresfuerzos y consumos de gasolina.

* + - * 1. **Evaluación de la longitud de curvas verticales Km 00+00 - 05+000**

**Tabla 4.22.** Resumen de la longitud de curvas verticales

|  |  |
| --- | --- |
| LONGITUD DE CURVAS VERTICALES | |
| CUMPLE | NO CUMPLE |
| 28 | 0 |

**Gráfico 4.7:** Longitud de curvas verticales.

Del gráfico 4.7, se observa que el 100% de las longitudes de curvas verticales cumplen con lo establecido en el manual de diseño de carreteras no pavimentadas de bajo volumen de tránsito (MDCNPBVT). Por lo tanto se considera que las longitudes de curvas verticales son las adecuadas.

* + - 1. **Sección transversal**
         1. **Evaluación de anchos de berma y calzada del Km 00+00 – 05+000**

**Tabla 4.23.** Resumen de anchos de bermas y calzada (corona)

|  |  |
| --- | --- |
| ANCHOS DE BERMAS Y CALZADA (Corona) | |
| CUMPLE | NO CUMPLE |
| 87 | 164 |

**Gráfico 4.8:** Anchos de bermas y calzada (corona)

Del gráfico 4.8, se observa que el 65% de anchos de corona no cumplen y solo el 35% cumplen, esto generaría que el tránsito vehicular no sea fluido.

* + - * 1. **Evaluación de peraltes Km 0+000 – 05+000**

**Tabla 4.24.** Resumen de peraltes

|  |  |
| --- | --- |
| PERALTES | |
| CUMPLE | NO CUMPLE |
| 41 | 59 |

**Gráfico 4.9:** Peraltes.

Del gráfico 4.9, se observa que 59% de los peraltes no cumplen y el 41% cumplen con lo establecido en el manual de diseño de carreteras no pavimentadas de bajo volumen de tránsito (MDCNPBVT).

* + - * 1. **Taludes de corte y relleno del Km 00+00 – 05+000**

**Tabla 4.25.** Resumen de taludes de corte

|  |  |
| --- | --- |
| TALUDES DE CORTE | |
| CUMPLE | NO CUMPLE |
| 245 | 7 |

**Grafico 4.10:** Taludes de corte.

**Tabla 4.26.** Resumen de taludes de relleno

|  |  |
| --- | --- |
| TALUDES DE RELLENO | |
| CUMPLE | NO CUMPLE |
| 238 | 12 |

**Gráfico 4.11:** Taludes de relleno.

De los gráficos 4.10 y 4.11 , se observa que los taludes de corte cumplen el 97% y los taludes de relleno cumplen en 95% de acuerdo con el manual de diseño de carreteras no pavimentadas de bajo volumen de tránsito (MDCNPBVT).

* + - * 1. **Evaluación de Cunetas del Km 00+00 – 05+000**

**Tabla 4.27.** Resumen de cunetas

|  |  |
| --- | --- |
| CUNETAS | |
| CUMPLE | NO CUMPLE |
| 0 | 251 |

En la gran parte de la vía se ha observado la inexistencia de cunetas, así como también cunetas de dimensiones distintas a las que establece el manual de diseño de carreteras no pavimentadas de bajo volumen de tránsito (MDCNPBVT).

#### Discusión de resultados

Cada documento de investigación ha sido útiles para conocer los diferentes criterios en la determinación de cada uno de los parámetros geométricos. Cada una con sus características propias como su topografía, demanda vehicular. Por lo tanto cada vía es única en su género.

**Gráfico 4.12:** Comparación de la velocidad directriz (km/h)

Del gráfico 4.12, la velocidad de diseño fue 20 km/h para una topografía tipo ondulada. Los estudios realizados; Quiroz y Estupiñan consideró una Vd.= 30 km/h con topografía tipo Ondulada; Zea, Ortiz y Zamudio consideró una Vd.= 50 km/h con topografía tipo Accidentado, Romaní consideró una Vd.= 50 km/h con topografía tipo ondulado; Galán y Quispe consideró una Vd.= 40 km/h con topografía tipo plana y ondulado; Correa consideró una Vd.= 40 km/h con topografía tipo accidentada; Cueva consideró una Vd.= 30km/h con topografía tipo ondulada; Huaripata consideró una Vd.= 20 km/h con topografía tipo ondulada. Los valores varían porque cada investigación tiene una topografía y demanda vehicular diferente.

**Gráfico 4.13:** Comparación de radios mínimos (m)

Del gráfico 4.13, el valor del radio mínimo fue de 12 m. Los estudios realizados; Quiroz y Estupiñan consideró un radio mínimo 30m.; Zea, Ortiz y Zamudio 80m.; Romaní 82m.; Galan y Quispe 125m.; Correa 45 m.; Cueva 30m.; Huaripata 12m. Los valores de cada una de las investigaciones varían porque las velocidades de diseño, peraltes y coeficientes de fricción son diferentes.

**Gráfico 4.14:** Comparación de las longitudes mínimas de tramos en tangente con radios de curva en sentido contrario (m)

Del gráfico 4.14,el valor de la longitud mínima de tramos en tangente con radios de curva en sentido contrario fue de 28m. Los estudios realizados; Romaní consideró 84m.; Galan y Quispe 83m.; Correa 56m; Cueva 42m.; Huaripata 28m. Los valores de cada una de las investigaciones varían porque las velocidades de diseño son diferentes.

**Gráfico 4.15:** Comparación de las longitudes mínimas de tramos en tangente con radios de curva en el mismo sentido (m)

Del gráfico 4.15, el valor de la longitud mínima de tramos en tangente con radios de curva en el mismo sentido fue 56m. Los estudios realizados; Romaní consideró 139m.; Galan y Quispe 167m.; Correa 111m.; Cueva 83m.; Huaripata 57m. Los valores de cada una de las investigaciones varían porque las velocidades de diseño son diferentes.

**Gráfico 4.16:** Comparación de las longitudes de curvas horizontales (m)

Del gráfico 4.16. el valor de la longitud de curva horizontal fue de 60m. Los estudios realizados; Romaní consideró 150m.; Galan y Quispe 180m.; Correa 90m.; Cueva 90m.; Huaripata 60m. Los valores de cada una de las investigaciones varían porque las velocidades de diseño son diferentes.

**Gráfico 4.17:** Comparación de peraltes (%)

Del gráfico 4.17, el valor del peralte fue 8%. Los estudios realizados; Quiroz y Estupiñan consideró 8%; Romaní 8%; Galan y Quispe 8%; Correa 12%, Cueva 8%; Huaripata 8%. Los valores de cada una de las investigaciones varían porque las velocidades de diseño, radios mínimos y coeficientes de fricción son diferentes.

**Gráfico 4.18:** Comparación de pendientes (%)

Del gráfico 4.18, la pendiente usada en el análisis fue del 9%. Los estudios realizados; Quiroz y Estupiñan consideró 10%; Romaní 7%; Galan y Quispe 7%; Correa 9%; Cueva 9%; Huaripata 10%. Los valores de cada una de las investigaciones varían porque las velocidades de diseño y demandas vehiculares son diferentes.

**Gráfico 4.19:** Comparación de anchos de calzada (m)

Del gráfico 4.19, el ancho de calzada fue de 3.50m. Los estudios realizados; Quiroz y Estupiñan consideró 6m.; Zea, Ortiz y Zamudio 7m.; Romaní 7.20m.; Galan y Quispe 6.60m.; Correa 6.60m., Cueva 5.50m.; Huaripata 3.50m. Los valores de cada una de las investigaciones varían porque las velocidades de diseño y demandas vehiculares son diferentes.

**Gráfico 4.20:** Comparación de anchos de bermas (m)

Del gráfico 4.20, el ancho de bermas fue de 0.5 m. Los estudios realizados; Zea, Ortiz y Zamudio consideró 0.60m.; Romaní 1.20m.; Galan y Quispe 1.20m.; Correa 1.20m., Cueva 0.90m.; Huaripata 0.50m. Los valores de cada una de las investigaciones varían porque las velocidades de diseño y demandas vehiculares son diferentes.

**Tabla 4.28:** Resumen del análisis del tramo Km 00+000 – 05+000.

| **PARÁMETROS** | **Km 00+000 – 05+000** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Cumple** | | **%** | **No cumple** | | **%** | **Norma** |
| Longitud en tramos en tangente | 32 | | 32 | 68 | | 68 | DG - 2018 |
| Radios | 100 | | 100 | 0 | | 0 | MDCNPBVT |
| Longitud de curvas horizontales | 1 | | 1 | 99 | | 99 | MDCNPBVT |
| Distancia de visibilidad en curvas horizontales | 38 | | 86 | 6 | | 14 | MDCNPBVT |
| Sobreanchos | 54 | | 54 | 46 | | 46 | MDCNPBVT |
| Pendiente | 23 | | 79 | 6 | | 21 | MDCNPBVT |
| Longitud de curvas verticales | 28 | | 100 | 0 | | 0 | DG - 2018 |
| Anchos de bermas y calzada (corona) |  | 87 | 35 |  | 164 | 65 | MDCNPBVT |
| Peraltes | 41 | | 41 | 59 | | 59 | MDCNPBVT |
| Taludes de corte | 245 | | 97 | 7 | | 3 | MDCNPBVT |
| Taludes de relleno | 238 | | 95 |  | 12 | 5 | MDCNPBVT |
| Cunetas | 0 | | 0 |  | 251 | 100 | MDCNPBVT |

**Fuente:** Elaboración propia.

**CONTRASTACIÓN DE LA HIPÓTESIS**

Analizados los resultados de la evaluación de las características geométricas del camino vecinal Santa Rosa – Chaupelanche, se observa que tales características no cumplen en 40%. De esta manera se contrastó la hipótesis formulada.

**CAPÍTULO V. CONCLUSIONES Y RECOMENDACIONES.**

* 1. **Conclusiones**

Realizada la evaluación de las características geométricas del camino vecinal Santa Rosa - Chaupelanche de acuerdo con el manual de diseño de carreteras no pavimentadas de bajo volumen de tránsito (MDCNPBVT) se concluyó que:

1. Las características geométricas correspondientes al alineamiento horizontal, tales como: los radios mínimos son los adecuados cumpliendo en un 100%, las distancias de visibilidad en las curvas horizontales son las adecuadas cumpliendo en un 86% y los sobreanchos cumplen en un 54%. Para el alineamiento vertical: las pendientes máximas son las adecuadas cumpliendo en un 79% y las longitudes de curvas verticales son las apropiadas cumpliendo en un 100%. Para la sección transversal: los taludes de corte cumplen en un 97% y los taludes de relleno cumplen en un 95%.
2. Las características geométricas correspondientes al alineamiento horizontal, tales como: las longitudes de tramos en tangente no son los apropiados las cuales no cumplen en un 68% y las longitudes de curvas horizontales no son las adecuadas incumpliendo en un 99%. Para el alineamiento vertical: los anchos de bermas y calzada (corona) no son los adecuados presentando un porcentaje de incumplimiento del 65%, los peraltes no son los apropiados incumpliendo en un 59% y las dimensiones de las cunetas no cumplen en un 100%.
3. Por incidencia de porcentajes en el camino vecinal Santa Rosa - Chaupelanche se determinó que sus características geométricas cumplen en un 60% y no cumplen en un 40% de acuerdo a lo parámetros establecidos en el manual de diseño de carreteras no pavimentadas de bajo volumen de tránsito (MDCNPBVT); de esta manera se pone en evidencia que las características geométricas del camino vecinal Santa Rosa – Chaupelnche son deficientes.
   1. **Recomendaciones**

* Profundizar en futuras investigaciones la evaluación geométrica de vías respecto a puntos de intersección teniendo en cuenta las preferencias, perpendicularidad, punto de giro, visibilidad, curvas de transición , curvas compuestas, peraltes.
* Profundizar en futuras investigaciones la evaluación geométrica de los peraltes y bombeos de un alineamiento próximos a un puente.

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**ANEXOS**

**ANEXO A:**

**PANEL FOTOGRÁFICO**

**Fotografía N° 1.-** Levantamiento topográfico de la vía en estudio.



**Fotografía N° 2.-** Tomando medida del ancho de la calzada.



**Fotografía N° 03.-** Imagen donde se observa una calzada de un solo carril. Así como también se observa el mal estado de la vía presentando surcos erosivos y baches.



**Fotografía N° 4.-** Imagen donde se ve la carencia de cunetas



**ANEXO B.**

**PUNTOS TOPOGRAFICOS.**

| Punto | Este | Norte | Cota | Descripción |
| --- | --- | --- | --- | --- |
| 1 | 759989 | 9273445 | 2486 | E1 |
| 2 | 759974.8935 | 9273445.3560 | 2485.0159 | P. referencia |
| 3 | 759972.8706 | 9273441.0273 | 2484.9130 | eje |
| 4 | 759962.9846 | 9273444.6750 | 2484.7036 | borde la palma |
| 5 | 759963.5954 | 9273445.6150 | 2485.2264 | bm01 |
| 6 | 759967.1862 | 9273452.1250 | 2484.9251 | bp |
| 7 | 759970.2598 | 9273457.5260 | 2484.8047 | bp |
| 8 | 759969.9281 | 9273460.1460 | 2484.7740 | bp |
| 9 | 759976.9648 | 9273457.6250 | 2484.1639 | bp |
| 10 | 759972.1090 | 9273444.6220 | 2484.9369 | b |
| 11 | 759975.7303 | 9273446.1900 | 2485.1071 | r |
| 12 | 759976.3224 | 9273446.1650 | 2485.1841 | r |
| 13 | 759978.1341 | 9273440.3040 | 2485.7018 | b |
| 14 | 759979.5184 | 9273440.6710 | 2485.8424 | r |
| 15 | 759980.7614 | 9273440.2260 | 2486.2209 | r |
| 16 | 759983.8599 | 9273441.0780 | 2486.7021 | r |
| 17 | 759983.5943 | 9273442.6940 | 2485.9877 | b |
| 18 | 759984.7603 | 9273442.6470 | 2486.2224 | r |
| 19 | 759988.0280 | 9273444.1860 | 2486.9309 | b |
| 20 | 759988.9505 | 9273442.6690 | 2487.6158 | r |
| 21 | 759990.8502 | 9273441.493 | 2488.7502 | bm02 |
| 22 | 759990.8603 | 9273443.5870 | 2487.2873 | r |
| 23 | 759991.2695 | 9273445.1875 | 2487.2774 | b |
| 24 | 759993.3945 | 9273445.8125 | 2487.4059 | r |
| 25 | 759995.4708 | 9273447.2860 | 2487.6675 | r |
| 26 | 759996.1230 | 9273448.6040 | 2487.6822 | b |
| 27 | 759998.8613 | 9273446.6390 | 2487.9763 | c |
| 28 | 760001.1445 | 9273449.9583 | 2488.3354 | c |
| 29 | 760003.4749 | 9273453.1100 | 2488.9522 | c |
| 30 | 760000.6226 | 9273453.1150 | 2488.2980 | b |
| 32 | 760004.8673 | 9273454.1130 | 2490.1650 | r |
| 33 | 760005.3945 | 9273456.8542 | 2488.9993 | r |
| 34 | 760008.9832 | 9273458.6360 | 2491.0242 | r |
| 35 | 760009.5901 | 9273464.7190 | 2489.4086 | b |
| 36 | 760013.2253 | 9273464.6010 | 2489.8371 | c |
| 37 | 760012.4742 | 9273466.7810 | 2489.6326 | r |
| 38 | 759978.5539 | 9273443.5546 | 2485.3925 | e |
| 39 | 759979.7070 | 9273447.3958 | 2485.5907 | b |
| 40 | 759986.8884 | 9273447.2241 | 2486.6747 | e |
| 41 | 759985.9424 | 9273450.1180 | 2486.6775 | b |
| 42 | 759988.1419 | 9273452.1875 | 2487.0191 | r |
| 43 | 759989.7552 | 9273452.8340 | 2487.0128 | r |
| 44 | 759990.9558 | 9273453.8910 | 2487.3825 | r |
| 45 | 759990.3893 | 9273455.8958 | 2487.5881 | c |
| 46 | 759993.1062 | 9273455.4510 | 2487.9631 | r |
| 47 | 759994.2073 | 9273455.4380 | 2487.9715 | b |
| 48 | 759992.0761 | 9273449.8355 | 2487.1951 | e |
| 49 | 759994.9709 | 9273451.7835 | 2487.5494 | e |
| 50 | 759998.1663 | 9273454.4685 | 2487.9807 | r |
| 51 | 760000.5902 | 9273456.9915 | 2488.5296 | e |
| 52 | 759994.5720 | 9273456.9167 | 2488.0006 | r |
| 53 | 759995.6660 | 9273457.5810 | 2488.0014 | r |
| 54 | 759999.6213 | 9273455.9235 | 2488.2872 | e |
| 55 | 760002.7726 | 9273459.7587 | 2488.6301 | e |
| 56 | 759998.4857 | 9273459.3333 | 2488.0930 | b |
| 57 | 759996.2776 | 9273459.6340 | 2487.9138 | r |
| 58 | 759999.0849 | 9273463.5000 | 2488.2503 | c |
| 59 | 760003.6971 | 9273465.9890 | 2488.8056 | b |
| 60 | 760003.8504 | 9273469.7170 | 2488.9199 | c |
| 61 | 760008.0591 | 9273467.4959 | 2489.2686 | e |
| 62 | 760012.1493 | 9273473.4923 | 2489.9712 | e |
| 63 | 760010.5922 | 9273474.9670 | 2489.9920 | b |
| 64 | 760009.4836 | 9273475.5900 | 2490.0053 | r |
| 65 | 760011.9602 | 9273479.3270 | 2490.0469 | r |
| 66 | 760012.4903 | 9273482.3890 | 2489.9458 | c |
| 67 | 760016.7259 | 9273488.8200 | 2490.3962 | c |
| 68 | 760017.8166 | 9273487.3010 | 2490.7316 | b |
| 69 | 760020.3770 | 9273485.5545 | 2490.7988 | e |
| 70 | 760023.3558 | 9273489.9215 | 2491.2755 | e |
| 71 | 760018.1191 | 9273491.4350 | 2490.8285 | r |
| 72 | 760021.5065 | 9273492.6875 | 2491.3295 | E2 |
| 73 | 760026.8882 | 9273489.0598 | 2491.6858 | b |
| 74 | 760028.4524 | 9273489.9530 | 2491.9273 | r |
| 75 | 760032.3810 | 9273489.9043 | 2492.9943 | r |
| 76 | 760029.4768 | 9273492.8228 | 2491.9804 | r |
| 77 | 760033.2375 | 9273492.2418 | 2493.0302 | r |
| 78 | 760033.7449 | 9273494.8390 | 2492.5744 | c |
| 79 | 760039.4086 | 9273502.9400 | 2493.1987 | c |
| 80 | 760034.1535 | 9273501.6115 | 2492.5718 | r |
| 81 | 760029.4335 | 9273498.8317 | 2492.0912 | e |
| 82 | 760024.2707 | 9273497.8793 | 2491.9505 | b |
| 83 | 760024.3739 | 9273499.5010 | 2492.0115 | r |
| 84 | 760029.1531 | 9273505.1700 | 2492.6375 | b |
| 85 | 760026.3607 | 9273506.8670 | 2492.0874 | r |
| 86 | 760031.0181 | 9273508.4920 | 2493.0014 | r |
| 87 | 760002.5603 | 9273498.5190 | 2484.3252 | bp |
| 88 | 760003.9625 | 9273500.7420 | 2484.4522 | bp |
| 89 | 760005.3494 | 9273503.0060 | 2484.2695 | bp |
| 90 | 760006.8988 | 9273505.6220 | 2484.3203 | bp |
| 91 | 760002.3162 | 9273502.5750 | 2484.0000 | c |
| 92 | 760008.0552 | 9273511.9100 | 2484.6301 | c |
| 93 | 760008.4216 | 9273507.7960 | 2484.4907 | bp |
| 94 | 760009.9028 | 9273510.1650 | 2484.7162 | bp |
| 95 | 760013.1405 | 9273504.3214 | 2484.9538 | bp |
| 96 | 760014.2113 | 9273505.9632 | 2484.9644 | bp |
| 97 | 760019.0533 | 9273515.1750 | 2484.9948 | bp |
| 98 | 760020.8520 | 9273525.3428 | 2485.4728 | bp |
| 99 | 760013.1347 | 9273520.4567 | 2484.9236 | bp |
| 100 | 760008.9219 | 9273519.7292 | 2484.9341 | c |
| 101 | 760014.1026 | 9273527.2325 | 2485.2827 | bp |
| 102 | 760009.7783 | 9273528.0080 | 2485.2244 | c |
| 103 | 760010.2939 | 9273533.4250 | 2485.8165 | c |
| 104 | 760013.9269 | 9273535.8605 | 2486.0086 | bp |
| 105 | 760020.8397 | 9273539.0311 | 2486.0216 | bp |
| 106 | 760020.7941 | 9273546.3031 | 2486.4788 | ponton1 |
| 107 | 760018.4510 | 9273553.1724 | 2487.5728 | bp |
| 108 | 760009.3293 | 9273551.0744 | 2487.1255 | bp |
| 109 | 760011.6929 | 9273547.3174 | 2486.8027 | bp |
| 110 | 760037.1365 | 9273462.5642 | 2498.9617 | r |
| 111 | 760054.6757 | 9273481.7222 | 2499.2854 | r |
| 113 | 760037.5937 | 9273484.4036 | 2495.1448 | r |
| 114 | 760040.2849 | 9273506.5290 | 2493.3595 | r |
| 115 | 760037.3192 | 9273509.2381 | 2493.4521 | e |
| 116 | 760042.2247 | 9273514.0677 | 2494.1547 | e |
| 117 | 760046.8798 | 9273517.8215 | 2494.8292 | e |
| 118 | 760046.5932 | 9273513.1416 | 2494.6944 | b |
| 119 | 760038.6197 | 9273514.8975 | 2494.0000 | b |
| 120 | 760043.8738 | 9273519.5153 | 2494.6427 | E3 |
| 121 | 760054.1716 | 9273519.1601 | 2495.1930 | b |
| 122 | 760049.1390 | 9273512.9620 | 2494.9921 | c |
| 123 | 760054.1120 | 9273517.2535 | 2495.2727 | r |
| 124 | 760058.7264 | 9273519.7380 | 2495.7813 | c |
| 125 | 760057.4127 | 9273520.3650 | 2495.5668 | r |
| 126 | 760059.7985 | 9273522.4390 | 2495.7836 | b |
| 127 | 760064.0125 | 9273522.4920 | 2495.9960 | c |
| 128 | 760064.6729 | 9273524.9719 | 2496.0478 | b |
| 129 | 760067.3676 | 9273524.1340 | 2496.4974 | c |
| 131 | 760057.9720 | 9273524.6635 | 2495.7828 | e |
| 132 | 760053.9937 | 9273526.7063 | 2495.6181 | b |
| 133 | 760036.0074 | 9273524.9071 | 2490.7037 | r |
| 134 | 760036.8226 | 9273537.2833 | 2488.0000 | r |
| 135 | 760039.1778 | 9273550.8088 | 2484.1031 | r |
| 136 | 760046.8882 | 9273555.0680 | 2485.6810 | r |
| 137 | 760044.5127 | 9273564.9812 | 2490.7337 | r |
| 138 | 760045.1670 | 9273531.0475 | 2492.4733 | r |
| 139 | 760049.4922 | 9273525.9792 | 2495.0205 | c |
| 140 | 760055.2131 | 9273528.9610 | 2495.7614 | c |
| 141 | 760063.2024 | 9273532.9540 | 2495.8383 | c |
| 142 | 760065.3616 | 9273532.2480 | 2496.0559 | b |
| 143 | 760064.1790 | 9273528.2380 | 2496.1176 | e |
| 145 | 760069.0867 | 9273527.8126 | 2496.7560 | b |
| 146 | 760073.3358 | 9273530.5958 | 2496.9980 | b |
| 147 | 760078.2452 | 9273530.6823 | 2499.1396 | r |
| 148 | 760081.1930 | 9273533.7473 | 2499.5513 | r |
| 149 | 760079.0685 | 9273535.3585 | 2497.9940 | b |
| 150 | 760076.9138 | 9273536.5063 | 2497.5888 | e |
| 151 | 760071.7536 | 9273537.2931 | 2496.9697 | b |
| 152 | 760071.4384 | 9273538.8610 | 2497.0052 | c |
| 153 | 760074.3947 | 9273541.0540 | 2497.1829 | c |
| 154 | 760080.8550 | 9273543.8234 | 2498.1245 | b |
| 155 | 760085.4674 | 9273542.4655 | 2498.9250 | e |
| 156 | 760084.5289 | 9273539.4127 | 2498.7846 | b |
| 157 | 760086.6445 | 9273538.9710 | 2500.0942 | r |
| 158 | 760088.5167 | 9273540.9860 | 2498.9805 | r |
| 159 | 760089.6920 | 9273536.9097 | 2502.5766 | r |
| 160 | 760095.6877 | 9273539.1344 | 2502.4744 | r |
| 161 | 760093.5771 | 9273542.4390 | 2500.5553 | r |
| 162 | 760093.6440 | 9273544.1020 | 2499.3403 | b |
| 163 | 760091.1477 | 9273546.2417 | 2499.0351 | e |
| 164 | 760081.8002 | 9273546.6700 | 2497.9602 | c |
| 165 | 760084.5660 | 9273545.8127 | 2498.9737 | b |
| 166 | 760088.7566 | 9273548.3780 | 2498.9901 | b |
| 167 | 760088.8790 | 9273550.3240 | 2499.0025 | c |
| 168 | 760094.0446 | 9273551.5044 | 2499.4785 | r |
| 169 | 760098.5547 | 9273551.8719 | 2499.9090 | b |
| 170 | 760100.4669 | 9273550.5013 | 2499.9560 | e |
| 171 | 760098.8167 | 9273554.1620 | 2500.0020 | c |
| 172 | 760102.8615 | 9273553.3160 | 2499.9979 | b |
| 173 | 760105.3573 | 9273551.8824 | 2500.0883 | e |
| 174 | 760106.9566 | 9273549.5915 | 2500.0766 | b |
| 175 | 760104.8555 | 9273554.5208 | 2500.1101 | E4 |
| 176 | 760107.1382 | 9273555.9210 | 2500.0515 | c |
| 177 | 760109.3456 | 9273554.7280 | 2500.1435 | b |
| 178 | 760109.5009 | 9273557.1030 | 2499.7676 | r |
| 179 | 760115.5430 | 9273556.2917 | 2500.9425 | b |
| 180 | 760118.8292 | 9273558.4396 | 2500.9036 | r |
| 181 | 760121.3572 | 9273556.9670 | 2501.3705 | b |
| 182 | 760124.2580 | 9273557.5920 | 2501.5203 | r |
| 183 | 760111.9605 | 9273552.9310 | 2500.4764 | e |
| 184 | 760118.3720 | 9273553.3654 | 2501.5236 | e |
| 185 | 760125.6142 | 9273553.8377 | 2501.9800 | e |
| 186 | 760110.9765 | 9273550.3700 | 2500.7295 | b |
| 187 | 760109.2057 | 9273548.9583 | 2500.7861 | r |
| 188 | 760111.0718 | 9273544.3111 | 2503.1338 | r |
| 189 | 760107.6871 | 9273537.9260 | 2504.8043 | r |
| 190 | 760107.7638 | 9273535.1930 | 2505.8913 | c |
| 191 | 760102.4868 | 9273532.0890 | 2505.8047 | c |
| 192 | 760099.4305 | 9273535.4013 | 2505.1415 | r |
| 193 | 760098.0057 | 9273531.2997 | 2507.0328 | r |
| 194 | 760096.7474 | 9273526.8310 | 2508.1017 | c |
| 195 | 760093.2261 | 9273524.7650 | 2508.2622 | c |
| 196 | 760093.0916 | 9273534.4141 | 2504.8604 | r |
| 197 | 760102.7714 | 9273543.9756 | 2501.0138 | r |
| 198 | 760104.8085 | 9273547.7686 | 2499.9937 | r |
| 199 | 760117.7144 | 9273551.2880 | 2501.4838 | b |
| 200 | 760124.3281 | 9273551.3750 | 2501.9864 | b |
| 201 | 760124.4095 | 9273549.3274 | 2503.6496 | r |
| 202 | 760126.9240 | 9273550.2860 | 2501.9984 | r |
| 203 | 760129.5679 | 9273551.6726 | 2502.1096 | b |
| 204 | 760130.2149 | 9273554.1378 | 2502.2272 | e |
| 205 | 760129.7555 | 9273557.3600 | 2502.2413 | b |
| 206 | 760130.3763 | 9273559.6667 | 2502.2087 | c |
| 207 | 760134.2784 | 9273558.3859 | 2502.5888 | r |
| 208 | 760138.8383 | 9273559.8170 | 2502.7548 | c |
| 209 | 760138.9766 | 9273557.5730 | 2503.0040 | b |
| 210 | 760138.1738 | 9273554.5582 | 2502.9454 | e |
| 211 | 760146.2743 | 9273556.9450 | 2503.7896 | b |
| 212 | 760150.4840 | 9273557.3700 | 2504.0557 | r |
| 213 | 760145.7620 | 9273554.2792 | 2503.9328 | e |
| 214 | 760150.0885 | 9273553.7731 | 2503.9844 | e |
| 215 | 760153.9870 | 9273555.7292 | 2504.3871 | b |
| 216 | 760138.0183 | 9273551.7285 | 2502.9900 | b |
| 217 | 760137.7038 | 9273551.0160 | 2502.9852 | r |
| 218 | 760138.0973 | 9273550.4250 | 2503.4045 | r |
| 219 | 760142.0011 | 9273551.3890 | 2503.6730 | b |
| 220 | 760149.5977 | 9273549.6250 | 2503.9905 | r |
| 221 | 760149.5820 | 9273549.0417 | 2503.9970 | r |
| 222 | 760153.5375 | 9273550.0820 | 2504.0532 | b |
| 223 | 760152.8727 | 9273544.1164 | 2508.4981 | r |
| 224 | 760152.1488 | 9273534.1511 | 2512.4132 | r |
| 225 | 760148.8400 | 9273521.5379 | 2514.4126 | r |
| 229 | 760166.2171 | 9273533.9095 | 2510.7088 | r |
| 230 | 760166.4934 | 9273543.0950 | 2507.2919 | r |
| 231 | 760160.7236 | 9273546.7770 | 2505.1192 | r |
| 232 | 760163.1035 | 9273547.7360 | 2505.3142 | b |
| 233 | 760156.9611 | 9273552.4358 | 2504.6721 | e |
| 234 | 760161.5706 | 9273551.1562 | 2504.9428 | e |
| 235 | 760165.2099 | 9273549.9166 | 2505.3653 | e |
| 236 | 760163.7808 | 9273552.4820 | 2505.1566 | b |
| 237 | 760182.6026 | 9273545.7020 | 2506.9457 | E5 |
| 238 | 760170.1406 | 9273550.7940 | 2505.8738 | b |
| 239 | 760174.0273 | 9273550.8125 | 2506.0155 | r |
| 240 | 760178.0171 | 9273549.3640 | 2506.3657 | r |
| 241 | 760177.3461 | 9273548.2140 | 2506.4260 | b |
| 242 | 760185.3572 | 9273543.9550 | 2507.4264 | b |
| 243 | 760189.2668 | 9273542.8630 | 2508.0003 | r |
| 244 | 760171.8411 | 9273547.1340 | 2506.0000 | e |
| 245 | 760175.9897 | 9273544.9768 | 2506.6642 | e |
| 246 | 760181.8152 | 9273541.9475 | 2507.1466 | e |
| 247 | 760173.3646 | 9273543.5120 | 2506.6107 | b |
| 248 | 760175.6758 | 9273539.5000 | 2508.1772 | r |
| 249 | 760174.1081 | 9273538.5000 | 2509.1127 | r |
| 250 | 760181.3867 | 9273538.0625 | 2507.0929 | r |
| 251 | 760125.6719 | 9273474.9375 | 2513.1299 | c |
| 252 | 760126.1581 | 9273468.3620 | 2513.1516 | c |
| 253 | 760159.7522 | 9273469.8632 | 2514.4616 | c |
| 254 | 760174.6492 | 9273481.8102 | 2516.7895 | r |
| 255 | 760192.1427 | 9273477.0898 | 2517.0000 | t |
| 256 | 760195.1079 | 9273476.8399 | 2517.1343 | t |
| 257 | 760198.1684 | 9273475.1342 | 2517.1231 | t |
| 259 | 760184.7952 | 9273520.3690 | 2512.0533 | r |
| 260 | 760182.2500 | 9273527.9160 | 2510.5027 | r |
| 261 | 760185.9297 | 9273530.9792 | 2509.6866 | r |
| 262 | 760184.7536 | 9273537.6890 | 2507.9567 | b |
| 263 | 760190.0901 | 9273534.9105 | 2508.1097 | b |
| 264 | 760190.1516 | 9273537.6126 | 2508.0330 | e |
| 265 | 760195.1908 | 9273532.8792 | 2508.9042 | b |
| 266 | 760196.9243 | 9273534.6127 | 2508.9437 | e |
| 267 | 760201.4393 | 9273531.4355 | 2509.5722 | b |
| 268 | 760201.3640 | 9273533.4736 | 2509.4076 | e |
| 269 | 760196.8815 | 9273537.2500 | 2508.7949 | b |
| 271 | 760203.9832 | 9273535.7196 | 2509.5429 | b |
| 272 | 760209.6370 | 9273532.8828 | 2510.2973 | e |
| 273 | 760212.8648 | 9273535.1299 | 2510.4508 | b |
| 274 | 760205.4621 | 9273530.9754 | 2509.9787 | b |
| 275 | 760204.1471 | 9273525.5370 | 2510.9563 | r |
| 276 | 760198.9844 | 9273524.3750 | 2511.0564 | r |
| 277 | 760197.7771 | 9273520.2880 | 2515.0222 | r |
| 278 | 760213.4348 | 9273528.1920 | 2510.9999 | r |
| 279 | 760214.6628 | 9273529.8958 | 2510.9602 | b |
| 280 | 760220.8839 | 9273532.9523 | 2511.2301 | e |
| 281 | 760222.6449 | 9273536.1540 | 2511.0384 | b |
| 282 | 760221.6280 | 9273544.2181 | 2507.3424 | r |
| 283 | 760220.5244 | 9273558.0742 | 2503.5383 | r |
| 284 | 760199.6072 | 9273564.4759 | 2502.0419 | r |
| 285 | 760205.9412 | 9273577.1239 | 2505.0922 | r |
| 286 | 760229.4724 | 9273573.8570 | 2507.2276 | r |
| 287 | 760195.9711 | 9273551.2812 | 2505.4779 | r |
| 288 | 760236.1055 | 9273535.3750 | 2512.7221 | b |
| 289 | 760230.6074 | 9273532.9616 | 2512.0807 | e |
| 290 | 760234.4451 | 9273532.9141 | 2512.6097 | e |
| 291 | 760238.1638 | 9273532.5003 | 2512.9139 | e |
| 292 | 760226.4455 | 9273530.1856 | 2511.9351 | b |
| 293 | 760230.7553 | 9273530.2390 | 2512.0177 | b |
| 294 | 760230.9705 | 9273529.3450 | 2511.9941 | r |
| 295 | 760236.2643 | 9273528.0417 | 2513.3457 | r |
| 296 | 760238.5455 | 9273526.5580 | 2514.5386 | r |
| 297 | 760240.1641 | 9273523.8542 | 2516.1169 | r |
| 298 | 760239.8880 | 9273528.7292 | 2513.0000 | r |
| 299 | 760240.0264 | 9273529.4440 | 2513.0051 | b |
| 300 | 760241.2720 | 9273529.4810 | 2513.0252 | b |
| 301 | 760242.5084 | 9273532.0330 | 2513.0373 | e |
| 302 | 760247.8643 | 9273531.4477 | 2513.5303 | e |
| 303 | 760251.0912 | 9273528.5990 | 2513.9885 | b |
| 304 | 760247.7149 | 9273527.6900 | 2513.5873 | r |
| 305 | 760254.9851 | 9273523.3490 | 2516.0180 | r |
| 306 | 760259.7509 | 9273525.4600 | 2514.9977 | r |
| 307 | 760259.0008 | 9273526.5570 | 2514.9761 | r |
| 308 | 760258.9951 | 9273527.9470 | 2514.9252 | b |
| 309 | 760264.4596 | 9273526.8060 | 2514.9891 | r |
| 310 | 760264.4310 | 9273528.9167 | 2515.0023 | b |
| 311 | 760271.0761 | 9273530.4210 | 2515.6881 | b |
| 312 | 760276.2720 | 9273531.7006 | 2515.9954 | r |
| 313 | 760276.6243 | 9273533.4150 | 2516.1275 | b |
| 314 | 760257.1413 | 9273530.8961 | 2514.5010 | e |
| 315 | 760260.7407 | 9273531.2138 | 2514.6732 | e |
| 316 | 760265.3802 | 9273532.1173 | 2515.0681 | e |
| 317 | 760240.6802 | 9273535.6830 | 2513.0185 | b |
| 318 | 760250.3324 | 9273534.2970 | 2513.8339 | b |
| 319 | 760251.2973 | 9273534.8070 | 2513.7448 | r |
| 320 | 760250.9162 | 9273538.2050 | 2511.9011 | r |
| 321 | 760249.7567 | 9273546.7326 | 2508.4658 | r |
| 322 | 760263.6493 | 9273554.3531 | 2510.0000 | r |
| 323 | 760261.0664 | 9273534.8333 | 2514.4065 | b |
| 324 | 760268.1953 | 9273537.3125 | 2514.9239 | r |
| 325 | 760270.2352 | 9273536.6090 | 2515.2390 | b |
| 326 | 760269.6998 | 9273533.4922 | 2515.3886 | e |
| 327 | 760277.0535 | 9273536.7024 | 2516.4071 | e |
| 328 | 760284.7716 | 9273537.0892 | 2516.9556 | b |
| 329 | 760286.7133 | 9273541.0033 | 2517.1412 | e |
| 330 | 760279.6996 | 9273540.7980 | 2516.3247 | b |
| 331 | 760279.0169 | 9273542.1458 | 2516.0927 | r |
| 332 | 760276.8602 | 9273548.1599 | 2514.4806 | r |
| 333 | 760289.6473 | 9273551.1570 | 2514.9379 | r |
| 334 | 760291.1549 | 9273546.0417 | 2517.1848 | b |
| 335 | 760291.7616 | 9273540.5314 | 2517.8164 | b |
| 336 | 760290.4077 | 9273538.9173 | 2517.8137 | r |
| 337 | 760290.6777 | 9273538.1770 | 2517.9595 | r |
| 338 | 760292.2639 | 9273530.7288 | 2521.2870 | r |
| 339 | 760303.5313 | 9273539.9375 | 2521.2977 | r |
| 340 | 760301.3932 | 9273543.7080 | 2518.8782 | r |
| 341 | 760299.9307 | 9273543.9009 | 2518.8336 | b |
| 342 | 760298.6024 | 9273546.2968 | 2518.5075 | e |
| 343 | 760297.9298 | 9273549.0430 | 2518.1489 | b |
| 344 | 760294.1999 | 9273549.1230 | 2517.5609 | r |
| 345 | 760298.2597 | 9273552.6120 | 2517.2490 | r |
| 346 | 760301.4310 | 9273556.7500 | 2516.4642 | r |
| 347 | 760302.3164 | 9273553.3542 | 2518.3431 | r |
| 348 | 760302.5226 | 9273551.3829 | 2518.9702 | b |
| 349 | 760305.8947 | 9273552.7040 | 2519.0867 | b |
| 350 | 760305.6306 | 9273549.4260 | 2519.0567 | e |
| 351 | 760307.7148 | 9273547.2708 | 2519.1774 | b |
| 352 | 760310.8409 | 9273544.3184 | 2521.2245 | r |
| 353 | 760314.5974 | 9273541.0280 | 2523.0561 | r |
| 354 | 760315.5744 | 9273538.9410 | 2523.3958 | r |
| 355 | 760318.7322 | 9273532.2000 | 2525.0827 | r |
| 356 | 760313.3268 | 9273548.5840 | 2519.9477 | r |
| 357 | 760315.1551 | 9273550.6760 | 2520.0878 | b |
| 358 | 760310.2460 | 9273551.4810 | 2519.6506 | e |
| 359 | 760314.1047 | 9273553.1990 | 2520.2227 | e |
| 360 | 760311.6433 | 9273555.4198 | 2520.0474 | b |
| 361 | 760311.1661 | 9273555.9230 | 2520.0368 | r |
| 362 | 760305.2291 | 9273565.6489 | 2515.3127 | r |
| 363 | 760304.7523 | 9273574.6501 | 2513.4212 | r |
| 364 | 760317.0466 | 9273578.3256 | 2514.9847 | r |
| 365 | 760329.4444 | 9273580.2007 | 2516.7789 | r |
| 366 | 760321.4139 | 9273573.5067 | 2517.2522 | r |
| 369 | 760325.1674 | 9273597.7286 | 2520.9420 | r |
| 370 | 760340.2317 | 9273608.6322 | 2524.9057 | r |
| 371 | 760346.8506 | 9273593.6933 | 2521.2095 | r |
| 372 | 760348.8142 | 9273584.0174 | 2518.7863 | r |
| 373 | 760336.7260 | 9273570.2054 | 2521.0672 | r |
| 374 | 760321.5251 | 9273563.1499 | 2520.5815 | r |
| 375 | 760314.5072 | 9273558.1326 | 2520.2768 | r |
| 376 | 760315.1076 | 9273556.7840 | 2520.4282 | b |
| 377 | 760319.1255 | 9273559.6600 | 2520.8354 | r |
| 378 | 760322.1758 | 9273559.3125 | 2521.6185 | b |
| 379 | 760327.5972 | 9273560.3270 | 2522.2495 | E6 |
| 380 | 760326.5846 | 9273561.2708 | 2522.0298 | r |
| 381 | 760328.2318 | 9273561.5833 | 2522.4407 | r |
| 382 | 760324.6127 | 9273557.3932 | 2521.6360 | e |
| 383 | 760328.7595 | 9273558.2306 | 2522.2923 | e |
| 384 | 760333.2374 | 9273558.5651 | 2522.7978 | e |
| 385 | 760339.5501 | 9273558.0577 | 2523.5604 | e |
| 386 | 760343.5375 | 9273557.1269 | 2524.1133 | e |
| 387 | 760347.8039 | 9273555.5557 | 2524.5093 | e |
| 388 | 760352.0847 | 9273553.2882 | 2525.0919 | e |
| 389 | 760352.7227 | 9273556.6270 | 2525.1227 | b |
| 390 | 760352.6416 | 9273558.4580 | 2525.0310 | r |
| 391 | 760351.4701 | 9273558.2210 | 2525.0126 | r |
| 392 | 760348.3330 | 9273559.3910 | 2524.8132 | b |
| 393 | 760344.1862 | 9273561.0830 | 2524.1009 | b |
| 394 | 760343.2372 | 9273561.8150 | 2524.0868 | r |
| 395 | 760339.8974 | 9273563.6650 | 2523.5834 | r |
| 396 | 760336.9819 | 9273562.6640 | 2523.3750 | r |
| 397 | 760337.0131 | 9273562.0310 | 2523.4300 | b |
| 398 | 760335.5542 | 9273561.8480 | 2523.1784 | b |
| 399 | 760331.2403 | 9273562.2020 | 2523.0090 | r |
| 400 | 760331.2378 | 9273561.6614 | 2522.9835 | b |
| 401 | 760322.2686 | 9273552.5309 | 2521.0202 | b |
| 402 | 760324.6247 | 9273553.0930 | 2521.0900 | b |
| 403 | 760325.2668 | 9273552.3310 | 2520.9976 | r |
| 404 | 760328.8853 | 9273548.6055 | 2524.4520 | r |
| 405 | 760333.4460 | 9273550.4810 | 2525.3983 | r |
| 406 | 760332.7742 | 9273552.0293 | 2524.0000 | r |
| 407 | 760328.4337 | 9273554.1830 | 2521.9638 | b |
| 408 | 760334.1881 | 9273554.9460 | 2522.9712 | b |
| 409 | 760334.5642 | 9273553.5930 | 2522.9784 | r |
| 410 | 760339.4071 | 9273552.2007 | 2525.0480 | r |
| 411 | 760342.9728 | 9273549.2540 | 2528.0000 | r |
| 412 | 760342.6958 | 9273552.6747 | 2524.3410 | r |
| 413 | 760341.5086 | 9273554.5000 | 2523.9811 | b |
| 414 | 760345.7721 | 9273553.3259 | 2524.0592 | b |
| 415 | 760348.9505 | 9273552.2292 | 2524.9147 | b |
| 416 | 760348.8164 | 9273549.3125 | 2526.3765 | r |
| 417 | 760349.0638 | 9273547.8750 | 2528.0000 | r |
| 418 | 760353.0633 | 9273547.2414 | 2526.7823 | r |
| 419 | 760353.5459 | 9273549.0030 | 2525.0901 | r |
| 420 | 760354.7186 | 9273549.1690 | 2525.2394 | b |
| 421 | 760355.1100 | 9273551.3167 | 2525.3736 | e |
| 422 | 760356.6028 | 9273553.2322 | 2525.6330 | b |
| 423 | 760356.6563 | 9273554.8125 | 2525.5859 | r |
| 424 | 760359.0395 | 9273554.2409 | 2525.7854 | r |
| 425 | 760358.5654 | 9273551.6960 | 2525.8100 | b |
| 426 | 760363.9219 | 9273549.3333 | 2526.0499 | r |
| 427 | 760360.4658 | 9273547.8053 | 2526.0101 | e |
| 428 | 760358.8408 | 9273546.1804 | 2525.9248 | b |
| 429 | 760360.6778 | 9273544.1030 | 2525.9812 | r |
| 430 | 760365.9701 | 9273541.0000 | 2526.4414 | b |
| 431 | 760370.3350 | 9273537.6510 | 2526.9291 | r |
| 432 | 760373.2280 | 9273537.3670 | 2527.0075 | b |
| 433 | 760366.5057 | 9273543.8829 | 2526.5120 | e |
| 434 | 760370.3788 | 9273541.6085 | 2526.8680 | e |
| 435 | 760376.0007 | 9273538.7239 | 2527.1584 | e |
| 436 | 760379.8275 | 9273537.0207 | 2527.5051 | e |
| 437 | 760383.9053 | 9273535.4218 | 2527.7940 | e |
| 438 | 760378.8346 | 9273534.6210 | 2527.1848 | b |
| 439 | 760377.9544 | 9273534.3125 | 2527.0796 | r |
| 440 | 760380.8261 | 9273539.0870 | 2527.8514 | b |
| 441 | 760379.2014 | 9273540.0910 | 2527.7007 | r |
| 442 | 760376.2539 | 9273542.0625 | 2527.1581 | r |
| 443 | 760373.0503 | 9273542.4570 | 2526.9937 | b |
| 444 | 760373.6963 | 9273543.1550 | 2527.0293 | r |
| 445 | 760366.5899 | 9273546.4050 | 2526.4627 | b |
| 446 | 760386.5211 | 9273531.7560 | 2527.9623 | r |
| 447 | 760388.6875 | 9273531.5910 | 2528.0058 | b |
| 448 | 760389.4029 | 9273533.5925 | 2528.0590 | e |
| 449 | 760390.2164 | 9273536.1060 | 2528.1770 | b |
| 450 | 760393.4047 | 9273535.3760 | 2528.4703 | r |
| 451 | 760396.5529 | 9273534.0067 | 2528.7410 | b |
| 452 | 760397.0477 | 9273531.2168 | 2528.7666 | e |
| 453 | 760397.9751 | 9273528.5320 | 2528.9639 | b |
| 454 | 760397.1781 | 9273527.8660 | 2528.9830 | r |
| 455 | 760400.0154 | 9273525.7680 | 2529.1229 | r |
| 456 | 760400.0208 | 9273527.0625 | 2528.9870 | r |
| 457 | 760405.1367 | 9273524.0208 | 2529.5059 | c |
| 458 | 760406.1536 | 9273525.1040 | 2529.1916 | r |
| 459 | 760406.8088 | 9273525.8430 | 2529.0683 | b |
| 460 | 760412.4232 | 9273524.1042 | 2529.7415 | b |
| 461 | 760413.2635 | 9273522.7830 | 2529.8589 | c |
| 462 | 760413.7269 | 9273523.0900 | 2529.9044 | r |
| 463 | 760418.7210 | 9273521.7670 | 2529.9844 | r |
| 464 | 760418.4115 | 9273522.5245 | 2529.9664 | b |
| 465 | 760418.2365 | 9273524.6321 | 2529.9520 | e |
| 466 | 760417.5535 | 9273527.9470 | 2529.9439 | b |
| 467 | 760416.5901 | 9273529.9977 | 2529.9591 | c |
| 468 | 760408.6596 | 9273531.7444 | 2529.4436 | c |
| 469 | 760408.6596 | 9273530.0728 | 2529.4271 | b |
| 470 | 760409.6596 | 9273531.7495 | 2529.4435 | bm03 |
| 471 | 760406.4180 | 9273531.1458 | 2529.0725 | r |
| 472 | 760402.7148 | 9273533.0000 | 2529.0055 | r |
| 473 | 760401.2652 | 9273532.6840 | 2528.9706 | b |
| 474 | 760402.8824 | 9273529.4035 | 2528.9693 | e |
| 475 | 760422.0790 | 9273521.4380 | 2530.5380 | E7 |
| 476 | 760424.7947 | 9273525.7150 | 2530.8089 | b |
| 477 | 760425.0704 | 9273528.1650 | 2530.8962 | c |
| 478 | 760425.9847 | 9273526.1080 | 2530.9987 | r |
| 479 | 760427.1728 | 9273521.8811 | 2530.9483 | e |
| 480 | 760431.0319 | 9273521.2205 | 2531.2633 | e |
| 481 | 760434.3144 | 9273521.1781 | 2531.7749 | e |
| 482 | 760433.8291 | 9273524.2130 | 2531.9170 | b |
| 483 | 760433.2461 | 9273524.3750 | 2531.9128 | r |
| 484 | 760432.3861 | 9273524.8150 | 2531.7881 | r |
| 485 | 760431.0117 | 9273525.6875 | 2532.0692 | r |
| 486 | 760428.7980 | 9273524.8885 | 2530.9966 | b |
| 487 | 760426.2878 | 9273520.4583 | 2530.9532 | b |
| 488 | 760427.3411 | 9273519.7500 | 2530.9701 | r |
| 489 | 760431.2928 | 9273519.8269 | 2531.2386 | b |
| 490 | 760434.0099 | 9273519.8240 | 2531.8081 | b |
| 491 | 760438.1587 | 9273518.6720 | 2531.9618 | r |
| 492 | 760437.8676 | 9273519.8580 | 2532.0018 | b |
| 493 | 760439.3279 | 9273521.9161 | 2532.1309 | e |
| 494 | 760437.7137 | 9273524.1370 | 2532.0039 | b |
| 495 | 760439.4006 | 9273524.6230 | 2532.2370 | r |
| 496 | 760442.6461 | 9273524.5402 | 2532.5991 | b |
| 497 | 760444.9185 | 9273526.6507 | 2532.9440 | r |
| 498 | 760443.2156 | 9273522.6159 | 2532.6101 | e |
| 499 | 760447.7621 | 9273521.7354 | 2533.4561 | b |
| 500 | 760451.4601 | 9273522.0629 | 2534.1966 | r |
| 501 | 760451.2959 | 9273523.1860 | 2533.8683 | b |
| 502 | 760449.0755 | 9273524.2103 | 2533.4636 | e |
| 503 | 760452.0970 | 9273526.0506 | 2533.7751 | e |
| 504 | 760454.5506 | 9273528.4025 | 2534.0149 | e |
| 505 | 760456.1444 | 9273530.6659 | 2534.1344 | e |
| 506 | 760455.0824 | 9273526.8568 | 2534.1664 | b |
| 507 | 760457.2020 | 9273526.6830 | 2535.0013 | r |
| 508 | 760458.2348 | 9273530.6915 | 2534.0134 | b |
| 509 | 760456.4013 | 9273531.1247 | 2534.1890 | a |
| 510 | 760453.3004 | 9273531.8573 | 2534.2828 | b |
| 511 | 760450.3787 | 9273528.6360 | 2533.3036 | b |
| 512 | 760453.8293 | 9273534.0334 | 2534.8517 | r |
| 513 | 760456.1416 | 9273535.8023 | 2534.7488 | b |
| 514 | 760458.2429 | 9273535.2988 | 2534.4507 | e |
| 515 | 760459.9492 | 9273533.9792 | 2534.1095 | b |
| 516 | 760457.0228 | 9273537.2060 | 2534.8116 | b |
| 518 | 760459.0764 | 9273537.2700 | 2534.6368 | e |
| 519 | 760462.4714 | 9273540.0417 | 2535.1610 | b |
| 520 | 760465.5703 | 9273541.6966 | 2535.5376 | r |
| 521 | 760465.0391 | 9273544.6250 | 2535.8416 | b |
| 524 | 760461.9409 | 9273544.0446 | 2535.6812 | e |
| 525 | 760459.8743 | 9273544.0723 | 2535.7430 | b |
| 526 | 760458.4011 | 9273545.2370 | 2534.9981 | r |
| 527 | 760461.3655 | 9273547.6630 | 2535.7925 | b |
| 528 | 760464.6794 | 9273550.5212 | 2535.9270 | e |
| 529 | 760467.9573 | 9273553.9750 | 2536.4799 | b |
| 530 | 760466.2794 | 9273555.3160 | 2536.6665 | e |
| 531 | 760467.1517 | 9273558.0276 | 2536.9377 | e |
| 532 | 760468.2678 | 9273561.8369 | 2536.9623 | e |
| 533 | 760469.8543 | 9273559.1100 | 2536.9575 | b |
| 534 | 760474.9318 | 9273561.5268 | 2537.3871 | r |
| 535 | 760472.1250 | 9273567.0625 | 2537.1368 | b |
| 536 | 760469.7608 | 9273567.6520 | 2537.1841 | e |
| 537 | 760467.4535 | 9273568.8550 | 2537.1746 | b |
| 538 | 760458.8800 | 9273572.0683 | 2537.1575 | r |
| 539 | 760457.7386 | 9273577.1500 | 2537.0898 | r |
| 540 | 760464.5712 | 9273575.6156 | 2537.2594 | r |
| 541 | 760468.1068 | 9273575.6458 | 2537.4683 | r |
| 542 | 760471.8699 | 9273576.1111 | 2537.6994 | e |
| 543 | 760472.6403 | 9273570.0920 | 2537.3981 | b |
| 544 | 760475.1367 | 9273578.7500 | 2537.9853 | b |
| 545 | 760477.8923 | 9273579.9290 | 2538.2681 | r |
| 546 | 760485.1033 | 9273580.1014 | 2538.6948 | r |
| 547 | 760486.2204 | 9273584.4341 | 2539.1200 | r |
| 548 | 760487.3917 | 9273588.4793 | 2539.6914 | r |
| 549 | 760484.8409 | 9273591.2790 | 2539.5914 | r |
| 550 | 760493.4136 | 9273595.7429 | 2541.0502 | r |
| 554 | 760488.5625 | 9273601.4167 | 2539.7113 | b |
| 555 | 760486.4183 | 9273602.1611 | 2539.4027 | e |
| 556 | 760483.7642 | 9273604.0250 | 2539.0484 | b |
| 557 | 760482.3532 | 9273605.1910 | 2538.7704 | r |
| 558 | 760481.3530 | 9273601.4510 | 2538.9302 | b |
| 559 | 760483.5074 | 9273599.3900 | 2538.9524 | e |
| 560 | 760480.4810 | 9273595.8631 | 2538.5264 | e |
| 561 | 760482.1600 | 9273594.8790 | 2538.8112 | b |
| 562 | 760476.1231 | 9273594.6605 | 2538.1191 | b |
| 563 | 760477.1932 | 9273590.9090 | 2538.4838 | e |
| 564 | 760475.1828 | 9273586.8968 | 2538.1780 | e |
| 565 | 760535.2298 | 9273605.1989 | 2544.0041 | E8 |
| 566 | 760487.8121 | 9273607.6090 | 2539.2258 | b |
| 567 | 760495.4258 | 9273601.2500 | 2541.5936 | r |
| 568 | 760495.2770 | 9273606.0260 | 2540.1400 | b |
| 569 | 760491.5588 | 9273605.9844 | 2539.8855 | e |
| 570 | 760495.5012 | 9273608.2016 | 2540.3541 | e |
| 571 | 760501.1661 | 9273610.5200 | 2540.9502 | e |
| 572 | 760508.4817 | 9273612.2311 | 2541.9194 | e |
| 573 | 760504.0979 | 9273609.5620 | 2541.1820 | b |
| 574 | 760509.0153 | 9273607.9070 | 2542.8989 | r |
| 575 | 760515.9331 | 9273608.0480 | 2543.6959 | r |
| 576 | 760521.7645 | 9273607.7188 | 2543.6080 | r |
| 577 | 760525.5820 | 9273609.0208 | 2543.3897 | b |
| 579 | 760523.8980 | 9273611.7915 | 2543.2401 | e |
| 581 | 760518.3411 | 9273614.8333 | 2542.6949 | b |
| 582 | 760517.0551 | 9273615.4880 | 2542.3105 | r |
| 583 | 760515.6403 | 9273612.6525 | 2542.4266 | e |
| 584 | 760512.1272 | 9273612.5956 | 2541.9845 | e |
| 585 | 760509.5906 | 9273615.3080 | 2541.9902 | b |
| 586 | 760508.4195 | 9273616.0540 | 2542.0000 | r |
| 587 | 760505.5459 | 9273616.0173 | 2541.3019 | r |
| 588 | 760512.0009 | 9273610.7268 | 2541.9840 | b |
| 589 | 760515.4054 | 9273610.8949 | 2542.6098 | b |
| 590 | 760520.6651 | 9273610.0283 | 2542.9702 | b |
| 591 | 760526.2799 | 9273607.6042 | 2543.5295 | r |
| 592 | 760531.2311 | 9273608.7293 | 2543.9625 | b |
| 594 | 760529.7521 | 9273610.9910 | 2543.9425 | e |
| 595 | 760528.7240 | 9273613.2708 | 2543.9843 | b |
| 596 | 760528.2377 | 9273614.3390 | 2544.0192 | r |
| 597 | 760530.1615 | 9273614.1250 | 2544.0302 | r |
| 598 | 760534.7712 | 9273613.5630 | 2544.1131 | r |
| 599 | 760535.0677 | 9273616.0450 | 2543.7000 | r |
| 600 | 760541.1637 | 9273614.7150 | 2544.0000 | r |
| 601 | 760541.0521 | 9273614.1250 | 2545.0010 | r |
| 602 | 760540.4483 | 9273613.3510 | 2544.8614 | b |
| 603 | 760538.1641 | 9273610.3843 | 2544.4326 | e |
| 604 | 760538.3127 | 9273608.8118 | 2544.6289 | b |
| 605 | 760538.2489 | 9273607.5400 | 2544.7035 | r |
| 606 | 760542.6203 | 9273608.0208 | 2544.9415 | r |
| 607 | 760543.9727 | 9273604.9583 | 2547.0805 | r |
| 608 | 760547.4106 | 9273603.6740 | 2548.0021 | r |
| 609 | 760546.2088 | 9273609.0920 | 2544.9871 | r |
| 610 | 760547.6922 | 9273610.1232 | 2545.2179 | b |
| 611 | 760542.6463 | 9273611.1214 | 2544.9467 | e |
| 612 | 760546.5412 | 9273612.4844 | 2545.4511 | e |
| 613 | 760544.6891 | 9273614.4286 | 2545.4820 | b |
| 614 | 760544.5117 | 9273614.9375 | 2545.3870 | r |
| 615 | 760547.1720 | 9273615.8940 | 2546.0072 | r |
| 616 | 760549.7670 | 9273616.6359 | 2546.0458 | b |
| 617 | 760551.5733 | 9273615.4776 | 2546.0621 | e |
| 618 | 760550.3800 | 9273611.3596 | 2545.9563 | b |
| 619 | 760553.4652 | 9273613.7020 | 2546.4443 | b |
| 620 | 760557.6814 | 9273614.5920 | 2546.9181 | r |
| 621 | 760558.6194 | 9273615.4863 | 2546.9460 | r |
| 622 | 760558.5378 | 9273618.7292 | 2546.9645 | b |
| 623 | 760555.4977 | 9273619.2282 | 2546.5173 | e |
| 624 | 760555.4782 | 9273622.8550 | 2546.9243 | b |
| 625 | 760554.9497 | 9273624.4925 | 2546.7948 | r |
| 626 | 760556.3516 | 9273625.8125 | 2547.1788 | b |
| 627 | 760559.0679 | 9273624.8521 | 2547.4575 | e |
| 628 | 760562.1823 | 9273624.5610 | 2547.8481 | b |
| 629 | 760565.5221 | 9273625.4130 | 2549.0679 | r |
| 630 | 760563.5028 | 9273627.1452 | 2547.9436 | r |
| 631 | 760563.2656 | 9273628.8750 | 2547.9802 | b |
| 632 | 760560.9813 | 9273629.3438 | 2547.8973 | e |
| 633 | 760558.8464 | 9273630.9259 | 2547.9711 | b |
| 634 | 760557.6328 | 9273631.9792 | 2548.0083 | r |
| 635 | 760550.8765 | 9273635.6954 | 2545.4462 | r |
| 636 | 760554.2634 | 9273640.5852 | 2546.1722 | r |
| 637 | 760561.0313 | 9273636.1875 | 2548.0409 | b |
| 638 | 760563.4440 | 9273635.1672 | 2548.1257 | e |
| 639 | 760565.7955 | 9273635.1493 | 2548.3642 | b |
| 640 | 760567.3172 | 9273636.4050 | 2548.6368 | r |
| 641 | 760567.5000 | 9273638.3542 | 2548.8196 | r |
| 642 | 760568.6495 | 9273640.6632 | 2548.9726 | b |
| 643 | 760566.0369 | 9273640.7597 | 2548.7323 | e |
| 644 | 760562.9095 | 9273640.2829 | 2548.3244 | b |
| 645 | 760564.9056 | 9273643.7277 | 2548.8519 | b |
| 646 | 760568.1637 | 9273644.1662 | 2548.9957 | e |
| 647 | 760571.2754 | 9273643.9948 | 2549.0067 | b |
| 648 | 760572.6713 | 9273644.1450 | 2549.1075 | r |
| 649 | 760578.5972 | 9273639.1928 | 2551.0124 | r |
| 650 | 760587.5227 | 9273644.8390 | 2552.0000 | r |
| 651 | 760580.3370 | 9273649.5634 | 2550.0000 | r |
| 652 | 760577.5756 | 9273649.8656 | 2549.8478 | b |
| 653 | 760571.5001 | 9273648.2855 | 2549.4669 | e |
| 654 | 760570.0683 | 9273650.5820 | 2549.4136 | b |
| 655 | 760572.4909 | 9273654.4890 | 2550.0006 | r |
| 656 | 760573.6602 | 9273654.0330 | 2550.0070 | b |
| 657 | 760575.3840 | 9273651.9058 | 2549.8859 | e |
| 658 | 760569.4265 | 9273659.8802 | 2547.6902 | r |
| 662 | 760576.4755 | 9273661.2083 | 2549.6325 | r |
| 663 | 760578.2489 | 9273659.2530 | 2550.0723 | r |
| 664 | 760578.8151 | 9273657.1671 | 2550.0570 | b |
| 665 | 760581.8932 | 9273656.2603 | 2550.2734 | e |
| 666 | 760583.6510 | 9273654.5025 | 2550.3071 | b |
| 667 | 760590.9564 | 9273653.1784 | 2551.4504 | r |
| 668 | 760589.3307 | 9273657.4167 | 2550.9612 | r |
| 669 | 760589.9574 | 9273658.4630 | 2550.9876 | b |
| 670 | 760586.6631 | 9273659.1555 | 2550.7963 | e |
| 671 | 760585.3280 | 9273661.0410 | 2550.7686 | b |
| 672 | 760587.5890 | 9273663.6311 | 2551.0706 | r |
| 673 | 760591.1261 | 9273661.8644 | 2551.3055 | e |
| 674 | 760597.0029 | 9273662.7090 | 2551.9205 | b |
| 675 | 760601.1482 | 9273664.5672 | 2551.9732 | b |
| 676 | 760597.6195 | 9273665.8058 | 2551.9587 | e |
| 677 | 760592.8008 | 9273665.9375 | 2551.7937 | b |
| 679 | 760594.4092 | 9273667.8190 | 2552.0048 | r |
| 680 | 760597.3516 | 9273667.7917 | 2551.9911 | b |
| 681 | 760599.6858 | 9273670.3268 | 2552.0095 | r |
| 682 | 760602.9499 | 9273670.8240 | 2552.3539 | b |
| 683 | 760601.9886 | 9273667.9795 | 2552.0519 | e |
| 684 | 760605.0273 | 9273665.7292 | 2552.0600 | b |
| 685 | 760608.0050 | 9273665.2356 | 2552.6128 | r |
| 686 | 760607.9023 | 9273665.9686 | 2552.5953 | b |
| 687 | 760605.6362 | 9273668.7279 | 2552.3688 | e |
| 688 | 760605.7006 | 9273671.2696 | 2552.6228 | b |
| 689 | 760607.9180 | 9273671.2917 | 2552.8310 | b |
| 690 | 760608.1477 | 9273668.7460 | 2552.6662 | e |
| 698 | 760618.9437 | 9273671.6700 | 2553.4934 | E9 |
| 699 | 760612.4123 | 9273671.1160 | 2552.9418 | b |
| 700 | 760612.3737 | 9273671.6875 | 2552.9350 | r |
| 701 | 760614.4466 | 9273671.3960 | 2553.0001 | r |
| 702 | 760615.8372 | 9273669.9375 | 2553.1277 | b |
| 703 | 760611.7341 | 9273668.0723 | 2552.8871 | e |
| 704 | 760611.4108 | 9273665.2030 | 2552.9649 | b |
| 705 | 760612.1290 | 9273663.5466 | 2553.0089 | r |
| 706 | 760615.1713 | 9273662.1880 | 2553.2842 | b |
| 708 | 760614.5312 | 9273666.9068 | 2553.0303 | e |
| 709 | 760617.2673 | 9273665.0633 | 2553.3303 | e |
| 710 | 760619.1086 | 9273667.6900 | 2553.4490 | b |
| 711 | 760621.2609 | 9273668.0696 | 2553.6520 | r |
| 712 | 760626.0026 | 9273667.2500 | 2554.2268 | r |
| 713 | 760623.0995 | 9273665.0280 | 2553.8772 | r |
| 714 | 760621.8371 | 9273665.5450 | 2553.7492 | b |
| 715 | 760619.2491 | 9273663.0881 | 2553.5555 | e |
| 716 | 760621.4713 | 9273659.6254 | 2554.0000 | e |
| 717 | 760617.3451 | 9273658.3333 | 2553.9851 | b |
| 718 | 760617.2018 | 9273657.6458 | 2554.0021 | r |
| 719 | 760614.0117 | 9273655.1358 | 2553.9702 | r |
| 720 | 760618.6426 | 9273651.6361 | 2554.4976 | r |
| 721 | 760619.9066 | 9273652.4330 | 2554.5528 | b |
| 722 | 760622.7432 | 9273655.6773 | 2554.6017 | e |
| 723 | 760624.4096 | 9273659.0142 | 2554.4680 | b |
| 724 | 760628.5482 | 9273661.4484 | 2555.1766 | r |
| 725 | 760631.8601 | 9273662.9870 | 2555.8957 | c |
| 726 | 760631.4678 | 9273652.7130 | 2556.1901 | c |
| 727 | 760626.3085 | 9273654.1790 | 2555.2543 | r |
| 728 | 760624.7725 | 9273653.6130 | 2554.9881 | b |
| 729 | 760623.0843 | 9273651.4648 | 2554.9366 | e |
| 730 | 760620.6037 | 9273650.5960 | 2554.7803 | b |
| 731 | 760619.5538 | 9273649.2080 | 2554.8224 | r |
| 732 | 760623.1978 | 9273648.9986 | 2555.1803 | e |
| 733 | 760625.3897 | 9273648.5910 | 2555.4242 | b |
| 744 | 760614.8259 | 9273676.6654 | 2553.3147 | r |
| 745 | 760598.8801 | 9273678.9254 | 2552.0000 | r |
| 746 | 760582.5027 | 9273684.4082 | 2549.2620 | r |
| 747 | 760587.7809 | 9273691.0863 | 2550.5341 | r |
| 748 | 760573.4106 | 9273692.9890 | 2551.0556 | r |
| 749 | 760585.6209 | 9273703.9259 | 2553.3680 | r |
| 750 | 760604.7719 | 9273678.1271 | 2553.0526 | r |
| 751 | 760623.6861 | 9273638.3932 | 2555.9160 | e |
| 752 | 760626.1301 | 9273638.2477 | 2555.9054 | b |
| 753 | 760626.3919 | 9273634.6042 | 2556.0723 | b |
| 754 | 760623.9175 | 9273633.3654 | 2556.3412 | e |
| 755 | 760622.0726 | 9273631.5834 | 2556.3486 | b |
| 756 | 760619.3674 | 9273627.0775 | 2556.7427 | r |
| 757 | 760622.2268 | 9273622.7680 | 2556.9867 | b |
| 758 | 760624.4008 | 9273622.8681 | 2556.9610 | e |
| 759 | 760627.1375 | 9273622.5221 | 2556.9687 | b |
| 760 | 760628.5296 | 9273621.7400 | 2556.9958 | r |
| 761 | 760628.2578 | 9273617.8423 | 2556.9976 | r |
| 762 | 760627.4474 | 9273616.0766 | 2557.0913 | b |
| 763 | 760624.7193 | 9273615.9510 | 2557.0440 | e |
| 764 | 760621.4965 | 9273613.5052 | 2557.1840 | b |
| 765 | 760621.6827 | 9273617.9635 | 2557.0454 | b |
| 766 | 760619.6196 | 9273619.5320 | 2557.0320 | c |
| 767 | 760619.8186 | 9273612.6230 | 2557.1895 | c |
| 768 | 760620.2658 | 9273604.8220 | 2557.6940 | c |
| 769 | 760620.7594 | 9273597.4160 | 2557.9597 | c |
| 770 | 760623.4462 | 9273599.6870 | 2558.0759 | b |
| 771 | 760625.4251 | 9273600.6207 | 2558.1275 | e |
| 772 | 760628.1760 | 9273602.0163 | 2558.0390 | b |
| 773 | 760628.9297 | 9273604.3958 | 2557.9836 | r |
| 774 | 760630.2063 | 9273606.4280 | 2558.0944 | c |
| 775 | 760630.0653 | 9273611.3409 | 2558.0000 | c |
| 776 | 760628.8472 | 9273611.5060 | 2557.8324 | r |
| 777 | 760627.8924 | 9273607.5854 | 2557.9889 | b |
| 778 | 760625.2008 | 9273605.4924 | 2558.0642 | e |
| 779 | 760628.3057 | 9273597.4420 | 2558.6420 | b |
| 780 | 760625.6531 | 9273595.6670 | 2558.5490 | e |
| 781 | 760623.4311 | 9273593.6581 | 2558.7855 | b |
| 782 | 760623.1829 | 9273588.5790 | 2559.0076 | b |
| 783 | 760625.9899 | 9273588.3513 | 2559.0281 | e |
| 784 | 760628.7644 | 9273587.0140 | 2559.0825 | b |
| 785 | 760629.3023 | 9273593.7110 | 2558.9650 | r |
| 786 | 760630.8802 | 9273596.2500 | 2558.9562 | c |
| 787 | 760630.8083 | 9273591.4026 | 2559.2399 | c |
| 788 | 760629.0039 | 9273580.9583 | 2559.8411 | b |
| 789 | 760626.3360 | 9273580.8355 | 2559.8236 | e |
| 790 | 760623.1160 | 9273579.8477 | 2560.0000 | b |
| 791 | 760624.8997 | 9273555.9167 | 2562.0162 | E10 |
| 792 | 760620.1983 | 9273587.3850 | 2558.5662 | c |
| 793 | 760620.0521 | 9273580.0072 | 2559.5558 | c |
| 794 | 760619.5326 | 9273571.6458 | 2560.0657 | c |
| 795 | 760624.0486 | 9273571.7844 | 2560.4140 | b |
| 796 | 760626.7660 | 9273571.4945 | 2560.4529 | e |
| 797 | 760629.1055 | 9273571.9583 | 2560.3912 | b |
| 798 | 760630.7258 | 9273577.0976 | 2560.2697 | r |
| 799 | 760632.3412 | 9273583.4100 | 2559.9295 | c |
| 800 | 760632.2215 | 9273587.2170 | 2560.0337 | c |
| 801 | 760630.9649 | 9273587.1310 | 2559.5652 | c |
| 802 | 760636.7662 | 9273573.3480 | 2562.0013 | c |
| 803 | 760635.3516 | 9273564.5208 | 2563.1130 | c |
| 804 | 760633.2539 | 9273569.3542 | 2562.0429 | r |
| 805 | 760630.2355 | 9273568.0295 | 2561.0107 | r |
| 806 | 760629.4818 | 9273566.8125 | 2560.9935 | b |
| 807 | 760627.1468 | 9273566.4979 | 2560.9632 | e |
| 808 | 760624.8583 | 9273566.6002 | 2561.0083 | b |
| 809 | 760625.6341 | 9273561.6667 | 2561.6007 | b |
| 810 | 760627.9615 | 9273562.2484 | 2561.4714 | e |
| 811 | 760630.4163 | 9273561.5490 | 2561.6146 | b |
| 812 | 760631.5369 | 9273561.8360 | 2561.6229 | r |
| 813 | 760634.3063 | 9273562.6350 | 2562.7408 | r |
| 814 | 760631.8047 | 9273558.2708 | 2561.9624 | b |
| 815 | 760629.3773 | 9273557.7563 | 2561.9110 | e |
| 817 | 760626.2852 | 9273557.0625 | 2561.9749 | b |
| 818 | 760623.2513 | 9273557.2083 | 2562.0080 | r |
| 819 | 760621.8870 | 9273554.1450 | 2562.0097 | r |
| 820 | 760625.8857 | 9273553.8360 | 2562.0280 | r |
| 821 | 760623.9348 | 9273552.5380 | 2561.9482 | r |
| 822 | 760623.5260 | 9273551.5833 | 2561.8043 | r |
| 823 | 760629.3003 | 9273551.2510 | 2562.1529 | b |
| 824 | 760631.2749 | 9273553.5616 | 2562.0286 | e |
| 825 | 760632.1576 | 9273551.9730 | 2562.3395 | e |
| 826 | 760633.3090 | 9273550.1297 | 2562.6233 | e |
| 827 | 760634.2384 | 9273552.2784 | 2562.4523 | b |
| 828 | 760637.3867 | 9273550.7708 | 2563.0640 | r |
| 829 | 760643.3911 | 9273552.4565 | 2563.5909 | r |
| 830 | 760642.4364 | 9273547.5309 | 2563.3876 | r |
| 831 | 760639.2266 | 9273545.7708 | 2562.9823 | b |
| 832 | 760636.6925 | 9273545.7455 | 2562.9634 | e |
| 833 | 760632.9761 | 9273546.6590 | 2562.8162 | b |
| 834 | 760637.2125 | 9273542.4544 | 2562.9990 | b |
| 835 | 760639.7839 | 9273537.8820 | 2563.1755 | r |
| 836 | 760641.5521 | 9273541.0248 | 2563.4983 | e |
| 837 | 760643.4076 | 9273541.7356 | 2563.7912 | b |
| 838 | 760646.0302 | 9273543.1607 | 2564.4235 | r |
| 839 | 760646.6472 | 9273540.1310 | 2563.9002 | r |
| 840 | 760646.7248 | 9273538.5800 | 2563.8644 | b |
| 841 | 760645.7052 | 9273537.2198 | 2563.7472 | e |
| 842 | 760644.1081 | 9273535.6107 | 2563.5979 | b |
| 843 | 760648.2596 | 9273531.4943 | 2564.0441 | b |
| 844 | 760650.5704 | 9273532.7623 | 2564.2344 | e |
| 845 | 760652.8240 | 9273533.7044 | 2564.4055 | b |
| 846 | 760654.8645 | 9273535.1278 | 2565.0954 | r |
| 847 | 760658.8498 | 9273536.6312 | 2567.1181 | r |
| 848 | 760656.1320 | 9273531.0600 | 2564.9675 | b |
| 849 | 760655.3234 | 9273528.4683 | 2564.8895 | e |
| 850 | 760654.1222 | 9273526.7209 | 2564.7485 | b |
| 851 | 760653.7148 | 9273526.2500 | 2564.6940 | r |
| 852 | 760657.3842 | 9273524.0350 | 2564.9951 | b |
| 853 | 760659.0675 | 9273525.3051 | 2564.9659 | e |
| 854 | 760661.1822 | 9273526.8038 | 2564.9784 | b |
| 855 | 760663.2697 | 9273525.9780 | 2564.9933 | r |
| 856 | 760665.7251 | 9273522.9750 | 2565.5296 | b |
| 857 | 760662.6941 | 9273522.4299 | 2565.3246 | e |
| 858 | 760661.7536 | 9273520.8513 | 2565.2010 | b |
| 859 | 760663.7721 | 9273519.3680 | 2565.3777 | b |
| 860 | 760665.8996 | 9273520.0302 | 2565.5983 | e |
| 861 | 760667.7818 | 9273521.3259 | 2565.8500 | b |
| 862 | 760670.5004 | 9273521.9068 | 2566.5171 | r |
| 863 | 760671.7574 | 9273518.9900 | 2565.9847 | r |
| 864 | 760671.5042 | 9273518.3412 | 2565.9726 | b |
| 865 | 760669.9687 | 9273517.0383 | 2565.9363 | e |
| 866 | 760668.6916 | 9273515.4392 | 2565.8060 | b |
| 867 | 760673.9128 | 9273516.608 | 2565.9481 | bm04 |
| 868 | 760672.6749 | 9273515.0486 | 2565.9668 | a |
| 869 | 760672.7612 | 9273512.2896 | 2565.9962 | b |
| 870 | 760675.9041 | 9273512.6743 | 2565.9937 | e |
| 871 | 760679.9744 | 9273512.1370 | 2566.0083 | b |
| 872 | 760681.1061 | 9273512.6750 | 2566.0000 | r |
| 873 | 760682.4337 | 9273512.2592 | 2566.3878 | r |
| 874 | 760688.3682 | 9273513.8270 | 2567.9906 | c |
| 875 | 760682.6921 | 9273510.2050 | 2566.1776 | b |
| 876 | 760681.4886 | 9273508.5682 | 2566.2567 | e |
| 877 | 760678.3548 | 9273507.9237 | 2566.0287 | b |
| 878 | 760681.9993 | 9273505.1757 | 2566.5350 | b |
| 879 | 760684.0509 | 9273506.6842 | 2566.5528 | e |
| 880 | 760687.7943 | 9273506.8600 | 2566.9684 | b |
| 881 | 760689.8658 | 9273506.1011 | 2566.9798 | r |
| 882 | 760694.6821 | 9273502.0836 | 2567.4034 | r |
| 883 | 760693.5742 | 9273501.9583 | 2567.2565 | b |
| 884 | 760692.1694 | 9273500.7149 | 2567.3318 | e |
| 885 | 760690.1756 | 9273499.1570 | 2567.4199 | b |
| 886 | 760691.0054 | 9273497.5165 | 2567.6745 | r |
| 887 | 760691.6533 | 9273497.9360 | 2567.6711 | b |
| 888 | 760694.0548 | 9273499.0645 | 2567.6853 | e |
| 889 | 760696.4806 | 9273499.0645 | 2567.9487 | b |
| 890 | 760697.9883 | 9273501.1250 | 2568.0412 | r |
| 891 | 760700.5075 | 9273504.8730 | 2568.2044 | c |
| 892 | 760703.7031 | 9273498.8125 | 2568.9694 | c |
| 893 | 760699.5143 | 9273498.1667 | 2568.0726 | r |
| 894 | 760703.0526 | 9273496.6790 | 2569.7891 | bm05 |
| 895 | 760700.7310 | 9273494.8890 | 2568.0337 | b |
| 896 | 760697.2335 | 9273495.6410 | 2567.9521 | e |
| 897 | 760696.1320 | 9273493.5800 | 2567.9833 | b |
| 898 | 760697.0469 | 9273492.1458 | 2567.9948 | r |
| 899 | 760697.9381 | 9273491.5114 | 2568.0178 | b |
| 900 | 760699.7347 | 9273492.0368 | 2568.2405 | e |
| 901 | 760702.8568 | 9273491.5630 | 2568.7359 | b |
| 924 | 760707.7681 | 9273486.1780 | 2570.0735 | E11 |
| 928 | 760698.9972 | 9273488.4074 | 2568.1348 | b |
| 929 | 760696.9565 | 9273487.4980 | 2568.0134 | c |
| 930 | 760701.7131 | 9273488.1395 | 2568.5083 | e |
| 931 | 760704.3654 | 9273488.1575 | 2568.8699 | b |
| 932 | 760706.5176 | 9273486.9620 | 2569.7065 | r |
| 933 | 760709.4167 | 9273487.4375 | 2570.5742 | r |
| 934 | 760709.7135 | 9273484.2708 | 2570.5727 | r |
| 935 | 760707.3878 | 9273484.5070 | 2569.8661 | r |
| 936 | 760705.1497 | 9273485.6380 | 2568.9920 | b |
| 937 | 760702.7078 | 9273485.4716 | 2568.7599 | e |
| 938 | 760703.3313 | 9273483.2761 | 2568.9419 | e |
| 939 | 760700.3628 | 9273481.9744 | 2568.7971 | b |
| 940 | 760697.7852 | 9273481.6042 | 2568.7467 | c |
| 941 | 760699.6309 | 9273478.8910 | 2568.9971 | r |
| 942 | 760700.9224 | 9273478.9671 | 2569.0598 | b |
| 943 | 760704.0685 | 9273479.2281 | 2569.3112 | e |
| 944 | 760706.1461 | 9273479.8060 | 2569.3064 | b |
| 945 | 760707.3158 | 9273476.6370 | 2569.8330 | r |
| 946 | 760712.1442 | 9273475.6787 | 2571.0140 | c |
| 947 | 760708.5788 | 9273474.6590 | 2570.0848 | r |
| 948 | 760706.8516 | 9273474.0000 | 2569.9299 | b |
| 949 | 760704.6199 | 9273472.5810 | 2569.6521 | e |
| 950 | 760702.1795 | 9273472.2170 | 2569.4019 | b |
| 951 | 760699.2370 | 9273469.7500 | 2569.0351 | r |
| 952 | 760701.6992 | 9273468.7708 | 2569.1629 | r |
| 953 | 760702.8048 | 9273466.3325 | 2569.6211 | b |
| 954 | 760705.1520 | 9273466.1672 | 2570.0305 | e |
| 955 | 760707.5525 | 9273464.7060 | 2570.4339 | b |
| 956 | 760708.7458 | 9273462.5750 | 2570.7883 | r |
| 957 | 760708.3685 | 9273462.3958 | 2570.7472 | r |
| 958 | 760707.8645 | 9273460.8247 | 2570.7446 | b |
| 959 | 760705.6108 | 9273460.6377 | 2570.4451 | e |
| 960 | 760703.4300 | 9273460.4480 | 2570.2001 | b |
| 961 | 760702.2516 | 9273461.5300 | 2569.9453 | r |
| 962 | 760699.6107 | 9273462.1875 | 2569.4195 | c |
| 963 | 760700.2237 | 9273451.6150 | 2570.7780 | c |
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| 965 | 760706.1557 | 9273452.6824 | 2571.2997 | e |
| 966 | 760708.2569 | 9273451.5650 | 2571.6282 | b |
| 967 | 760710.9136 | 9273450.8191 | 2571.9529 | r |
| 968 | 760708.0497 | 9273448.3681 | 2571.8819 | b |
| 969 | 760705.9135 | 9273448.2019 | 2571.6474 | e |
| 970 | 760703.4548 | 9273447.9596 | 2571.4555 | b |
| 976 | 760708.5638 | 9273445.9792 | 2572.4186 | E12 |
| 977 | 760699.9671 | 9273446.9440 | 2571.4393 | c |
| 978 | 760701.9453 | 9273446.6250 | 2571.6185 | r |
| 979 | 760703.1705 | 9273444.9328 | 2571.9384 | b |
| 980 | 760705.4148 | 9273445.0199 | 2571.9617 | e |
| 981 | 760707.4385 | 9273444.0623 | 2572.4267 | b |
| 983 | 760712.4188 | 9273444.5360 | 2574.0236 | r |
| 984 | 760709.6713 | 9273443.4710 | 2573.3488 | r |
| 985 | 760711.3417 | 9273445.1970 | 2573.8241 | r |
| 986 | 760714.7529 | 9273447.9540 | 2573.6869 | r |
| 987 | 760715.0195 | 9273449.2708 | 2573.4700 | r |
| 988 | 760720.2913 | 9273451.4030 | 2575.0270 | r |
| 989 | 760716.7302 | 9273454.1840 | 2572.1111 | c |
| 990 | 760714.6209 | 9273456.4200 | 2571.7889 | c |
| 991 | 760714.1634 | 9273460.7322 | 2571.8430 | c |
| 992 | 760713.0104 | 9273459.1042 | 2571.6512 | r |
| 993 | 760706.6264 | 9273440.4680 | 2572.9176 | b |
| 994 | 760704.5480 | 9273441.5517 | 2572.5991 | e |
| 995 | 760702.3458 | 9273441.2430 | 2572.5619 | b |
| 996 | 760700.4748 | 9273438.2210 | 2573.0000 | r |
| 997 | 760701.5999 | 9273438.3930 | 2572.9990 | b |
| 998 | 760703.3163 | 9273437.8178 | 2572.9961 | e |
| 999 | 760705.0953 | 9273436.3690 | 2572.9982 | b |
| 1000 | 760706.1136 | 9273430.7000 | 2573.4648 | c |
| 1001 | 760711.4180 | 9273434.4167 | 2573.9463 | c |
| 1002 | 760719.3933 | 9273442.2700 | 2575.0358 | c |
| 1003 | 760724.3117 | 9273445.6170 | 2575.8858 | c |
| 1004 | 760725.1568 | 9273446.7920 | 2576.0114 | r |
| 1005 | 760718.5857 | 9273443.7439 | 2574.6979 | r |
| 1006 | 760710.4470 | 9273437.0722 | 2573.6543 | r |
| 1007 | 760704.5234 | 9273431.5833 | 2573.1913 | b |
| 1008 | 760701.2460 | 9273431.6403 | 2573.0670 | e |
| 1009 | 760697.7154 | 9273428.9700 | 2573.0557 | b |
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| 1012 | 760697.0296 | 9273419.0591 | 2573.4332 | e |
| 1013 | 760699.7344 | 9273418.2708 | 2573.6965 | b |
| 1014 | 760698.4492 | 9273413.5833 | 2573.7452 | b |
| 1015 | 760695.1910 | 9273413.5732 | 2573.5182 | e |
| 1016 | 760691.7011 | 9273412.1051 | 2573.3687 | b |
| 1017 | 760688.4661 | 9273405.2500 | 2573.7624 | E13 |
| 1018 | 760700.6088 | 9273415.0230 | 2573.9090 | c |
| 1019 | 760698.9752 | 9273409.8070 | 2573.9439 | c |
| 1020 | 760696.8884 | 9273403.5509 | 2574.1648 | c |
| 1021 | 760695.2263 | 9273403.5830 | 2573.9916 | r |
| 1022 | 760694.4063 | 9273403.9530 | 2573.9713 | b |
| 1023 | 760692.0320 | 9273404.1471 | 2573.9797 | e |
| 1024 | 760688.7139 | 9273403.3520 | 2574.0000 | b |
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| 1026 | 760684.9922 | 9273403.0208 | 2573.3137 | r |
| 1027 | 760684.2617 | 9273404.9375 | 2573.0655 | r |
| 1028 | 760685.4961 | 9273406.7917 | 2572.9946 | r |
| 1029 | 760686.9079 | 9273407.9960 | 2573.2411 | c |
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| 1031 | 760682.4940 | 9273406.9310 | 2572.8521 | r |
| 1032 | 760683.1241 | 9273402.2410 | 2573.1766 | r |
| 1033 | 760677.8138 | 9273401.3125 | 2572.8207 | r |
| 1034 | 760680.6236 | 9273398.0210 | 2573.1509 | r |
| 1035 | 760683.3384 | 9273396.8850 | 2573.6425 | r |
| 1036 | 760677.4453 | 9273396.4360 | 2573.2560 | r |
| 1037 | 760677.1549 | 9273395.4340 | 2573.4024 | c |
| 1038 | 760680.6342 | 9273395.0060 | 2573.6929 | c |
| 1039 | 760682.5867 | 9273392.4550 | 2574.0365 | c |
| 1040 | 760686.6716 | 9273398.3990 | 2574.0000 | b |
| 1041 | 760689.7588 | 9273397.3644 | 2574.1512 | e |
| 1042 | 760692.0571 | 9273395.0889 | 2574.5415 | b |
| 1043 | 760689.9403 | 9273387.0769 | 2574.7031 | b |
| 1044 | 760686.2280 | 9273386.8291 | 2574.5391 | e |
| 1045 | 760682.4219 | 9273383.9583 | 2574.9022 | b |
| 1046 | 760680.7533 | 9273381.3453 | 2575.0002 | r |
| 1047 | 760681.4308 | 9273381.1280 | 2575.0004 | b |
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| 1051 | 760683.0277 | 9273375.6641 | 2575.0562 | e |
| 1052 | 760680.7922 | 9273375.9392 | 2575.0018 | b |
| 1054 | 760685.9358 | 9273371.1210 | 2575.6794 | r |
| 1055 | 760684.5612 | 9273370.4730 | 2575.6879 | b |
| 1056 | 760687.2792 | 9273369.3300 | 2575.9054 | c |
| 1057 | 760685.6393 | 9273368.9583 | 2575.8721 | r |
| 1058 | 760682.6067 | 9273372.6376 | 2575.4004 | e |
| 1059 | 760680.3429 | 9273372.2880 | 2575.3466 | b |
| 1060 | 760679.0098 | 9273369.1519 | 2575.5982 | r |
| 1061 | 760680.0982 | 9273368.8488 | 2575.6668 | b |
| 1062 | 760682.3680 | 9273368.6663 | 2575.7661 | e |
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| 1064 | 760685.2904 | 9273366.0625 | 2575.9870 | r |
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| 1066 | 760684.1525 | 9273364.7260 | 2575.9870 | b |
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| 1074 | 760682.7108 | 9273355.3171 | 2575.9976 | e |
| 1075 | 760680.4414 | 9273353.9167 | 2576.0089 | b |
| 1076 | 760679.7085 | 9273351.7564 | 2576.0311 | r |
| 1077 | 760681.1341 | 9273349.3330 | 2576.0436 | b |
| 1078 | 760683.5633 | 9273349.8426 | 2576.0617 | e |
| 1079 | 760686.5667 | 9273349.7572 | 2576.2431 | b |
| 1080 | 760687.8418 | 9273348.0322 | 2576.4620 | r |
| 1081 | 760687.0962 | 9273347.0290 | 2576.4862 | b |
| 1082 | 760684.5201 | 9273346.0014 | 2576.3364 | e |
| 1083 | 760682.7929 | 9273344.4860 | 2576.2519 | b |
| 1084 | 760682.5148 | 9273340.8870 | 2576.4600 | r |
| 1085 | 760684.2771 | 9273341.2150 | 2576.5436 | b |
| 1086 | 760686.2959 | 9273340.8635 | 2576.7189 | e |
| 1087 | 760688.9714 | 9273341.6574 | 2576.8894 | b |
| 1088 | 760689.5387 | 9273340.3110 | 2576.9685 | b |
| 1089 | 760687.3312 | 9273338.4725 | 2576.9385 | e |
| 1090 | 760686.0665 | 9273336.9405 | 2576.9677 | b |
| 1091 | 760685.2917 | 9273330.9337 | 2576.9539 | E14 |
| 1092 | 760681.4766 | 9273388.5417 | 2574.3429 | c |
| 1093 | 760680.0599 | 9273388.9167 | 2574.2706 | c |
| 1094 | 760679.2177 | 9273385.5370 | 2574.5598 | c |
| 1095 | 760687.1015 | 9273358.0800 | 2576.1745 | c |
| 1096 | 760689.1242 | 9273348.3750 | 2576.5810 | c |
| 1097 | 760691.2879 | 9273336.7410 | 2576.9763 | b |
| 1098 | 760688.7253 | 9273335.6780 | 2576.9705 | e |
| 1099 | 760686.7500 | 9273335.1875 | 2576.9971 | b |
| 1100 | 760683.6297 | 9273336.0520 | 2576.8567 | r |
| 1101 | 760679.6133 | 9273332.1250 | 2575.7234 | r |
| 1102 | 760675.6370 | 9273332.8800 | 2575.4070 | r |
| 1103 | 760676.3828 | 9273328.5208 | 2575.0450 | r |
| 1104 | 760678.8203 | 9273326.5000 | 2575.0000 | r |
| 1105 | 760681.4351 | 9273325.6650 | 2575.5377 | r |
| 1106 | 760686.3634 | 9273325.6030 | 2576.8221 | r |
| 1107 | 760689.5566 | 9273329.8828 | 2577.0332 | b |
| 1108 | 760691.5577 | 9273330.9938 | 2577.0009 | e |
| 1109 | 760693.3667 | 9273332.8560 | 2576.9797 | b |
| 1110 | 760694.0990 | 9273332.5625 | 2576.9887 | r |
| 1111 | 760695.1810 | 9273329.2708 | 2577.1464 | b |
| 1112 | 760692.8860 | 9273329.1220 | 2577.0514 | e |
| 1113 | 760691.3194 | 9273327.5553 | 2577.0717 | e |
| 1114 | 760691.8708 | 9273326.9220 | 2577.0849 | b |
| 1115 | 760695.6432 | 9273325.6520 | 2577.4687 | e |
| 1116 | 760698.2730 | 9273325.6870 | 2577.7528 | b |
| 1117 | 760699.9805 | 9273324.3542 | 2577.8346 | r |
| 1118 | 760700.1739 | 9273323.0400 | 2577.8087 | b |
| 1119 | 760698.1204 | 9273322.6089 | 2577.6049 | e |
| 1120 | 760696.5898 | 9273320.7708 | 2577.4537 | b |
| 1121 | 760695.7030 | 9273318.0460 | 2577.3808 | r |
| 1122 | 760697.9763 | 9273317.7019 | 2577.6875 | r |
| 1123 | 760696.5167 | 9273313.1110 | 2577.1790 | r |
| 1124 | 760699.6914 | 9273313.1875 | 2577.6411 | r |
| 1125 | 760704.4388 | 9273313.2640 | 2578.2215 | b |
| 1126 | 760705.1457 | 9273314.5279 | 2578.1721 | e |
| 1127 | 760707.2421 | 9273316.1389 | 2578.1886 | b |
| 1128 | 760709.9983 | 9273314.8890 | 2578.5802 | r |
| 1129 | 760709.9184 | 9273314.3780 | 2578.5935 | b |
| 1130 | 760708.0202 | 9273312.6293 | 2578.6849 | e |
| 1131 | 760707.2793 | 9273311.4199 | 2578.7516 | b |
| 1132 | 760709.7392 | 9273309.3370 | 2579.0450 | r |
| 1133 | 760709.9088 | 9273309.6570 | 2579.0342 | b |
| 1134 | 760710.7090 | 9273311.5039 | 2578.9179 | e |
| 1135 | 760712.1799 | 9273313.1903 | 2578.9371 | b |
| 1136 | 760713.4519 | 9273313.0600 | 2578.9534 | r |
| 1137 | 760713.4401 | 9273312.5130 | 2578.9691 | b |
| 1138 | 760712.9180 | 9273310.9549 | 2579.1106 | e |
| 1139 | 760713.2093 | 9273307.8108 | 2579.3184 | b |
| 1140 | 760713.8165 | 9273306.8840 | 2579.4041 | r |
| 1141 | 760713.4517 | 9273306.4010 | 2579.3094 | r |
| 1142 | 760709.9180 | 9273303.7708 | 2578.4216 | r |
| 1143 | 760717.2364 | 9273307.0600 | 2579.9134 | b |
| 1144 | 760716.9997 | 9273310.7259 | 2579.4360 | e |
| 1145 | 760715.2834 | 9273312.1470 | 2579.0727 | b |
| 1146 | 760716.6361 | 9273312.8398 | 2579.2061 | r |
| 1147 | 760717.1605 | 9273312.2520 | 2579.3355 | b |
| 1151 | 760721.2057 | 9273305.6560 | 2580.0457 | E15 |
| 1152 | 760717.9896 | 9273306.1458 | 2580.0067 | r |
| 1153 | 760719.8901 | 9273307.7484 | 2580.0143 | b |
| 1154 | 760719.2361 | 9273311.0203 | 2579.7614 | e |
| 1155 | 760719.3225 | 9273312.5810 | 2579.6658 | b |
| 1156 | 760720.6785 | 9273313.6087 | 2579.9758 | r |
| 1157 | 760721.5321 | 9273313.6860 | 2580.0127 | b |
| 1158 | 760723.4548 | 9273312.4595 | 2580.3049 | e |
| 1159 | 760725.1833 | 9273309.8775 | 2580.2250 | b |
| 1160 | 760727.6103 | 9273308.7603 | 2580.3145 | r |
| 1161 | 760729.1590 | 9273309.3659 | 2580.4884 | r |
| 1162 | 760726.6385 | 9273310.6620 | 2580.5122 | b |
| 1163 | 760725.1827 | 9273313.4460 | 2580.5213 | e |
| 1164 | 760723.5669 | 9273315.1639 | 2580.2562 | b |
| 1165 | 760725.9765 | 9273317.8900 | 2580.9488 | r |
| 1166 | 760726.1015 | 9273317.7650 | 2580.9426 | b |
| 1167 | 760728.4917 | 9273316.2646 | 2581.1156 | e |
| 1168 | 760731.4609 | 9273314.9375 | 2581.4687 | b |
| 1169 | 760733.7222 | 9273313.3280 | 2581.3976 | r |
| 1170 | 760735.6891 | 9273313.1170 | 2581.3938 | c |
| 1171 | 760735.0924 | 9273317.3003 | 2582.0000 | r |
| 1172 | 760733.1942 | 9273319.4250 | 2581.9488 | b |
| 1173 | 760730.5869 | 9273319.1222 | 2581.5667 | e |
| 1174 | 760727.6933 | 9273320.2080 | 2581.1400 | b |
| 1175 | 760730.3654 | 9273325.4580 | 2582.1330 | b |
| 1176 | 760732.9179 | 9273324.4300 | 2582.2902 | e |
| 1177 | 760734.8626 | 9273323.5494 | 2582.3738 | b |
| 1178 | 760736.3852 | 9273325.0720 | 2582.6677 | r |
| 1179 | 760738.5173 | 9273326.6930 | 2583.0005 | c |
| 1180 | 760740.8680 | 9273332.3700 | 2583.0145 | c |
| 1181 | 760738.5324 | 9273333.0800 | 2583.0059 | b |
| 1182 | 760736.5995 | 9273333.5715 | 2582.9923 | e |
| 1183 | 760734.1359 | 9273334.5845 | 2583.0001 | b |
| 1184 | 760734.7237 | 9273337.4010 | 2583.0142 | r |
| 1185 | 760735.2714 | 9273336.9010 | 2583.0164 | b |
| 1187 | 760738.0611 | 9273337.2007 | 2583.0340 | e |
| 1188 | 760740.6423 | 9273336.9203 | 2583.0097 | b |
| 1189 | 760741.9043 | 9273337.2370 | 2582.9888 | r |
| 1190 | 760734.4987 | 9273341.7083 | 2582.8399 | c |
| 1191 | 760736.1469 | 9273341.4130 | 2582.9812 | r |
| 1192 | 760739.1483 | 9273345.5060 | 2583.0431 | b |
| 1193 | 760741.5691 | 9273345.9109 | 2583.1977 | e |
| 1194 | 760745.3047 | 9273345.8730 | 2583.4991 | b |
| 1195 | 760749.1680 | 9273350.9375 | 2583.9750 | r |
| 1196 | 760749.8771 | 9273356.3570 | 2584.1288 | b |
| 1197 | 760746.7533 | 9273358.7834 | 2584.0413 | e |
| 1198 | 760745.2337 | 9273359.9470 | 2584.0084 | b |
| 1199 | 760745.7845 | 9273364.4150 | 2584.0074 | r |
| 1200 | 760745.0000 | 9273369.3542 | 2583.7332 | c |
| 1201 | 760749.0202 | 9273368.3560 | 2584.5855 | b |
| 1202 | 760750.7349 | 9273368.6696 | 2584.7753 | e |
| 1203 | 760753.9343 | 9273369.5410 | 2585.1292 | b |
| 1204 | 760756.9090 | 9273365.5370 | 2585.3032 | c |
| 1205 | 760759.1650 | 9273377.6930 | 2585.9711 | c |
| 1206 | 760756.2295 | 9273375.6101 | 2585.6735 | b |
| 1207 | 760753.7480 | 9273376.1512 | 2585.4092 | e |
| 1208 | 760752.4595 | 9273379.2220 | 2585.3405 | b |
| 1209 | 760753.1393 | 9273381.3125 | 2585.6323 | b |
| 1210 | 760755.5432 | 9273380.6085 | 2585.7319 | e |
| 1211 | 760758.0158 | 9273381.8480 | 2585.9878 | b |
| 1212 | 760759.7995 | 9273386.3641 | 2586.2884 | b |
| 1213 | 760758.1317 | 9273387.0358 | 2586.2853 | e |
| 1214 | 760756.4004 | 9273388.6210 | 2586.3401 | b |
| 1215 | 760757.9883 | 9273394.0000 | 2586.7405 | r |
| 1216 | 760759.0242 | 9273395.6610 | 2586.8882 | b |
| 1217 | 760761.2452 | 9273394.7665 | 2586.8896 | e |
| 1218 | 760762.8114 | 9273392.9590 | 2586.8276 | b |
| 1219 | 760766.4003 | 9273400.4114 | 2587.3868 | b |
| 1220 | 760763.9540 | 9273401.4926 | 2587.2469 | e |
| 1221 | 760760.9268 | 9273400.4380 | 2587.0887 | b |
| 1222 | 760757.7148 | 9273399.3125 | 2586.7763 | c |
| 1223 | 760762.8307 | 9273405.2083 | 2587.2294 | b |
| 1224 | 760765.1887 | 9273404.5584 | 2587.4615 | e |
| 1225 | 760767.6949 | 9273403.9300 | 2587.7088 | b |
| 1226 | 760771.0769 | 9273412.5560 | 2588.2549 | b |
| 1227 | 760769.0298 | 9273414.0956 | 2588.1803 | e |
| 1228 | 760767.3788 | 9273415.0400 | 2588.0386 | b |
| 1229 | 760773.7578 | 9273417.8076 | 2588.6599 | r |
| 1230 | 760774.2893 | 9273421.1227 | 2588.7689 | b |
| 1231 | 760772.1989 | 9273421.9646 | 2588.5946 | e |
| 1232 | 760770.6012 | 9273423.3219 | 2588.5384 | b |
| 1233 | 760770.8983 | 9273426.1260 | 2588.9223 | r |
| 1234 | 760771.6615 | 9273426.0470 | 2588.9771 | b |
| 1235 | 760773.5854 | 9273425.4072 | 2588.9253 | e |
| 1236 | 760776.7236 | 9273427.1457 | 2589.0160 | b |
| 1237 | 760778.0286 | 9273428.7708 | 2589.0200 | r |
| 1238 | 760780.2386 | 9273431.9590 | 2589.6957 | r |
| 1239 | 760778.9409 | 9273432.2816 | 2589.5047 | b |
| 1240 | 760776.7150 | 9273433.1781 | 2589.3740 | e |
| 1241 | 760774.6633 | 9273434.6870 | 2589.1906 | b |
| 1242 | 760774.8008 | 9273439.4370 | 2589.5026 | r |
| 1243 | 760776.9766 | 9273444.0417 | 2589.8666 | r |
| 1244 | 760778.5905 | 9273443.3063 | 2590.1962 | b |
| 1245 | 760780.4865 | 9273442.5427 | 2590.4856 | e |
| 1246 | 760783.5678 | 9273442.9770 | 2590.9052 | b |
| 1247 | 760785.9081 | 9273443.1429 | 2591.3668 | r |
| 1248 | 760784.0590 | 9273444.7128 | 2590.9456 | b |
| 1249 | 760781.4730 | 9273444.9920 | 2590.6377 | e |
| 1250 | 760779.7135 | 9273445.7708 | 2590.3443 | b |
| 1251 | 760778.5611 | 9273446.0766 | 2590.0000 | r |
| 1252 | 760779.3038 | 9273447.7312 | 2590.0000 | r |
| 1253 | 760780.7670 | 9273449.9350 | 2590.5880 | r |
| 1254 | 760782.2337 | 9273451.0670 | 2591.1981 | b |
| 1255 | 760784.3401 | 9273450.8394 | 2591.3762 | e |
| 1256 | 760786.5333 | 9273449.7968 | 2591.4235 | b |
| 1257 | 760786.3001 | 9273459.0680 | 2592.5374 | E16 |
| 1258 | 760761.0854 | 9273381.8510 | 2586.4543 | c |
| 1259 | 760764.3544 | 9273391.4160 | 2586.9318 | c |
| 1260 | 760762.7502 | 9273413.8600 | 2587.2522 | c |
| 1261 | 760787.1420 | 9273441.1430 | 2592.1466 | c |
| 1262 | 760791.8309 | 9273450.7910 | 2592.5514 | c |
| 1263 | 760788.9206 | 9273452.7708 | 2592.0583 | b |
| 1264 | 760787.1083 | 9273454.0087 | 2592.0951 | e |
| 1265 | 760785.1332 | 9273456.5990 | 2592.1465 | b |
| 1266 | 760784.1845 | 9273458.2990 | 2592.0913 | r |
| 1267 | 760777.9437 | 9273459.8050 | 2588.8685 | r |
| 1268 | 760774.0018 | 9273464.9420 | 2587.8424 | r |
| 1269 | 760778.9575 | 9273468.2220 | 2589.5828 | r |
| 1270 | 760787.3037 | 9273465.3780 | 2593.0103 | c |
| 1271 | 760795.8733 | 9273466.6790 | 2593.1304 | c |
| 1272 | 760796.3450 | 9273465.0510 | 2593.2558 | r |
| 1273 | 760788.7479 | 9273462.1560 | 2593.0129 | r |
| 1274 | 760789.8745 | 9273461.3280 | 2593.0025 | b |
| 1275 | 760792.6527 | 9273457.5464 | 2592.8314 | e |
| 1276 | 760793.6315 | 9273455.4375 | 2592.7951 | b |
| 1277 | 760798.5992 | 9273456.3960 | 2593.4712 | b |
| 1278 | 760797.6260 | 9273458.8598 | 2593.4045 | e |
| 1279 | 760794.6902 | 9273462.9947 | 2593.1479 | b |
| 1280 | 760796.6218 | 9273463.0170 | 2593.3766 | b |
| 1281 | 760800.3812 | 9273458.9971 | 2593.7229 | e |
| 1282 | 760802.7394 | 9273455.8417 | 2594.0067 | b |
| 1283 | 760804.2500 | 9273455.2917 | 2594.1279 | b |
| 1284 | 760807.4199 | 9273453.7754 | 2594.6020 | b |
| 1285 | 760807.8961 | 9273457.2590 | 2594.5179 | e |
| 1286 | 760803.6391 | 9273458.6397 | 2594.0608 | e |
| 1287 | 760804.2706 | 9273460.7950 | 2594.0617 | b |
| 1288 | 760808.9654 | 9273458.7033 | 2594.5674 | b |
| 1289 | 760813.4352 | 9273456.1660 | 2595.1538 | b |
| 1290 | 760812.6200 | 9273454.3654 | 2595.1370 | e |
| 1291 | 760811.0755 | 9273451.7917 | 2595.0265 | b |
| 1292 | 760813.1917 | 9273449.5751 | 2595.8010 | r |
| 1293 | 760817.4471 | 9273447.7350 | 2595.9577 | b |
| 1294 | 760818.3230 | 9273450.5011 | 2595.9140 | e |
| 1295 | 760820.1850 | 9273451.3940 | 2596.0000 | b |
| 1296 | 760825.9842 | 9273448.2757 | 2596.3929 | r |
| 1297 | 760825.8723 | 9273447.5331 | 2596.5165 | b |
| 1298 | 760824.8752 | 9273446.0615 | 2596.5681 | e |
| 1299 | 760822.7175 | 9273443.7991 | 2596.6005 | b |
| 1300 | 760827.5856 | 9273440.6530 | 2597.0811 | b |
| 1301 | 760829.8982 | 9273442.6580 | 2597.0383 | e |
| 1302 | 760832.2888 | 9273443.1772 | 2597.0990 | b |
| 1303 | 760835.7358 | 9273440.8372 | 2597.4118 | b |
| 1304 | 760834.9421 | 9273439.2403 | 2597.5044 | e |
| 1305 | 760833.0618 | 9273437.3095 | 2597.6611 | b |
| 1306 | 760831.4379 | 9273433.7240 | 2598.1027 | c |
| 1307 | 760822.5640 | 9273438.2650 | 2597.9465 | c |
| 1308 | 760828.7360 | 9273438.0720 | 2597.4512 | r |
| 1309 | 760833.8642 | 9273435.2846 | 2597.8623 | r |
| 1310 | 760834.6927 | 9273436.2292 | 2597.7635 | b |
| 1312 | 760838.1111 | 9273437.0930 | 2597.7857 | e |
| 1313 | 760842.6197 | 9273436.1640 | 2598.0066 | b |
| 1314 | 760842.2072 | 9273434.3175 | 2598.1691 | e |
| 1315 | 760841.2995 | 9273431.6042 | 2598.3909 | b |
| 1316 | 760842.8300 | 9273428.3650 | 2598.9997 | r |
| 1317 | 760847.8086 | 9273427.0900 | 2598.9931 | r |
| 1318 | 760849.8695 | 9273427.0320 | 2598.9938 | b |
| 1319 | 760849.7826 | 9273429.6456 | 2598.9911 | e |
| 1320 | 760847.8155 | 9273433.1610 | 2598.6769 | b |
| 1321 | 760854.2476 | 9273431.0410 | 2599.0058 | r |
| 1322 | 760855.6466 | 9273430.9810 | 2598.9964 | r |
| 1323 | 760857.8287 | 9273429.2750 | 2599.0511 | b |
| 1324 | 760855.4002 | 9273427.3477 | 2599.0884 | e |
| 1325 | 760855.4573 | 9273424.8882 | 2599.3108 | b |
| 1326 | 760858.8532 | 9273422.9380 | 2599.7162 | r |
| 1327 | 760863.6905 | 9273422.2150 | 2599.8066 | r |
| 1328 | 760863.9580 | 9273423.0616 | 2599.7658 | b |
| 1329 | 760863.2436 | 9273425.5927 | 2599.5046 | e |
| 1330 | 760863.8259 | 9273428.1910 | 2599.2455 | b |
| 1331 | 760867.0869 | 9273428.4038 | 2599.5464 | r |
| 1332 | 760868.0990 | 9273427.9100 | 2599.7727 | b |
| 1333 | 760868.4510 | 9273425.2686 | 2599.9430 | e |
| 1334 | 760869.0511 | 9273423.2052 | 2599.9226 | b |
| 1335 | 760874.8625 | 9273423.5890 | 2600.0086 | b |
| 1336 | 760873.9821 | 9273425.6106 | 2600.0050 | e |
| 1337 | 760873.1875 | 9273428.3125 | 2599.9845 | b |
| 1338 | 760875.7625 | 9273429.4440 | 2600.0535 | r |
| 1339 | 760875.6854 | 9273430.0270 | 2600.0528 | r |
| 1340 | 760879.6105 | 9273421.4480 | 2600.7627 | E17 |
| 1341 | 760877.9744 | 9273424.1642 | 2600.0792 | b |
| 1342 | 760878.0244 | 9273426.3743 | 2600.2372 | e |
| 1343 | 760877.2257 | 9273428.8120 | 2600.2131 | b |
| 1344 | 760880.0354 | 9273430.2531 | 2600.4405 | r |
| 1345 | 760880.4031 | 9273429.7830 | 2600.4804 | b |
| 1346 | 760881.9052 | 9273427.4819 | 2600.6780 | e |
| 1347 | 760882.0537 | 9273425.5805 | 2600.7060 | b |
| 1348 | 760883.7520 | 9273424.7510 | 2600.8764 | r |
| 1349 | 760884.3119 | 9273425.8872 | 2600.9387 | r |
| 1350 | 760886.0913 | 9273425.6762 | 2600.9979 | r |
| 1351 | 760888.6729 | 9273428.0410 | 2600.9866 | b |
| 1352 | 760887.2005 | 9273429.6860 | 2600.9849 | e |
| 1353 | 760885.2292 | 9273431.9583 | 2600.8842 | b |
| 1354 | 760882.1133 | 9273431.9583 | 2600.5958 | r |
| 1355 | 760881.5576 | 9273433.0600 | 2600.4980 | c |
| 1356 | 760889.5568 | 9273437.1070 | 2600.8858 | c |
| 1357 | 760890.1235 | 9273434.7250 | 2601.0194 | r |
| 1358 | 760888.6716 | 9273433.6293 | 2601.0137 | b |
| 1360 | 760892.3551 | 9273429.9450 | 2601.0066 | b |
| 1361 | 760893.4983 | 9273429.6860 | 2600.9982 | r |
| 1362 | 760896.3138 | 9273429.1667 | 2601.8400 | c |
| 1363 | 760898.7866 | 9273430.2310 | 2602.0125 | c |
| 1364 | 760898.4531 | 9273431.1870 | 2602.0000 | r |
| 1365 | 760896.9750 | 9273432.0190 | 2601.7192 | b |
| 1366 | 760896.0432 | 9273434.2616 | 2601.6283 | e |
| 1367 | 760894.7446 | 9273435.9080 | 2601.5849 | b |
| 1368 | 760899.7379 | 9273439.1650 | 2602.0305 | r |
| 1369 | 760902.0605 | 9273439.9130 | 2602.1833 | b |
| 1370 | 760903.5797 | 9273438.1660 | 2602.1922 | e |
| 1371 | 760904.3908 | 9273436.0000 | 2602.0181 | b |
| 1372 | 760906.5256 | 9273433.8653 | 2602.8102 | c |
| 1373 | 760910.2769 | 9273436.5600 | 2603.4348 | c |
| 1374 | 760912.0655 | 9273438.5890 | 2603.3268 | r |
| 1375 | 760911.3118 | 9273439.8540 | 2603.0034 | b |
| 1376 | 760914.1713 | 9273443.7438 | 2603.3719 | e |
| 1377 | 760913.8774 | 9273447.3920 | 2603.3013 | b |
| 1379 | 760917.2653 | 9273445.6318 | 2603.7779 | e |
| 1380 | 760920.5104 | 9273445.0208 | 2604.0624 | b |
| 1381 | 760920.8865 | 9273448.0639 | 2604.4738 | e |
| 1382 | 760919.6104 | 9273451.0530 | 2604.1721 | b |
| 1383 | 760922.1848 | 9273453.8380 | 2604.3752 | r |
| 1384 | 760924.6184 | 9273450.6006 | 2604.7451 | e |
| 1385 | 760926.6517 | 9273448.9460 | 2604.8847 | b |
| 1386 | 760931.4919 | 9273452.0513 | 2605.0025 | b |
| 1387 | 760930.3167 | 9273454.4737 | 2605.1501 | e |
| 1388 | 760928.6094 | 9273456.0700 | 2605.1657 | b |
| 1389 | 760932.9405 | 9273456.2572 | 2605.5121 | e |
| 1390 | 760935.0595 | 9273454.6440 | 2605.6529 | b |
| 1391 | 760938.7865 | 9273455.9765 | 2606.2265 | r |
| 1392 | 760941.9831 | 9273456.3125 | 2606.9495 | c |
| 1393 | 760942.5706 | 9273459.8990 | 2606.8132 | b |
| 1394 | 760950.7742 | 9273465.9120 | 2607.5969 | b |
| 1395 | 760949.6521 | 9273468.4851 | 2607.7792 | e |
| 1396 | 760948.4780 | 9273472.1510 | 2607.9973 | b |
| 1397 | 760941.9844 | 9273467.6042 | 2607.0355 | r |
| 1398 | 760942.3077 | 9273466.1390 | 2607.0157 | b |
| 1400 | 760944.6942 | 9273464.4191 | 2607.0517 | e |
| 1401 | 760946.6020 | 9273462.2555 | 2606.9792 | b |
| 1402 | 760950.8302 | 9273475.3720 | 2608.3729 | r |
| 1403 | 760951.3741 | 9273474.5472 | 2608.4559 | b |
| 1404 | 760953.4738 | 9273472.0415 | 2608.4509 | e |
| 1405 | 760958.5833 | 9273473.8333 | 2609.0099 | b |
| 1406 | 760956.9060 | 9273475.5107 | 2609.0369 | e |
| 1407 | 760954.2967 | 9273476.9110 | 2608.9225 | b |
| 1408 | 760958.8690 | 9273481.4310 | 2609.8215 | b |
| 1409 | 760960.9339 | 9273479.6009 | 2609.7806 | e |
| 1410 | 760963.1366 | 9273477.8907 | 2609.9782 | b |
| 1412 | 760990.9016 | 9273504.1840 | 2613.9922 | E18 |
| 1413 | 760966.0322 | 9273481.0930 | 2610.7040 | b |
| 1414 | 760967.4526 | 9273481.3550 | 2610.9606 | r |
| 1415 | 760967.7843 | 9273482.3001 | 2610.9654 | r |
| 1416 | 760968.2717 | 9273483.8250 | 2610.9445 | b |
| 1417 | 760966.1696 | 9273484.9176 | 2610.8903 | e |
| 1418 | 760963.4207 | 9273486.2340 | 2610.7555 | b |
| 1419 | 760963.2848 | 9273489.2890 | 2611.0119 | r |
| 1420 | 760966.7390 | 9273489.2419 | 2611.3494 | b |
| 1421 | 760969.4403 | 9273488.2389 | 2611.3962 | e |
| 1422 | 760970.7422 | 9273486.3542 | 2611.2629 | b |
| 1423 | 760973.5742 | 9273486.9792 | 2611.9855 | r |
| 1424 | 760973.5944 | 9273488.4110 | 2611.9484 | b |
| 1425 | 760971.9279 | 9273490.4094 | 2611.8183 | e |
| 1426 | 760970.5957 | 9273492.9500 | 2611.9458 | b |
| 1427 | 760950.6523 | 9273462.1250 | 2607.7365 | c |
| 1428 | 760956.9982 | 9273467.3550 | 2608.6957 | c |
| 1429 | 760962.8995 | 9273473.5470 | 2610.3350 | c |
| 1430 | 760975.3610 | 9273486.4600 | 2612.5813 | c |
| 1431 | 760982.5490 | 9273492.1320 | 2612.8796 | c |
| 1432 | 760979.3377 | 9273492.2900 | 2612.2269 | r |
| 1433 | 760979.0301 | 9273492.9688 | 2612.2243 | b |
| 1434 | 760977.2115 | 9273494.2786 | 2612.1024 | e |
| 1435 | 760974.2864 | 9273496.1170 | 2612.0670 | b |
| 1436 | 760975.7889 | 9273498.4370 | 2612.0671 | r |
| 1437 | 760980.8472 | 9273499.9430 | 2612.9231 | b |
| 1438 | 760982.6350 | 9273497.3073 | 2612.9869 | e |
| 1439 | 760984.3245 | 9273495.3073 | 2612.9974 | b |
| 1440 | 760989.4240 | 9273497.4390 | 2613.7519 | b |
| 1441 | 760989.9953 | 9273496.0510 | 2613.9269 | r |
| 1442 | 760990.2340 | 9273494.7510 | 2614.1698 | r |
| 1443 | 760993.1250 | 9273497.3542 | 2614.7281 | r |
| 1444 | 760991.9803 | 9273498.4988 | 2613.9993 | b |
| 1445 | 760988.6890 | 9273499.9532 | 2613.6042 | b |
| 1446 | 760985.0424 | 9273502.0529 | 2613.0354 | b |
| 1447 | 760984.9547 | 9273502.5220 | 2613.0226 | r |
| 1448 | 760987.0995 | 9273502.9800 | 2613.3383 | b |
| 1449 | 760991.8836 | 9273501.3183 | 2613.9973 | e |
| 1450 | 760995.5781 | 9273499.9792 | 2614.5894 | b |
| 1451 | 760999.4909 | 9273497.4366 | 2618.0353 | r |
| 1452 | 760999.7495 | 9273500.6900 | 2614.9747 | r |
| 1453 | 761000.7298 | 9273501.9741 | 2614.9208 | b |
| 1456 | 760997.9741 | 9273503.9206 | 2614.8376 | e |
| 1457 | 760995.3476 | 9273505.5600 | 2614.2573 | b |
| 1458 | 760994.3197 | 9273506.6540 | 2614.1125 | r |
| 1459 | 760995.0889 | 9273508.6820 | 2613.8767 | r |
| 1460 | 760999.1068 | 9273508.7500 | 2614.9736 | r |
| 1461 | 761000.8789 | 9273509.0417 | 2615.0126 | r |
| 1462 | 761001.5449 | 9273508.3757 | 2615.0383 | b |
| 1463 | 761003.3501 | 9273506.2193 | 2615.2147 | e |
| 1464 | 761004.2927 | 9273503.3460 | 2615.3073 | b |
| 1465 | 761007.5066 | 9273502.8760 | 2616.5251 | r |
| 1466 | 761009.0164 | 9273504.8660 | 2615.9552 | r |
| 1467 | 761009.1326 | 9273505.6193 | 2615.9726 | b |
| 1468 | 761007.1176 | 9273507.8275 | 2615.9269 | e |
| 1469 | 761005.0060 | 9273510.0175 | 2615.6005 | b |
| 1470 | 761006.7734 | 9273512.3125 | 2616.0027 | r |
| 1471 | 761006.2591 | 9273512.9375 | 2615.2498 | r |
| 1472 | 761004.9824 | 9273515.7236 | 2613.6173 | r |
| 1473 | 761012.9390 | 9273513.5450 | 2616.6666 | b |
| 1474 | 761014.5733 | 9273511.0133 | 2616.8001 | e |
| 1475 | 761016.1271 | 9273509.5050 | 2616.9958 | b |
| 1476 | 761018.3293 | 9273508.6610 | 2616.9999 | r |
| 1477 | 761019.0898 | 9273508.3958 | 2620.0040 | r |
| 1478 | 761020.4273 | 9273505.1970 | 2621.4188 | r |
| 1479 | 761022.6623 | 9273511.1520 | 2617.9846 | r |
| 1481 | 761022.9465 | 9273511.8760 | 2617.9821 | b |
| 1482 | 761021.9987 | 9273514.0427 | 2617.8912 | e |
| 1483 | 761021.5187 | 9273516.8040 | 2617.8014 | b |
| 1484 | 761027.5898 | 9273518.7917 | 2618.1988 | r |
| 1485 | 761027.4276 | 9273518.1040 | 2618.2257 | b |
| 1486 | 761027.9429 | 9273515.6965 | 2618.2192 | e |
| 1487 | 761030.0842 | 9273513.7552 | 2618.5312 | b |
| 1488 | 761032.4848 | 9273513.8877 | 2618.9937 | r |
| 1489 | 761032.5302 | 9273514.3090 | 2618.9814 | b |
| 1490 | 761031.3727 | 9273516.3088 | 2618.7266 | e |
| 1491 | 761032.4563 | 9273518.6600 | 2618.6278 | b |
| 1492 | 761035.7651 | 9273518.9890 | 2618.9155 | b |
| 1493 | 761036.4922 | 9273516.7918 | 2618.9627 | e |
| 1494 | 761036.6311 | 9273515.4164 | 2618.9650 | b |
| 1495 | 761039.7183 | 9273515.4060 | 2619.2669 | b |
| 1496 | 761040.6256 | 9273517.0470 | 2619.3800 | e |
| 1497 | 761040.1663 | 9273519.3180 | 2619.0636 | b |
| 1498 | 761042.8277 | 9273520.3620 | 2618.9910 | r |
| 1499 | 761046.0809 | 9273520.5972 | 2619.0494 | r |
| 1504 | 761059.1622 | 9273520.6620 | 2620.1554 | E19 |
| 1505 | 761048.4908 | 9273519.7830 | 2619.3425 | b |
| 1506 | 761048.6292 | 9273517.5412 | 2619.5831 | e |
| 1507 | 761048.4098 | 9273514.8900 | 2619.8838 | b |
| 1508 | 761048.6016 | 9273513.8450 | 2619.9842 | r |
| 1509 | 761055.9307 | 9273516.2508 | 2620.3989 | b |
| 1510 | 761055.8236 | 9273517.9855 | 2620.2504 | e |
| 1511 | 761055.0916 | 9273520.3070 | 2620.0081 | b |
| 1512 | 761057.0221 | 9273522.2374 | 2619.7639 | r |
| 1513 | 761060.8701 | 9273521.4760 | 2620.0684 | r |
| 1514 | 761061.2943 | 9273520.5208 | 2620.1671 | b |
| 1515 | 761061.7872 | 9273518.5563 | 2620.3731 | e |
| 1516 | 761062.2246 | 9273516.7492 | 2620.6357 | b |
| 1517 | 761065.3921 | 9273517.2208 | 2620.8814 | b |
| 1518 | 761064.5501 | 9273519.1291 | 2620.4944 | e |
| 1519 | 761062.6962 | 9273520.9390 | 2620.1030 | b |
| 1520 | 761064.2791 | 9273522.1410 | 2619.9914 | r |
| 1521 | 761065.1568 | 9273523.1530 | 2619.8548 | r |
| 1522 | 761066.7348 | 9273522.2910 | 2620.4297 | b |
| 1523 | 761068.0948 | 9273520.1969 | 2620.9012 | e |
| 1524 | 761069.6304 | 9273518.4830 | 2621.4508 | e |
| 1525 | 761069.4103 | 9273516.5590 | 2621.0000 | r |
| 1526 | 761067.2614 | 9273514.4470 | 2621.9817 | r |
| 1527 | 761066.1682 | 9273513.9280 | 2621.8678 | c |
| 1528 | 761055.0156 | 9273512.2500 | 2620.9396 | c |
| 1529 | 761072.0064 | 9273515.9135 | 2622.5984 | r |
| 1530 | 761078.7054 | 9273521.9880 | 2621.9944 | b |
| 1531 | 761076.8538 | 9273523.8396 | 2621.7740 | e |
| 1532 | 761075.1658 | 9273525.4580 | 2621.6012 | b |
| 1533 | 761078.9019 | 9273528.3259 | 2622.2316 | r |
| 1534 | 761080.7987 | 9273528.7880 | 2622.5430 | r |
| 1535 | 761084.2370 | 9273529.8900 | 2622.9766 | b |
| 1536 | 761085.2868 | 9273527.4118 | 2622.8894 | e |
| 1537 | 761086.7281 | 9273525.3266 | 2622.9308 | b |
| 1538 | 761091.2191 | 9273526.8170 | 2623.7026 | r |
| 1539 | 761092.3516 | 9273527.9792 | 2623.9645 | b |
| 1540 | 761091.2782 | 9273529.9498 | 2623.7245 | e |
| 1541 | 761089.6999 | 9273532.3942 | 2623.5412 | b |
| 1542 | 761089.1934 | 9273532.9710 | 2623.5280 | r |
| 1543 | 761094.7963 | 9273534.4500 | 2624.0473 | b |
| 1544 | 761098.3534 | 9273532.9468 | 2624.6202 | e |
| 1545 | 761102.1068 | 9273532.3333 | 2624.9981 | b |
| 1546 | 761106.6246 | 9273532.5949 | 2625.7345 | r |
| 1547 | 761108.5528 | 9273533.2862 | 2625.8380 | r |
| 1548 | 761112.8262 | 9273534.5970 | 2626.3913 | r |
| 1550 | 761110.5537 | 9273535.1447 | 2625.9973 | b |
| 1551 | 761106.7426 | 9273536.5005 | 2625.7075 | e |
| 1552 | 761103.2005 | 9273538.3333 | 2625.3852 | b |
| 1553 | 761099.1454 | 9273544.3888 | 2625.1767 | r |
| 1554 | 761104.0196 | 9273546.4995 | 2625.7827 | r |
| 1555 | 761110.5405 | 9273541.9400 | 2626.3202 | r |
| 1556 | 761110.9772 | 9273541.1390 | 2626.3510 | b |
| 1557 | 761111.8651 | 9273538.6704 | 2626.3286 | e |
| 1558 | 761113.6703 | 9273536.1850 | 2626.5464 | b |
| 1559 | 761118.8126 | 9273536.7620 | 2626.9891 | r |
| 1561 | 761118.6377 | 9273538.1686 | 2626.9693 | b |
| 1562 | 761116.4122 | 9273540.5966 | 2626.9156 | e |
| 1563 | 761114.3786 | 9273542.4250 | 2626.7835 | b |
| 1564 | 761115.7566 | 9273544.2380 | 2627.0083 | r |
| 1565 | 761118.0751 | 9273544.7697 | 2626.9964 | r |
| 1566 | 761121.7040 | 9273544.6809 | 2627.2002 | b |
| 1567 | 761121.9784 | 9273542.3349 | 2627.0551 | e |
| 1568 | 761123.6019 | 9273540.1600 | 2627.0527 | b |
| 1569 | 761126.1961 | 9273538.8330 | 2626.9943 | r |
| 1574 | 761132.8956 | 9273546.7760 | 2627.9027 | E20 |
| 1575 | 761110.7706 | 9273531.6560 | 2626.3397 | c |
| 1576 | 761120.4915 | 9273535.2060 | 2627.0000 | c |
| 1577 | 761120.4915 | 9273535.2060 | 2627.726 | bm06 |
| 1578 | 761132.4089 | 9273539.2500 | 2627.1641 | c |
| 1579 | 761132.6706 | 9273541.5417 | 2627.3921 | b |
| 1580 | 761129.0115 | 9273543.8260 | 2627.5149 | e |
| 1581 | 761123.9258 | 9273545.3750 | 2627.4565 | b |
| 1582 | 761131.3234 | 9273545.8820 | 2627.7715 | b |
| 1583 | 761134.1413 | 9273544.3970 | 2627.7093 | e |
| 1584 | 761137.5531 | 9273542.1942 | 2627.5208 | b |
| 1585 | 761142.4120 | 9273541.4080 | 2627.7845 | r |
| 1586 | 761142.4768 | 9273542.3800 | 2627.8876 | b |
| 1587 | 761139.5762 | 9273544.5709 | 2627.9003 | e |
| 1588 | 761139.2871 | 9273546.0434 | 2627.9874 | b |
| 1589 | 761141.2687 | 9273547.1643 | 2627.9962 | r |
| 1590 | 761142.0977 | 9273549.0583 | 2628.7762 | r |
| 1591 | 761144.8750 | 9273546.5208 | 2627.9992 | b |
| 1592 | 761146.4039 | 9273544.2525 | 2628.0567 | e |
| 1593 | 761150.6206 | 9273542.2944 | 2628.0415 | b |
| 1594 | 761153.3619 | 9273541.5237 | 2628.2708 | r |
| 1595 | 761151.8986 | 9273535.9232 | 2626.9835 | r |
| 1596 | 761142.9873 | 9273531.1356 | 2626.3610 | r |
| 1597 | 761148.3151 | 9273527.8887 | 2625.7087 | r |
| 1598 | 761153.8834 | 9273541.4103 | 2628.3263 | r |
| 1599 | 761154.2730 | 9273542.2560 | 2628.4329 | b |
| 1600 | 761154.7208 | 9273543.8648 | 2628.6326 | e |
| 1601 | 761155.4504 | 9273546.3370 | 2628.9815 | b |
| 1602 | 761155.7485 | 9273547.6171 | 2629.0104 | r |
| 1603 | 761157.8517 | 9273548.2797 | 2629.5615 | r |
| 1604 | 761164.9581 | 9273545.9540 | 2629.7655 | b |
| 1605 | 761165.1928 | 9273543.3765 | 2629.4032 | e |
| 1606 | 761165.2753 | 9273541.5090 | 2629.1410 | b |
| 1607 | 761168.1445 | 9273539.1458 | 2629.3053 | r |
| 1608 | 761175.3632 | 9273539.0046 | 2630.0708 | r |
| 1609 | 761175.5413 | 9273541.0654 | 2630.0560 | b |
| 1610 | 761175.1533 | 9273542.9996 | 2629.9992 | e |
| 1611 | 761173.9772 | 9273545.4880 | 2629.9949 | b |
| 1612 | 761175.1921 | 9273546.0310 | 2629.9916 | r |
| 1613 | 761177.9219 | 9273546.6458 | 2630.5301 | r |
| 1614 | 761178.8786 | 9273551.5846 | 2632.6306 | r |
| 1615 | 761174.6122 | 9273559.3790 | 2634.6114 | r |
| 1616 | 761170.0392 | 9273566.3823 | 2635.5210 | r |
| 1617 | 761159.4522 | 9273563.9989 | 2633.1300 | r |
| 1618 | 761154.7359 | 9273558.7556 | 2631.3386 | r |
| 1619 | 761160.0927 | 9273548.3921 | 2630.0000 | r |
| 1620 | 761182.0526 | 9273545.2110 | 2630.6213 | r |
| 1621 | 761182.7082 | 9273545.0820 | 2630.7621 | b |
| 1622 | 761182.9728 | 9273542.6800 | 2630.7669 | e |
| 1623 | 761185.6467 | 9273540.8591 | 2630.9500 | b |
| 1624 | 761187.3030 | 9273539.9489 | 2630.8410 | r |
| 1625 | 761188.2361 | 9273539.8444 | 2630.8948 | r |
| 1626 | 761187.7929 | 9273540.8568 | 2631.0214 | b |
| 1627 | 761186.3222 | 9273542.7808 | 2630.9427 | e |
| 1628 | 761188.4633 | 9273542.9163 | 2631.0189 | e |
| 1629 | 761187.6476 | 9273545.4830 | 2630.9957 | b |
| 1630 | 761189.7315 | 9273547.5336 | 2632.3193 | r |
| 1631 | 761191.5338 | 9273547.9750 | 2632.5927 | r |
| 1632 | 761193.1776 | 9273546.1150 | 2631.8839 | b |
| 1633 | 761193.6282 | 9273543.3681 | 2631.5376 | e |
| 1634 | 761195.9587 | 9273541.6590 | 2631.2787 | b |
| 1635 | 761196.2798 | 9273541.3260 | 2631.2311 | r |
| 1636 | 761200.4332 | 9273539.8491 | 2630.9781 | r |
| 1637 | 761202.8477 | 9273541.9792 | 2632.0105 | r |
| 1638 | 761202.9270 | 9273542.4986 | 2631.9220 | b |
| 1639 | 761202.3608 | 9273544.1428 | 2631.8733 | e |
| 1640 | 761201.4219 | 9273546.4583 | 2631.9783 | b |
| 1641 | 761204.5028 | 9273547.4542 | 2632.3904 | r |
| 1642 | 761206.8263 | 9273547.9566 | 2632.5574 | r |
| 1643 | 761206.8854 | 9273546.8333 | 2632.4183 | b |
| 1644 | 761207.0869 | 9273544.5621 | 2632.0323 | e |
| 1645 | 761207.1212 | 9273542.6150 | 2632.0024 | b |
| 1646 | 761212.6726 | 9273542.8370 | 2632.1411 | b |
| 1647 | 761215.3081 | 9273543.5280 | 2632.3161 | b |
| 1648 | 761215.1529 | 9273545.2777 | 2632.5111 | e |
| 1649 | 761215.3359 | 9273547.1875 | 2632.7236 | b |
| 1650 | 761225.2903 | 9273542.9580 | 2632.9966 | b |
| 1651 | 761225.1685 | 9273545.4112 | 2632.9809 | e |
| 1652 | 761225.1327 | 9273547.3360 | 2632.9981 | b |
| 1653 | 761226.3997 | 9273548.6030 | 2633.6304 | r |
| 1654 | 761231.5375 | 9273547.0490 | 2633.7694 | b |
| 1655 | 761231.7585 | 9273545.1253 | 2633.5268 | e |
| 1656 | 761232.3861 | 9273542.6410 | 2633.1962 | b |
| 1657 | 761238.1941 | 9273542.7660 | 2633.2465 | E21 |
| 1658 | 761212.3388 | 9273549.3120 | 2632.8595 | c |
| 1659 | 761221.2839 | 9273549.9375 | 2633.1734 | c |
| 1660 | 761222.7461 | 9273540.5260 | 2632.6643 | c |
| 1661 | 761238.0744 | 9273539.5640 | 2633.0028 | c |
| 1662 | 761238.0120 | 9273540.6080 | 2633.0006 | r |
| 1663 | 761236.8828 | 9273542.1667 | 2633.2005 | r |
| 1664 | 761243.5547 | 9273544.4792 | 2633.7581 | b |
| 1665 | 761240.2874 | 9273545.3226 | 2633.5837 | e |
| 1666 | 761237.0250 | 9273547.5740 | 2633.9217 | b |
| 1667 | 761237.2157 | 9273548.0920 | 2633.9863 | r |
| 1668 | 761237.0532 | 9273548.9840 | 2634.4221 | r |
| 1669 | 761239.0666 | 9273550.2990 | 2635.1589 | r |
| 1670 | 761241.9554 | 9273552.2660 | 2635.7029 | r |
| 1671 | 761244.0664 | 9273550.4375 | 2634.1882 | r |
| 1672 | 761244.2096 | 9273549.8890 | 2633.9964 | r |
| 1673 | 761241.8318 | 9273548.2460 | 2633.9919 | b |
| 1674 | 761244.9598 | 9273546.6008 | 2633.9763 | e |
| 1675 | 761247.4248 | 9273545.1184 | 2633.9991 | b |
| 1676 | 761250.0075 | 9273545.8390 | 2634.0000 | b |
| 1677 | 761247.8864 | 9273547.9375 | 2633.9820 | e |
| 1678 | 761247.0407 | 9273550.4940 | 2633.9965 | b |
| 1679 | 761251.0169 | 9273553.3958 | 2633.9955 | r |
| 1680 | 761251.5942 | 9273553.0150 | 2633.9932 | b |
| 1681 | 761253.9604 | 9273551.6087 | 2633.9896 | e |
| 1682 | 761258.6524 | 9273551.5270 | 2633.4129 | b |
| 1683 | 761261.0546 | 9273551.4990 | 2632.9922 | r |
| 1684 | 761261.1306 | 9273552.1680 | 2633.0760 | r |
| 1685 | 761261.4984 | 9273553.1564 | 2633.1891 | b |
| 1686 | 761259.0444 | 9273554.7205 | 2633.5552 | e |
| 1687 | 761255.8097 | 9273555.7470 | 2633.9984 | b |
| 1688 | 761254.1373 | 9273556.2980 | 2634.1846 | r |
| 1689 | 761253.5396 | 9273568.8967 | 2636.6663 | r |
| 1690 | 761256.7826 | 9273579.1042 | 2638.6866 | r |
| 1691 | 761261.9449 | 9273578.8230 | 2637.1115 | r |
| 1692 | 761257.2510 | 9273573.1850 | 2636.8777 | r |
| 1693 | 761260.0791 | 9273559.4020 | 2634.0282 | r |
| 1694 | 761260.7500 | 9273558.3570 | 2633.9126 | b |
| 1695 | 761263.5087 | 9273557.3258 | 2633.6433 | e |
| 1696 | 761267.9907 | 9273556.1890 | 2633.2191 | b |
| 1697 | 761272.1476 | 9273557.2648 | 2633.0043 | b |
| 1698 | 761268.8024 | 9273558.7382 | 2633.4526 | e |
| 1699 | 761266.9704 | 9273560.4400 | 2633.7805 | b |
| 1700 | 761267.9254 | 9273565.9570 | 2634.5187 | r |
| 1701 | 761273.0858 | 9273566.0800 | 2634.0599 | r |
| 1702 | 761275.0529 | 9273563.3100 | 2633.0000 | r |
| 1703 | 761272.9575 | 9273561.4344 | 2633.2778 | b |
| 1704 | 761274.3250 | 9273558.2653 | 2633.0252 | e |
| 1705 | 761275.5824 | 9273555.7245 | 2633.0209 | b |
| 1706 | 761276.6620 | 9273554.7570 | 2633.0371 | b |
| 1707 | 761277.8094 | 9273556.8862 | 2633.0938 | e |
| 1708 | 761278.9182 | 9273559.2961 | 2633.0770 | b |
| 1709 | 761281.0664 | 9273557.7708 | 2633.3761 | b |
| 1710 | 761280.8582 | 9273554.7514 | 2633.4229 | e |
| 1711 | 761280.1194 | 9273551.2326 | 2633.3242 | b |
| 1712 | 761280.6630 | 9273549.7099 | 2633.2377 | r |
| 1713 | 761281.7123 | 9273549.6397 | 2633.3354 | b |
| 1714 | 761283.8978 | 9273551.1519 | 2633.6899 | e |
| 1715 | 761285.1096 | 9273554.0157 | 2633.7799 | b |
| 1716 | 761288.6608 | 9273551.0210 | 2633.9918 | r |
| 1717 | 761288.2437 | 9273549.9340 | 2634.0124 | r |
| 1718 | 761289.0039 | 9273548.3333 | 2634.0446 | b |
| 1719 | 761286.9502 | 9273546.7405 | 2634.0402 | e |
| 1720 | 761285.1803 | 9273545.7600 | 2633.9405 | b |
| 1721 | 761284.7548 | 9273543.7516 | 2633.5510 | r |
| 1722 | 761283.8616 | 9273541.2358 | 2632.5138 | r |
| 1723 | 761284.2862 | 9273539.7460 | 2632.2765 | r |
| 1724 | 761287.0856 | 9273540.3840 | 2634.0201 | r |
| 1727 | 761287.4501 | 9273541.6871 | 2634.1038 | b |
| 1728 | 761289.6624 | 9273542.4773 | 2634.4753 | e |
| 1729 | 761292.2890 | 9273542.3776 | 2634.8309 | b |
| 1730 | 761294.2111 | 9273540.6300 | 2634.9309 | r |
| 1731 | 761293.7349 | 9273540.4270 | 2634.8535 | r |
| 1732 | 761293.5659 | 9273539.5996 | 2634.7739 | b |
| 1733 | 761291.5854 | 9273538.6993 | 2634.4771 | e |
| 1734 | 761288.4251 | 9273538.8790 | 2634.0459 | b |
| 1735 | 761295.2826 | 9273535.4167 | 2634.9222 | E22 |
| 1736 | 761289.9118 | 9273536.3699 | 2634.1523 | b |
| 1737 | 761292.3892 | 9273536.8266 | 2634.5139 | e |
| 1738 | 761294.5488 | 9273537.3110 | 2634.8454 | b |
| 1739 | 761295.3698 | 9273537.5833 | 2634.9751 | r |
| 1740 | 761296.3685 | 9273536.6667 | 2635.5626 | r |
| 1741 | 761297.1231 | 9273535.7010 | 2636.4442 | r |
| 1742 | 761295.4375 | 9273534.5417 | 2634.9192 | b |
| 1743 | 761295.4980 | 9273533.5640 | 2634.8457 | b |
| 1744 | 761293.6136 | 9273533.4374 | 2634.5817 | e |
| 1745 | 761294.1706 | 9273531.5620 | 2634.5478 | e |
| 1746 | 761292.1083 | 9273530.8536 | 2634.2486 | b |
| 1747 | 761291.7370 | 9273530.3958 | 2634.1785 | r |
| 1748 | 761291.2513 | 9273530.3125 | 2634.1049 | r |
| 1749 | 761289.0000 | 9273528.9525 | 2632.6470 | r |
| 1750 | 761292.0513 | 9273527.7160 | 2634.1304 | r |
| 1751 | 761292.9710 | 9273526.5220 | 2634.2235 | b |
| 1752 | 761294.8818 | 9273528.6145 | 2634.5736 | e |
| 1753 | 761295.1361 | 9273527.5198 | 2634.5797 | e |
| 1754 | 761296.7458 | 9273529.1220 | 2634.8630 | b |
| 1755 | 761296.9604 | 9273528.0260 | 2634.8689 | b |
| 1756 | 761298.3034 | 9273527.1875 | 2634.9858 | r |
| 1757 | 761298.4544 | 9273526.6250 | 2634.9843 | r |
| 1758 | 761299.2826 | 9273526.1930 | 2635.4343 | r |
| 1759 | 761298.3763 | 9273524.3125 | 2634.9397 | r |
| 1760 | 761298.1211 | 9273523.6458 | 2634.8606 | b |
| 1761 | 761295.7361 | 9273523.3062 | 2634.5241 | e |
| 1762 | 761293.6256 | 9273523.1037 | 2634.2461 | b |
| 1763 | 761293.7040 | 9273520.9530 | 2634.2917 | b |
| 1764 | 761296.0796 | 9273520.8490 | 2634.5721 | e |
| 1765 | 761298.1451 | 9273520.3649 | 2634.8157 | b |
| 1766 | 761298.1404 | 9273518.5590 | 2634.8816 | b |
| 1767 | 761296.2001 | 9273517.7530 | 2634.8156 | e |
| 1768 | 761293.4762 | 9273517.8622 | 2634.6301 | b |
| 1769 | 761293.2095 | 9273517.8900 | 2634.6114 | r |
| 1770 | 761292.4434 | 9273515.2730 | 2634.9167 | r |
| 1771 | 761295.9483 | 9273515.2706 | 2634.9432 | e |
| 1772 | 761298.0069 | 9273514.0514 | 2634.9717 | b |
| 1773 | 761297.8151 | 9273512.4792 | 2634.9947 | b |
| 1774 | 761295.2819 | 9273512.4440 | 2634.9752 | e |
| 1775 | 761292.9447 | 9273512.5670 | 2634.9984 | b |
| 1776 | 761290.2183 | 9273505.2600 | 2635.2019 | r |
| 1777 | 761291.0585 | 9273505.2170 | 2635.3037 | b |
| 1778 | 761293.7179 | 9273506.8413 | 2635.4949 | e |
| 1779 | 761296.4414 | 9273506.9375 | 2635.7523 | b |
| 1780 | 761296.4640 | 9273505.2300 | 2635.9105 | r |
| 1781 | 761297.9984 | 9273502.4091 | 2637.1123 | r |
| 1782 | 761294.8405 | 9273500.8350 | 2635.9689 | b |
| 1783 | 761292.2437 | 9273501.5599 | 2635.7044 | e |
| 1784 | 761290.0240 | 9273500.4993 | 2635.8531 | b |
| 1785 | 761288.4358 | 9273499.6830 | 2636.0001 | r |
| 1786 | 761286.0781 | 9273495.4436 | 2635.5870 | r |
| 1787 | 761286.4304 | 9273492.9228 | 2636.0000 | r |
| 1788 | 761284.8472 | 9273490.5480 | 2634.8660 | r |
| 1789 | 761284.2744 | 9273488.5970 | 2634.5887 | r |
| 1790 | 761284.7826 | 9273486.3125 | 2634.8157 | r |
| 1791 | 761287.3934 | 9273487.2798 | 2636.0042 | r |
| 1792 | 761288.4530 | 9273490.6901 | 2636.0063 | r |
| 1793 | 761289.1298 | 9273492.3620 | 2635.9909 | b |
| 1794 | 761292.0116 | 9273490.5991 | 2636.0096 | e |
| 1795 | 761289.0138 | 9273482.4610 | 2636.8059 | E23 |
| 1796 | 761297.1823 | 9273493.8750 | 2636.9797 | c |
| 1797 | 761293.9360 | 9273492.6910 | 2635.9961 | b |
| 1798 | 761294.5627 | 9273492.2046 | 2635.9867 | r |
| 1799 | 761295.6582 | 9273491.6470 | 2636.1995 | r |
| 1800 | 761294.1854 | 9273489.1430 | 2636.1275 | b |
| 1801 | 761297.3802 | 9273487.8542 | 2636.6816 | c |
| 1802 | 761296.1016 | 9273487.8542 | 2636.4411 | r |
| 1803 | 761294.4920 | 9273487.5617 | 2636.3059 | b |
| 1804 | 761293.7297 | 9273486.7993 | 2636.3783 | e |
| 1805 | 761289.5139 | 9273484.4205 | 2636.2986 | b |
| 1806 | 761290.8555 | 9273480.6875 | 2637.0060 | r |
| 1807 | 761289.7317 | 9273479.2670 | 2637.0549 | r |
| 1808 | 761287.2761 | 9273475.6420 | 2636.3877 | r |
| 1809 | 761290.0971 | 9273472.5450 | 2636.8696 | c |
| 1810 | 761293.8308 | 9273473.0800 | 2637.3069 | r |
| 1811 | 761300.8992 | 9273471.0050 | 2637.2797 | c |
| 1812 | 761302.6486 | 9273471.9920 | 2637.4228 | c |
| 1813 | 761320.0625 | 9273473.2708 | 2637.8417 | c |
| 1814 | 761291.8988 | 9273479.4620 | 2637.4342 | r |
| 1815 | 761293.3284 | 9273479.2721 | 2637.4896 | b |
| 1818 | 761296.7249 | 9273483.1477 | 2636.8760 | e |
| 1819 | 761298.2265 | 9273483.3308 | 2636.9774 | b |
| 1820 | 761299.7959 | 9273483.3960 | 2637.0563 | r |
| 1821 | 761299.3691 | 9273482.9130 | 2637.0570 | b |
| 1822 | 761299.2097 | 9273481.2494 | 2637.1748 | e |
| 1823 | 761296.2390 | 9273477.9030 | 2637.1959 | b |
| 1824 | 761299.2227 | 9273476.4375 | 2637.4584 | r |
| 1825 | 761301.0225 | 9273476.4330 | 2637.5712 | r |
| 1826 | 761302.9039 | 9273476.6270 | 2637.6981 | b |
| 1827 | 761303.0457 | 9273479.4644 | 2637.5409 | e |
| 1828 | 761304.0871 | 9273481.6387 | 2637.5909 | b |
| 1829 | 761305.0273 | 9273481.4167 | 2637.7126 | b |
| 1830 | 761305.3687 | 9273478.8951 | 2637.7384 | e |
| 1831 | 761306.9054 | 9273476.6813 | 2637.9517 | b |
| 1832 | 761309.9650 | 9273475.2182 | 2637.8278 | r |
| 1833 | 761309.7537 | 9273476.7820 | 2638.0221 | b |
| 1834 | 761309.1011 | 9273478.6718 | 2638.0407 | e |
| 1835 | 761309.3051 | 9273481.1317 | 2637.9879 | b |
| 1836 | 761310.3584 | 9273482.2147 | 2638.0000 | r |
| 1837 | 761311.1404 | 9273481.4327 | 2638.0613 | b |
| 1841 | 761312.3277 | 9273479.0362 | 2638.1432 | e |
| 1842 | 761312.9553 | 9273477.2147 | 2638.0383 | b |
| 1843 | 761313.2828 | 9273476.8872 | 2638.0253 | r |
| 1844 | 761318.8067 | 9273477.8150 | 2638.2019 | r |
| 1845 | 761320.1655 | 9273478.1890 | 2638.2143 | b |
| 1846 | 761319.9296 | 9273480.0171 | 2638.4601 | e |
| 1847 | 761319.1076 | 9273482.7461 | 2638.8432 | b |
| 1848 | 761325.2459 | 9273483.6237 | 2639.0059 | b |
| 1849 | 761326.0439 | 9273480.8060 | 2639.0139 | r |
| 1850 | 761329.2461 | 9273479.5417 | 2639.0133 | b |
| 1851 | 761335.4214 | 9273479.4600 | 2639.0052 | r |
| 1852 | 761336.5114 | 9273475.4897 | 2636.8198 | r |
| 1853 | 761342.6835 | 9273474.6468 | 2636.4581 | r |
| 1854 | 761337.8752 | 9273480.4585 | 2639.1202 | b |
| 1855 | 761337.0983 | 9273482.2324 | 2639.2109 | e |
| 1856 | 761335.1534 | 9273484.8203 | 2639.1630 | b |
| 1857 | 761350.3323 | 9273486.1324 | 2639.9576 | b |
| 1858 | 761350.2526 | 9273483.8665 | 2639.8003 | e |
| 1859 | 761350.6735 | 9273481.8278 | 2639.9627 | b |
| 1860 | 761356.9391 | 9273481.6270 | 2640.1753 | b |
| 1861 | 761356.2688 | 9273483.9423 | 2640.4294 | e |
| 1862 | 761354.7583 | 9273486.3970 | 2640.4285 | b |
| 1863 | 761346.2685 | 9273489.9190 | 2640.0079 | c |
| 1864 | 761358.2496 | 9273488.9860 | 2640.7921 | c |
| 1865 | 761359.8649 | 9273487.3708 | 2640.9713 | r |
| 1868 | 761362.2896 | 9273485.4127 | 2640.8480 | b |
| 1869 | 761361.9224 | 9273483.3063 | 2640.5473 | e |
| 1870 | 761362.4704 | 9273480.7346 | 2640.2993 | b |
| 1871 | 761365.9420 | 9273479.9710 | 2640.7966 | b |
| 1872 | 761365.9218 | 9273482.4281 | 2640.8064 | e |
| 1873 | 761366.0958 | 9273484.2360 | 2640.9337 | b |
| 1874 | 761366.2422 | 9273485.3310 | 2640.9633 | r |
| 1875 | 761366.2411 | 9273485.9760 | 2641.0255 | r |
| 1879 | 761371.1856 | 9273482.3305 | 2641.0496 | b |
| 1880 | 761370.6400 | 9273480.9037 | 2641.0903 | e |
| 1881 | 761370.2187 | 9273478.4101 | 2641.0291 | b |
| 1882 | 761373.2357 | 9273476.9583 | 2641.3162 | b |
| 1883 | 761374.3672 | 9273479.2905 | 2641.6320 | e |
| 1884 | 761374.9743 | 9273480.9121 | 2641.6675 | b |
| 1885 | 761376.2513 | 9273482.4375 | 2642.8421 | r |
| 1886 | 761376.2755 | 9273480.4250 | 2641.9674 | b |
| 1887 | 761380.3789 | 9273479.5208 | 2641.9980 | r |
| 1888 | 761382.9547 | 9273477.2927 | 2642.1576 | b |
| 1889 | 761382.0992 | 9273475.5325 | 2642.1069 | e |
| 1890 | 761380.2588 | 9273473.9830 | 2642.0917 | b |
| 1891 | 761381.8511 | 9273472.5490 | 2642.1362 | r |
| 1892 | 761387.8011 | 9273469.8290 | 2642.6647 | b |
| 1893 | 761385.9529 | 9273473.6595 | 2642.6564 | e |
| 1894 | 761385.2327 | 9273476.2496 | 2642.6950 | b |
| 1895 | 761391.3242 | 9273472.6730 | 2642.9992 | b |
| 1896 | 761390.3602 | 9273471.1979 | 2642.9234 | e |
| 1897 | 761389.6906 | 9273468.5971 | 2642.9378 | b |
| 1898 | 761392.1932 | 9273466.6160 | 2643.0504 | b |
| 1899 | 761393.6490 | 9273468.7714 | 2643.1492 | e |
| 1900 | 761395.1641 | 9273469.6250 | 2643.4853 | b |
| 1901 | 761397.2817 | 9273467.5829 | 2643.8122 | b |
| 1902 | 761396.1674 | 9273466.4727 | 2643.5597 | e |
| 1903 | 761394.0868 | 9273464.7880 | 2643.1252 | b |
| 1904 | 761396.5833 | 9273462.3725 | 2643.3335 | b |
| 1905 | 761398.5817 | 9273463.8552 | 2643.5916 | e |
| 1906 | 761399.9594 | 9273464.7660 | 2643.7884 | b |
| 1907 | 761401.0109 | 9273465.6750 | 2643.9445 | r |
| 1908 | 761401.7817 | 9273466.1800 | 2644.3756 | r |
| 1909 | 761422.2826 | 9273452.9270 | 2647.4618 | E24 |
| 1910 | 761399.0354 | 9273459.9120 | 2643.6498 | b |
| 1911 | 761400.7964 | 9273460.8701 | 2643.8144 | e |
| 1912 | 761402.6565 | 9273461.6064 | 2643.9523 | b |
| 1913 | 761406.6443 | 9273462.7482 | 2645.4551 | r |
| 1914 | 761411.4206 | 9273465.9704 | 2647.3173 | r |
| 1915 | 761418.1440 | 9273467.3668 | 2648.5159 | r |
| 1916 | 761404.6044 | 9273459.4930 | 2643.9844 | b |
| 1917 | 761402.6044 | 9273458.4332 | 2643.9270 | e |
| 1918 | 761401.8667 | 9273456.4145 | 2644.0035 | b |
| 1919 | 761404.5313 | 9273452.4792 | 2644.1299 | b |
| 1920 | 761406.2508 | 9273453.5192 | 2644.3672 | e |
| 1921 | 761408.0102 | 9273455.2786 | 2644.4027 | b |
| 1922 | 761409.6914 | 9273453.0833 | 2644.7751 | b |
| 1923 | 761408.5089 | 9273451.1227 | 2644.5062 | e |
| 1924 | 761408.0053 | 9273448.5100 | 2644.4033 | b |
| 1925 | 761412.1094 | 9273444.7917 | 2644.9355 | b |
| 1926 | 761412.6976 | 9273448.6036 | 2644.8212 | e |
| 1927 | 761412.9851 | 9273450.1627 | 2644.8920 | b |
| 1928 | 761416.9630 | 9273448.2790 | 2645.0018 | b |
| 1929 | 761416.9031 | 9273447.6046 | 2645.0737 | e |
| 1931 | 761418.2803 | 9273442.6170 | 2645.5583 | b |
| 1934 | 761414.5273 | 9273436.7500 | 2644.6959 | c |
| 1935 | 761409.2627 | 9273441.0930 | 2644.4624 | c |
| 1936 | 761410.5616 | 9273442.5460 | 2644.9162 | r |
| 1937 | 761422.3904 | 9273442.6378 | 2646.0041 | b |
| 1938 | 761422.5618 | 9273448.1845 | 2645.5906 | e |
| 1939 | 761424.1717 | 9273449.2420 | 2645.9957 | b |
| 1940 | 761424.7075 | 9273450.9110 | 2645.9948 | r |
| 1941 | 761425.8355 | 9273452.3110 | 2647.1505 | r |
| 1942 | 761427.4688 | 9273451.2292 | 2646.0933 | b |
| 1943 | 761427.7471 | 9273450.9508 | 2646.1330 | e |
| 1944 | 761430.2396 | 9273447.1042 | 2646.7982 | b |
| 1945 | 761431.7461 | 9273447.3750 | 2647.0000 | r |
| 1946 | 761432.6420 | 9273449.8030 | 2647.0003 | r |
| 1947 | 761432.2724 | 9273450.9690 | 2646.9058 | b |
| 1948 | 761429.8454 | 9273453.0535 | 2646.6997 | e |
| 1949 | 761429.1407 | 9273455.7775 | 2646.8643 | b |
| 1950 | 761428.7513 | 9273457.1875 | 2646.9428 | r |
| 1953 | 761431.7348 | 9273456.0156 | 2646.8677 | e |
| 1954 | 761432.0496 | 9273457.4773 | 2646.8863 | e |
| 1955 | 761433.6564 | 9273455.6250 | 2646.9806 | b |
| 1956 | 761434.3203 | 9273456.9167 | 2647.0008 | r |
| 1957 | 761434.6279 | 9273457.5170 | 2646.9337 | r |
| 1958 | 761434.3558 | 9273458.3331 | 2647.0077 | b |
| 1959 | 761432.7429 | 9273458.6779 | 2646.9707 | e |
| 1960 | 761430.2500 | 9273459.3125 | 2646.9847 | b |
| 1961 | 761434.8326 | 9273460.5180 | 2647.0152 | b |
| 1962 | 761433.2779 | 9273461.1804 | 2647.0464 | e |
| 1963 | 761431.1637 | 9273462.1566 | 2647.1053 | b |
| 1964 | 761432.4508 | 9273465.9821 | 2647.5274 | b |
| 1965 | 761434.1263 | 9273465.1488 | 2647.3138 | e |
| 1966 | 761436.0547 | 9273464.5333 | 2647.0527 | b |
| 1967 | 761437.0242 | 9273466.7890 | 2647.0629 | b |
| 1968 | 761434.8349 | 9273467.7180 | 2647.4391 | e |
| 1969 | 761433.6699 | 9273469.4314 | 2647.7534 | b |
| 1970 | 761434.1523 | 9273470.7917 | 2647.8634 | b |
| 1971 | 761435.6914 | 9273470.2041 | 2647.6138 | e |
| 1972 | 761438.1703 | 9273469.5233 | 2647.2320 | b |
| 1973 | 761439.9253 | 9273471.8708 | 2647.3518 | r |
| 1974 | 761440.4598 | 9273472.8184 | 2647.4954 | r |
| 1975 | 761440.1624 | 9273473.7260 | 2647.6973 | b |
| 1976 | 761437.6015 | 9273474.4485 | 2647.8352 | e |
| 1977 | 761435.9222 | 9273474.7517 | 2647.8383 | b |
| 1978 | 761437.2569 | 9273477.4488 | 2647.9508 | b |
| 1979 | 761438.8896 | 9273476.7661 | 2647.9033 | e |
| 1980 | 761441.1792 | 9273475.9053 | 2647.9758 | b |
| 1981 | 761442.4909 | 9273477.0000 | 2648.0018 | r |
| 1982 | 761443.7232 | 9273478.9096 | 2647.9050 | r |
| 1983 | 761443.5096 | 9273480.0940 | 2648.0210 | b |
| 1984 | 761441.5668 | 9273480.8725 | 2648.1481 | e |
| 1985 | 761439.3596 | 9273481.2779 | 2648.1621 | b |
| 1986 | 761441.9065 | 9273485.3823 | 2648.6085 | b |
| 1987 | 761444.0737 | 9273484.7178 | 2648.3677 | e |
| 1988 | 761446.3654 | 9273484.8861 | 2648.1495 | b |
| 1989 | 761447.9528 | 9273487.3736 | 2648.2096 | b |
| 1990 | 761446.1035 | 9273487.8311 | 2648.4290 | e |
| 1991 | 761444.2993 | 9273488.8240 | 2648.6879 | b |
| 1992 | 761444.7923 | 9273492.0290 | 2649.0564 | r |
| 1993 | 761446.0199 | 9273491.3397 | 2648.8349 | b |
| 1994 | 761447.8201 | 9273490.4641 | 2648.5075 | e |
| 1995 | 761449.6924 | 9273489.9730 | 2648.4463 | b |
| 1996 | 761449.8059 | 9273490.6420 | 2648.5147 | b |
| 1997 | 761451.1683 | 9273492.5209 | 2648.7871 | b |
| 1998 | 761449.7597 | 9273493.4392 | 2648.7294 | e |
| 1999 | 761447.8901 | 9273494.2118 | 2648.9951 | b |
| 2000 | 761447.2695 | 9273495.2708 | 2649.0000 | r |
| 2001 | 761448.0039 | 9273498.2083 | 2649.7794 | r |
| 2002 | 761449.7988 | 9273497.3084 | 2648.9988 | b |
| 2003 | 761451.8042 | 9273496.5751 | 2648.9880 | e |
| 2004 | 761453.4262 | 9273495.2960 | 2648.9853 | b |
| 2005 | 761454.3613 | 9273496.3047 | 2648.9982 | b |
| 2006 | 761452.8050 | 9273497.8609 | 2649.0149 | e |
| 2007 | 761450.5907 | 9273498.6470 | 2649.3433 | b |
| 2008 | 761449.8594 | 9273500.2708 | 2650.0142 | r |
| 2009 | 761453.6928 | 9273501.4710 | 2649.0899 | b |
| 2010 | 761455.2364 | 9273500.4536 | 2649.0818 | e |
| 2011 | 761457.0577 | 9273499.0765 | 2649.1821 | b |
| 2012 | 761460.0578 | 9273500.2618 | 2649.1760 | r |
| 2013 | 761461.8584 | 9273500.8259 | 2649.2337 | r |
| 2014 | 761461.8398 | 9273502.7500 | 2649.4118 | b |
| 2015 | 761458.3207 | 9273502.8857 | 2649.6993 | e |
| 2016 | 761457.2499 | 9273503.9564 | 2649.9468 | b |
| 2017 | 761462.0502 | 9273508.2520 | 2649.9988 | r |
| 2018 | 761462.7038 | 9273508.0140 | 2649.9985 | b |
| 2019 | 761464.2644 | 9273506.4534 | 2649.9869 | e |
| 2020 | 761466.4624 | 9273505.9762 | 2650.2375 | b |
| 2021 | 761467.4271 | 9273506.5417 | 2650.3131 | b |
| 2022 | 761466.9991 | 9273508.0757 | 2650.5792 | e |
| 2023 | 761466.3311 | 9273510.6572 | 2650.9671 | b |
| 2024 | 761465.8100 | 9273512.0800 | 2651.7884 | r |
| 2025 | 761469.3785 | 9273513.0900 | 2651.0000 | r |
| 2026 | 761471.4818 | 9273513.6690 | 2651.0344 | b |
| 2027 | 761473.3233 | 9273511.8275 | 2651.1779 | e |
| 2028 | 761476.8311 | 9273511.4322 | 2651.2253 | b |
| 2029 | 761479.7239 | 9273511.7549 | 2651.5514 | r |
| 2030 | 761482.2215 | 9273512.9776 | 2651.8470 | r |
| 2031 | 761481.7851 | 9273513.7796 | 2652.0148 | b |
| 2032 | 761479.1498 | 9273515.2839 | 2651.9550 | e |
| 2033 | 761476.1345 | 9273516.4527 | 2651.8688 | b |
| 2034 | 761484.5820 | 9273515.8750 | 2652.1676 | E25 |
| 2035 | 761479.5891 | 9273518.4340 | 2652.0879 | b |
| 2036 | 761479.5419 | 9273520.1470 | 2653.1750 | r |
| 2037 | 761481.2565 | 9273520.0193 | 2652.0000 | r |
| 2038 | 761482.5265 | 9273521.7390 | 2654.0025 | r |
| 2039 | 761484.6015 | 9273521.1374 | 2652.6705 | b |
| 2040 | 761485.7879 | 9273519.2350 | 2652.7555 | a |
| 2041 | 761487.8136 | 9273517.651 | 2653.1054 | bm07 |
| 2042 | 761489.1224 | 9273519.0833 | 2653.0016 | b |
| 2043 | 761487.8136 | 9273520.5661 | 2653.0094 | e |
| 2044 | 761486.4884 | 9273522.4434 | 2653.0029 | b |
| 2045 | 761487.1817 | 9273524.0364 | 2653.5775 | r |
| 2046 | 761489.0235 | 9273524.4990 | 2653.7814 | b |
| 2047 | 761490.7302 | 9273522.7923 | 2653.2298 | e |
| 2048 | 761492.8069 | 9273522.4728 | 2653.4098 | b |
| 2055 | 761491.7155 | 9273526.5859 | 2653.8639 | b |
| 2056 | 761493.6220 | 9273525.3927 | 2653.7445 | e |
| 2057 | 761495.2960 | 9273524.7648 | 2653.9292 | b |
| 2058 | 761497.4482 | 9273526.7456 | 2654.0111 | b |
| 2059 | 761495.6256 | 9273527.4812 | 2653.8921 | e |
| 2060 | 761494.1886 | 9273528.9182 | 2653.9710 | b |
| 2061 | 761491.9427 | 9273530.7940 | 2655.9152 | r |
| 2062 | 761495.2116 | 9273532.4520 | 2655.0043 | r |
| 2063 | 761496.1374 | 9273531.7650 | 2653.9657 | r |
| 2064 | 761498.0060 | 9273533.4040 | 2654.1710 | b |
| 2065 | 761499.5489 | 9273532.4713 | 2654.0828 | e |
| 2066 | 761501.2188 | 9273531.1888 | 2654.0240 | b |
| 2067 | 761502.3477 | 9273532.7917 | 2654.1783 | b |
| 2068 | 761500.7417 | 9273534.1442 | 2654.4388 | e |
| 2069 | 761499.5979 | 9273535.9820 | 2654.7092 | b |
| 2070 | 761501.0945 | 9273537.8587 | 2654.7708 | b |
| 2071 | 761502.7470 | 9273536.9566 | 2654.6247 | e |
| 2072 | 761504.8117 | 9273536.6033 | 2654.6072 | b |
| 2073 | 761506.3180 | 9273538.9810 | 2654.8987 | b |
| 2074 | 761504.2863 | 9273539.1153 | 2654.8717 | e |
| 2075 | 761502.4937 | 9273539.8090 | 2654.9472 | b |
| 2076 | 761504.7237 | 9273543.2203 | 2654.9896 | b |
| 2077 | 761506.6575 | 9273542.4408 | 2655.0094 | e |
| 2078 | 761508.3597 | 9273542.0270 | 2655.0056 | b |
| 2079 | 761510.8602 | 9273543.4010 | 2654.9857 | r |
| 2080 | 761510.1145 | 9273543.7070 | 2655.0074 | r |
| 2081 | 761512.3503 | 9273547.6108 | 2655.2555 | b |
| 2082 | 761509.3110 | 9273549.8132 | 2655.4524 | b |
| 2083 | 761512.9510 | 9273554.6860 | 2655.9038 | b |
| 2084 | 761514.7346 | 9273553.7688 | 2655.9427 | e |
| 2085 | 761516.4351 | 9273553.1260 | 2655.9914 | b |
| 2086 | 761518.5420 | 9273554.2924 | 2656.0089 | r |
| 2087 | 761520.5874 | 9273557.2962 | 2656.0102 | r |
| 2088 | 761522.6752 | 9273559.6994 | 2656.0243 | r |
| 2089 | 761522.5129 | 9273561.3433 | 2656.0286 | b |
| 2090 | 761520.8188 | 9273562.3017 | 2656.0373 | e |
| 2091 | 761518.5156 | 9273562.2708 | 2656.0226 | b |
| 2092 | 761518.3732 | 9273564.4720 | 2656.1143 | r |
| 2093 | 761518.7539 | 9273565.0833 | 2656.1131 | r |
| 2094 | 761519.9271 | 9273564.5000 | 2656.0093 | b |
| 2095 | 761521.6556 | 9273563.4753 | 2656.0286 | e |
| 2096 | 761523.2584 | 9273562.3326 | 2656.0242 | b |
| 2097 | 761524.2232 | 9273563.6070 | 2656.0293 | b |
| 2098 | 761522.6604 | 9273564.8845 | 2656.1596 | e |
| 2099 | 761521.1030 | 9273566.0280 | 2656.3005 | b |
| 2100 | 761521.8823 | 9273567.2564 | 2656.6479 | b |
| 2101 | 761523.6652 | 9273566.2937 | 2656.4953 | e |
| 2102 | 761525.1631 | 9273564.7480 | 2656.1430 | b |
| 2103 | 761527.8194 | 9273567.9345 | 2656.5288 | r |
| 2104 | 761529.5943 | 9273568.4082 | 2656.6026 | r |
| 2105 | 761530.2569 | 9273570.5570 | 2656.9838 | b |
| 2106 | 761527.9150 | 9273572.0949 | 2656.9093 | e |
| 2107 | 761526.6450 | 9273573.3649 | 2656.9946 | b |
| 2111 | 761528.9023 | 9273575.6573 | 2656.9935 | b |
| 2112 | 761530.1449 | 9273574.4147 | 2657.0129 | e |
| 2113 | 761532.1142 | 9273572.6874 | 2657.0491 | b |
| 2114 | 761534.7679 | 9273574.9999 | 2657.1417 | b |
| 2115 | 761533.0458 | 9273576.7219 | 2657.4561 | e |
| 2116 | 761531.3182 | 9273577.7990 | 2657.5955 | b |
| 2117 | 761531.0352 | 9273578.4375 | 2657.6928 | r |
| 2118 | 761533.0446 | 9273580.4210 | 2657.9928 | r |
| 2119 | 761533.7592 | 9273579.6890 | 2657.9012 | b |
| 2120 | 761535.3293 | 9273578.1189 | 2657.6396 | e |
| 2121 | 761536.6944 | 9273576.2920 | 2657.3481 | b |
| 2122 | 761540.0794 | 9273577.7220 | 2657.9471 | b |
| 2123 | 761538.7973 | 9273579.6856 | 2657.8696 | e |
| 2124 | 761538.0547 | 9273581.7917 | 2657.9339 | b |
| 2125 | 761538.8564 | 9273584.0090 | 2657.9834 | r |
| 2126 | 761542.1537 | 9273583.5760 | 2658.1433 | b |
| 2127 | 761543.5403 | 9273580.9301 | 2658.1678 | e |
| 2128 | 761544.6747 | 9273578.9430 | 2658.1327 | b |
| 2129 | 761548.2344 | 9273579.3249 | 2658.5711 | b |
| 2130 | 761547.7384 | 9273581.2713 | 2658.5962 | e |
| 2131 | 761546.5998 | 9273584.4367 | 2658.7501 | b |
| 2132 | 761548.8516 | 9273584.2292 | 2658.9547 | b |
| 2133 | 761550.1593 | 9273581.1584 | 2658.8356 | e |
| 2134 | 761550.0194 | 9273579.1010 | 2658.8067 | b |
| 2135 | 761552.2344 | 9273576.6250 | 2659.0000 | r |
| 2136 | 761552.2761 | 9273575.6750 | 2658.8349 | r |
| 2137 | 761554.3567 | 9273578.0040 | 2658.9888 | b |
| 2138 | 761553.8323 | 9273580.5471 | 2658.9758 | e |
| 2139 | 761554.0918 | 9273582.8410 | 2658.9932 | b |
| 2140 | 761557.7656 | 9273575.9792 | 2658.9993 | b |
| 2141 | 761557.8906 | 9273574.8125 | 2659.0569 | r |
| 2142 | 761559.5464 | 9273573.8960 | 2659.6108 | r |
| 2143 | 761560.0289 | 9273572.1316 | 2660.0000 | r |
| 2144 | 761559.5340 | 9273571.2010 | 2658.9579 | r |
| 2145 | 761551.1086 | 9273562.8218 | 2656.7410 | r |
| 2146 | 761560.5549 | 9273561.8698 | 2657.4911 | r |
| 2147 | 761562.6941 | 9273572.1228 | 2659.9078 | r |
| 2148 | 761561.2327 | 9273577.5625 | 2659.1109 | e |
| 2149 | 761557.4636 | 9273579.3840 | 2658.9825 | e |
| 2150 | 761559.1294 | 9273580.9080 | 2658.9995 | b |
| 2151 | 761562.4961 | 9273580.6667 | 2658.9996 | r |
| 2152 | 761562.4547 | 9273578.5970 | 2659.0613 | b |
| 2153 | 761563.4956 | 9273575.9783 | 2659.4189 | e |
| 2154 | 761561.9800 | 9273573.3475 | 2659.7115 | b |
| 2155 | 761565.5365 | 9273570.5000 | 2659.9999 | r |
| 2156 | 761568.1309 | 9273570.3700 | 2659.9997 | b |
| 2157 | 761568.6070 | 9273572.4000 | 2659.9996 | e |
| 2158 | 761569.0682 | 9273574.5950 | 2659.9234 | b |
| 2159 | 761571.9801 | 9273573.2004 | 2659.9997 | b |
| 2160 | 761575.2626 | 9273570.6810 | 2659.9997 | b |
| 2162 | 761573.9134 | 9273568.6853 | 2659.9991 | e |
| 2163 | 761573.5991 | 9273567.5086 | 2659.9995 | b |
| 2165 | 761574.3348 | 9273566.4580 | 2659.9996 | r |
| 2166 | 761574.6367 | 9273566.7599 | 2659.9993 | b |
| 2167 | 761575.4714 | 9273567.5946 | 2659.9987 | e |
| 2168 | 761577.3456 | 9273569.0609 | 2659.9992 | b |
| 2169 | 761579.0682 | 9273567.7126 | 2659.9993 | b |
| 2170 | 761577.8298 | 9273565.9436 | 2659.9980 | e |
| 2171 | 761576.6028 | 9273565.1080 | 2659.9996 | b |
| 2172 | 761576.3398 | 9273563.8125 | 2660.0000 | r |
| 2173 | 761579.7739 | 9273561.9100 | 2659.9985 | r |
| 2174 | 761579.9346 | 9273561.9168 | 2659.9986 | b |
| 2175 | 761581.1342 | 9273563.6303 | 2659.9966 | e |
| 2176 | 761582.1336 | 9273565.2940 | 2659.9996 | b |
| 2178 | 761588.9700 | 9273569.7599 | 2663.3062 | r |
| 2179 | 761591.5977 | 9273575.0296 | 2664.9947 | r |
| 2180 | 761594.2235 | 9273579.8308 | 2667.1231 | r |
| 2181 | 761596.9006 | 9273584.4056 | 2669.2892 | r |
| 2182 | 761593.4937 | 9273588.4374 | 2670.0000 | r |
| 2183 | 761588.8607 | 9273589.7859 | 2669.4002 | r |
| 2184 | 761583.0400 | 9273586.2832 | 2666.8721 | r |
| 2185 | 761576.9694 | 9273578.5610 | 2663.0207 | r |
| 2186 | 761584.9900 | 9273563.0180 | 2659.9996 | b |
| 2187 | 761583.9687 | 9273561.6461 | 2659.9962 | e |
| 2188 | 761582.9354 | 9273559.2151 | 2659.9997 | b |
| 2189 | 761582.5137 | 9273558.4670 | 2660.0000 | r |
| 2190 | 761585.5595 | 9273556.9257 | 2660.0097 | b |
| 2191 | 761587.1968 | 9273559.0060 | 2660.0049 | e |
| 2192 | 761588.6065 | 9273560.4157 | 2660.6329 | b |
| 2193 | 761592.1079 | 9273557.3236 | 2661.0226 | b |
| 2194 | 761591.1085 | 9273555.1744 | 2660.4080 | e |
| 2195 | 761589.2488 | 9273553.1746 | 2660.0918 | b |
| 2197 | 761640.7591 | 9273510.2917 | 2662.7793 | E26 |
| 2198 | 761585.8515 | 9273549.4039 | 2658.8845 | c |
| 2199 | 761592.3828 | 9273542.1910 | 2658.5989 | c |
| 2200 | 761593.2486 | 9273548.8757 | 2660.1862 | b |
| 2201 | 761595.2496 | 9273550.1393 | 2660.6019 | e |
| 2204 | 761597.2288 | 9273551.3736 | 2660.9298 | b |
| 2205 | 761598.7578 | 9273550.8125 | 2660.9769 | r |
| 2206 | 761599.9354 | 9273551.2001 | 2662.1063 | r |
| 2207 | 761599.8591 | 9273547.2860 | 2660.8704 | b |
| 2208 | 761598.3165 | 9273545.2826 | 2660.4620 | e |
| 2209 | 761597.1411 | 9273543.5300 | 2660.1391 | b |
| 2210 | 761598.7298 | 9273540.7830 | 2660.1933 | r |
| 2211 | 761599.4587 | 9273540.0541 | 2660.2711 | b |
| 2212 | 761601.9270 | 9273539.5651 | 2660.5603 | e |
| 2213 | 761603.6484 | 9273541.1875 | 2660.8955 | b |
| 2214 | 761606.4699 | 9273538.4445 | 2661.4660 | r |
| 2215 | 761610.4669 | 9273535.5389 | 2663.0586 | r |
| 2217 | 761608.6295 | 9273533.1962 | 2660.9856 | b |
| 2218 | 761606.5358 | 9273532.2666 | 2661.0133 | e |
| 2219 | 761603.3711 | 9273533.4583 | 2660.9695 | b |
| 2220 | 761602.8008 | 9273532.5000 | 2661.0077 | r |
| 2221 | 761601.5062 | 9273528.4050 | 2658.9767 | r |
| 2222 | 761593.5629 | 9273514.2229 | 2657.3830 | r |
| 2223 | 761597.3311 | 9273506.1878 | 2656.6375 | r |
| 2224 | 761602.0809 | 9273502.3478 | 2656.3655 | r |
| 2225 | 761611.9198 | 9273498.3949 | 2657.3371 | r |
| 2226 | 761621.1933 | 9273508.7854 | 2660.7539 | r |
| 2227 | 761604.7447 | 9273530.5000 | 2661.0181 | b |
| 2228 | 761607.1955 | 9273531.2220 | 2661.0412 | e |
| 2229 | 761609.6358 | 9273531.6740 | 2661.0877 | b |
| 2230 | 761612.6701 | 9273530.0265 | 2662.4506 | r |
| 2231 | 761612.1000 | 9273528.0614 | 2661.7005 | b |
| 2232 | 761610.2629 | 9273526.8372 | 2661.4985 | e |
| 2233 | 761607.5837 | 9273525.9660 | 2661.2649 | b |
| 2234 | 761607.7436 | 9273523.8406 | 2662.0000 | r |
| 2235 | 761608.9983 | 9273522.7960 | 2661.9228 | r |
| 2236 | 761610.7325 | 9273522.4316 | 2661.6680 | b |
| 2237 | 761612.6455 | 9273524.2863 | 2661.3417 | e |
| 2238 | 761613.9579 | 9273525.4390 | 2661.1788 | b |
| 2239 | 761614.8633 | 9273525.5210 | 2661.0000 | r |
| 2240 | 761615.4964 | 9273524.0961 | 2661.3619 | b |
| 2241 | 761614.2573 | 9273522.8571 | 2661.3808 | e |
| 2242 | 761611.8124 | 9273521.4550 | 2661.6094 | b |
| 2243 | 761613.8499 | 9273519.2850 | 2661.9724 | r |
| 2244 | 761614.8614 | 9273519.4635 | 2661.9554 | b |
| 2245 | 761616.1990 | 9273521.3845 | 2661.9183 | e |
| 2246 | 761617.1406 | 9273522.8850 | 2661.9759 | b |
| 2247 | 761620.9095 | 9273521.5076 | 2661.9922 | r |
| 2248 | 761621.1486 | 9273520.8840 | 2661.9826 | b |
| 2249 | 761620.5628 | 9273518.8620 | 2661.9658 | e |
| 2250 | 761619.5176 | 9273516.9182 | 2662.1682 | b |
| 2251 | 761623.0580 | 9273515.2840 | 2662.2766 | b |
| 2252 | 761623.8185 | 9273517.5558 | 2662.3451 | e |
| 2253 | 761624.4997 | 9273519.4162 | 2661.9815 | b |
| 2254 | 761627.5816 | 9273519.1403 | 2662.8599 | r |
| 2255 | 761627.3965 | 9273518.3740 | 2662.4323 | b |
| 2256 | 761626.9730 | 9273516.6738 | 2662.0619 | e |
| 2257 | 761626.8836 | 9273514.0112 | 2662.0123 | b |
| 2258 | 761627.5508 | 9273510.9167 | 2662.0147 | r |
| 2259 | 761628.5971 | 9273511.0960 | 2662.0000 | r |
| 2260 | 761629.4975 | 9273513.1930 | 2662.0045 | b |
| 2261 | 761630.9998 | 9273515.6707 | 2662.0050 | e |
| 2262 | 761632.4181 | 9273517.0890 | 2662.1203 | b |
| 2263 | 761632.4908 | 9273517.6090 | 2662.1129 | r |
| 2264 | 761633.8616 | 9273518.4630 | 2663.1082 | r |
| 2265 | 761637.4481 | 9273518.2150 | 2663.3804 | r |
| 2266 | 761638.3919 | 9273516.9375 | 2663.0053 | r |
| 2267 | 761638.2786 | 9273516.7292 | 2662.9919 | r |
| 2268 | 761638.3719 | 9273515.6510 | 2662.8742 | b |
| 2269 | 761637.9457 | 9273513.9403 | 2662.6704 | e |
| 2270 | 761636.4970 | 9273511.2710 | 2662.4079 | b |
| 2271 | 761640.7591 | 9273510.2917 | 2662.7793 | E27 |
| 2272 | 761641.3581 | 9273516.3125 | 2663.1006 | r |
| 2273 | 761642.0309 | 9273516.2520 | 2663.0931 | r |
| 2274 | 761643.1021 | 9273516.7350 | 2663.3878 | r |
| 2275 | 761643.0950 | 9273515.4760 | 2662.9944 | r |
| 2276 | 761646.2253 | 9273513.6875 | 2662.9930 | b |
| 2277 | 761645.8008 | 9273511.9835 | 2663.0030 | e |
| 2278 | 761646.9084 | 9273508.7450 | 2663.0240 | b |
| 2279 | 761649.2360 | 9273505.0490 | 2662.8518 | r |
| 2280 | 761657.7516 | 9273502.2890 | 2664.2328 | r |
| 2281 | 761656.5378 | 9273506.3570 | 2663.8878 | b |
| 2282 | 761656.8923 | 9273509.2204 | 2663.6335 | e |
| 2283 | 761657.9577 | 9273511.0110 | 2663.5737 | b |
| 2284 | 761659.9978 | 9273511.4490 | 2663.6965 | r |
| 2285 | 761663.1001 | 9273510.8381 | 2663.9641 | r |
| 2286 | 761663.4229 | 9273510.2764 | 2664.0000 | b |
| 2287 | 761662.8949 | 9273507.7250 | 2664.1552 | e |
| 2288 | 761662.6536 | 9273505.8125 | 2664.4179 | b |
| 2289 | 761666.9297 | 9273503.8902 | 2664.8767 | r |
| 2290 | 761670.8975 | 9273504.5570 | 2664.8847 | b |
| 2291 | 761669.3051 | 9273506.3433 | 2664.5818 | e |
| 2292 | 761669.3803 | 9273509.5603 | 2664.1204 | b |
| 2293 | 761671.8169 | 9273510.3980 | 2664.1458 | r |
| 2294 | 761674.6897 | 9273509.1340 | 2664.6456 | b |
| 2295 | 761675.0564 | 9273505.6940 | 2664.9746 | e |
| 2296 | 761677.1354 | 9273504.4375 | 2665.2230 | b |
| 2297 | 761681.9914 | 9273504.1191 | 2665.6521 | b |
| 2298 | 761681.3825 | 9273505.6216 | 2665.4760 | e |
| 2299 | 761681.2948 | 9273509.0324 | 2665.0620 | b |
| 2300 | 761684.4384 | 9273509.1261 | 2665.2408 | b |
| 2301 | 761684.7590 | 9273505.8567 | 2665.6233 | e |
| 2302 | 761684.4375 | 9273504.0417 | 2665.8428 | b |
| 2303 | 761686.4543 | 9273502.0249 | 2666.0021 | r |
| 2304 | 761689.5273 | 9273504.6875 | 2665.9614 | b |
| 2305 | 761688.7862 | 9273506.3898 | 2665.7086 | e |
| 2306 | 761686.8009 | 9273509.2570 | 2665.4339 | b |
| 2307 | 761693.4272 | 9273509.7010 | 2665.8565 | b |
| 2308 | 761693.9589 | 9273507.4789 | 2666.0009 | e |
| 2309 | 761694.3955 | 9273505.6520 | 2666.0192 | b |
| 2310 | 761696.8957 | 9273505.1270 | 2666.0367 | r |
| 2311 | 761701.8880 | 9273507.3333 | 2666.0928 | b |
| 2312 | 761701.6660 | 9273509.3232 | 2666.0881 | e |
| 2313 | 761701.7141 | 9273511.3971 | 2666.1033 | b |
| 2314 | 761705.8934 | 9273515.2692 | 2666.1671 | r |
| 2315 | 761707.2963 | 9273513.3485 | 2666.1365 | b |
| 2316 | 761707.5338 | 9273511.1917 | 2666.0910 | e |
| 2317 | 761707.3613 | 9273508.9520 | 2666.0606 | b |
| 2318 | 761713.2528 | 9273510.8492 | 2666.3662 | r |
| 2319 | 761712.7404 | 9273511.3615 | 2666.3412 | b |
| 2320 | 761711.3055 | 9273512.7964 | 2666.3182 | e |
| 2321 | 761710.0657 | 9273514.5851 | 2666.3170 | b |
| 2322 | 761714.2356 | 9273517.9594 | 2666.6403 | r |
| 2325 | 761714.6665 | 9273517.0820 | 2666.6320 | b |
| 2326 | 761716.5026 | 9273515.6015 | 2666.6882 | e |
| 2327 | 761718.2891 | 9273514.3539 | 2666.8208 | b |
| 2328 | 761721.0625 | 9273516.0625 | 2666.9986 | b |
| 2329 | 761719.1701 | 9273517.3460 | 2666.9195 | e |
| 2330 | 761717.9765 | 9273519.2660 | 2666.8718 | b |
| 2331 | 761721.1577 | 9273522.8348 | 2667.0090 | r |
| 2332 | 761722.0883 | 9273522.4232 | 2666.9981 | b |
| 2333 | 761724.2720 | 9273521.0030 | 2667.0786 | e |
| 2334 | 761726.5802 | 9273519.5579 | 2667.2108 | b |
| 2335 | 761728.9138 | 9273521.0830 | 2667.4846 | b |
| 2336 | 761727.3725 | 9273523.2294 | 2667.2771 | e |
| 2337 | 761726.4836 | 9273525.1720 | 2667.1440 | b |
| 2338 | 761730.9127 | 9273527.9414 | 2667.9592 | b |
| 2339 | 761732.6922 | 9273527.0494 | 2667.9680 | e |
| 2340 | 761734.5508 | 9273525.4792 | 2668.0026 | b |
| 2341 | 761737.3575 | 9273526.4000 | 2668.1406 | r |
| 2342 | 761739.4129 | 9273529.1468 | 2668.4840 | b |
| 2343 | 761737.4802 | 9273530.4876 | 2668.2894 | e |
| 2344 | 761735.6692 | 9273531.2730 | 2668.0914 | b |
| 2345 | 761738.4688 | 9273533.5404 | 2668.3353 | b |
| 2346 | 761740.2323 | 9273532.4639 | 2668.5731 | e |
| 2347 | 761741.4323 | 9273530.7083 | 2668.7420 | b |
| 2348 | 761744.0313 | 9273530.7083 | 2668.9705 | r |
| 2349 | 761743.8338 | 9273531.0960 | 2669.0012 | r |
| 2350 | 761743.4921 | 9273532.5361 | 2668.9470 | b |
| 2351 | 761741.6991 | 9273533.5172 | 2668.6958 | e |
| 2352 | 761740.0130 | 9273534.6458 | 2668.4548 | b |
| 2353 | 761740.6211 | 9273538.3740 | 2668.4738 | r |
| 2354 | 761741.2966 | 9273537.9720 | 2668.6107 | r |
| 2355 | 761743.3095 | 9273536.9218 | 2668.9513 | b |
| 2356 | 761744.8701 | 9273535.7943 | 2669.0001 | e |
| 2357 | 761746.7960 | 9273535.0060 | 2669.1182 | b |
| 2358 | 761753.8503 | 9273534.1250 | 2669.3677 | r |
| 2359 | 761753.2529 | 9273539.8828 | 2669.7880 | b |
| 2360 | 761752.3380 | 9273541.1569 | 2669.6892 | e |
| 2361 | 761750.7006 | 9273543.5805 | 2669.6430 | b |
| 2362 | 761754.1995 | 9273546.1348 | 2669.9941 | b |
| 2363 | 761756.1085 | 9273543.4089 | 2670.2391 | e |
| 2364 | 761758.8747 | 9273542.7440 | 2670.4175 | b |
| 2365 | 761761.5608 | 9273543.8530 | 2670.7395 | b |
| 2367 | 761760.5265 | 9273545.3410 | 2670.7498 | e |
| 2368 | 761758.7038 | 9273547.6960 | 2670.8514 | b |
| 2369 | 761762.7930 | 9273548.3226 | 2671.1367 | b |
| 2370 | 761764.0797 | 9273546.4154 | 2671.2380 | e |
| 2371 | 761765.5599 | 9273544.8333 | 2671.1914 | b |
| 2373 | 761773.4993 | 9273545.6125 | 2671.9127 | b |
| 2374 | 761772.9171 | 9273547.6700 | 2671.8940 | e |
| 2375 | 761772.7532 | 9273549.5981 | 2671.9714 | b |
| 2376 | 761776.4948 | 9273551.0625 | 2673.4273 | r |
| 2377 | 761780.2969 | 9273550.4690 | 2672.9892 | b |
| 2378 | 761780.5025 | 9273548.4378 | 2672.7189 | e |
| 2379 | 761781.3075 | 9273546.5434 | 2672.5403 | b |
| 2380 | 761778.4590 | 9273542.4320 | 2672.0535 | r |
| 2381 | 761787.7570 | 9273538.7962 | 2672.1350 | r |
| 2382 | 761784.2355 | 9273535.1646 | 2671.3915 | r |
| 2383 | 761772.6261 | 9273530.6242 | 2669.1662 | r |
| 2384 | 761787.5551 | 9273547.4035 | 2673.0508 | b |
| 2385 | 761787.8149 | 9273549.5588 | 2673.0817 | e |
| 2386 | 761787.4389 | 9273551.9828 | 2673.1027 | b |
| 2387 | 761793.7335 | 9273554.3450 | 2673.9301 | b |
| 2388 | 761794.8181 | 9273552.0741 | 2673.8102 | e |
| 2389 | 761795.5612 | 9273550.3478 | 2673.7151 | b |
| 2390 | 761804.2858 | 9273555.3973 | 2674.5251 | b |
| 2391 | 761801.2846 | 9273556.0220 | 2674.4746 | e |
| 2392 | 761799.6827 | 9273557.6239 | 2674.4836 | b |
| 2393 | 761805.1163 | 9273561.7503 | 2675.3123 | b |
| 2394 | 761806.3951 | 9273560.1991 | 2674.9934 | e |
| 2395 | 761807.5435 | 9273558.7336 | 2674.9380 | b |
| 2396 | 761809.9241 | 9273558.5231 | 2675.0114 | r |
| 2397 | 761810.1628 | 9273560.0589 | 2675.0568 | r |
| 2398 | 761810.0803 | 9273560.7718 | 2675.0798 | b |
| 2399 | 761808.3834 | 9273561.8383 | 2675.1660 | e |
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| 2401 | 761809.2832 | 9273565.2922 | 2675.7585 | b |
| 2402 | 761811.5021 | 9273564.0643 | 2675.4218 | e |
| 2403 | 761813.6233 | 9273563.0106 | 2675.2996 | b |
| 2404 | 761815.8477 | 9273564.1250 | 2675.3771 | b |
| 2405 | 761814.8044 | 9273566.0435 | 2675.6442 | e |
| 2406 | 761813.5480 | 9273568.1143 | 2676.0000 | b |
| 2407 | 761817.4835 | 9273569.8310 | 2676.1891 | b |
| 2408 | 761818.3138 | 9273567.7825 | 2676.0231 | e |
| 2409 | 761819.7283 | 9273565.7262 | 2676.0188 | b |
| 2410 | 761823.2695 | 9273567.0760 | 2676.3133 | b |
| 2411 | 761821.9413 | 9273569.2527 | 2676.4205 | e |
| 2412 | 761821.0740 | 9273571.2694 | 2676.5390 | b |
| 2413 | 761820.6836 | 9273572.4792 | 2676.7244 | r |
| 2414 | 761827.0880 | 9273575.3620 | 2677.6389 | r |
| 2415 | 761830.1537 | 9273575.1170 | 2677.7885 | b |
| 2416 | 761831.2205 | 9273573.0135 | 2677.6487 | e |
| 2417 | 761833.1590 | 9273571.0730 | 2677.7517 | b |
| 2418 | 761840.9934 | 9273568.9490 | 2677.7598 | r |
| 2419 | 761840.2651 | 9273569.6920 | 2678.0125 | r |
| 2420 | 761836.5984 | 9273572.8160 | 2678.0666 | b |
| 2421 | 761835.7709 | 9273574.8578 | 2678.0489 | e |
| 2422 | 761834.8208 | 9273577.4371 | 2678.0823 | b |
| 2423 | 761836.8437 | 9273579.6200 | 2678.7669 | r |
| 2424 | 761837.8357 | 9273579.2399 | 2678.7884 | b |
| 2425 | 761839.8613 | 9273576.7681 | 2678.5876 | e |
| 2426 | 761842.5379 | 9273576.3990 | 2678.8201 | b |
| 2433 | 761845.2132 | 9273581.0761 | 2679.0423 | e |
| 2473 | 761923.1732 | 9273671.7292 | 2684.1019 | E28 |
| 2474 | 761846.5172 | 9273580.3220 | 2679.0230 | b |
| 2475 | 761845.3067 | 9273581.1785 | 2679.0437 | e |
| 2476 | 761842.6059 | 9273582.6870 | 2678.9648 | b |
| 2477 | 761844.9153 | 9273585.0429 | 2679.0859 | b |
| 2478 | 761847.4440 | 9273583.8594 | 2679.2972 | e |
| 2479 | 761848.7295 | 9273583.2458 | 2679.1672 | b |
| 2480 | 761851.1860 | 9273586.5329 | 2679.2755 | b |
| 2481 | 761849.2917 | 9273586.9978 | 2679.4998 | e |
| 2482 | 761847.3090 | 9273588.7060 | 2679.8599 | b |
| 2483 | 761847.9374 | 9273593.7644 | 2680.4411 | r |
| 2484 | 761850.1987 | 9273596.9730 | 2680.3017 | r |
| 2485 | 761850.0915 | 9273593.5044 | 2679.9112 | b |
| 2486 | 761851.5435 | 9273590.8226 | 2679.5236 | e |
| 2487 | 761853.9033 | 9273590.2200 | 2679.2020 | b |
| 2488 | 761855.7738 | 9273593.2223 | 2679.2545 | b |
| 2489 | 761853.5383 | 9273594.2109 | 2679.5717 | e |
| 2490 | 761852.0471 | 9273596.2435 | 2679.9105 | b |
| 2491 | 761853.4180 | 9273597.9375 | 2679.8786 | b |
| 2492 | 761854.9890 | 9273596.5733 | 2679.6002 | e |
| 2493 | 761856.8028 | 9273594.7955 | 2679.2607 | b |
| 2494 | 761859.4328 | 9273598.5934 | 2679.2642 | b |
| 2495 | 761856.7760 | 9273599.1224 | 2679.6080 | e |
| 2496 | 761855.4838 | 9273600.4146 | 2679.8679 | b |
| 2497 | 761857.6468 | 9273603.0666 | 2679.8829 | b |
| 2498 | 761859.4332 | 9273602.2313 | 2679.5923 | e |
| 2499 | 761861.5320 | 9273601.4200 | 2679.2758 | b |
| 2500 | 761862.9886 | 9273603.2809 | 2679.4576 | b |
| 2501 | 761860.9158 | 9273603.9659 | 2679.6445 | e |
| 2502 | 761858.5571 | 9273604.2030 | 2679.9332 | b |
| 2503 | 761861.3927 | 9273604.5239 | 2679.7106 | e |
| 2504 | 761859.9633 | 9273605.9533 | 2679.9882 | b |
| 2505 | 761858.6036 | 9273607.1020 | 2681.0006 | r |
| 2506 | 761858.6549 | 9273608.0417 | 2681.0896 | r |
| 2507 | 761859.6457 | 9273608.6080 | 2681.0908 | r |
| 2508 | 761860.4336 | 9273609.4583 | 2681.1195 | r |
| 2509 | 761864.4050 | 9273611.2959 | 2680.6942 | b |
| 2510 | 761866.1394 | 9273610.0773 | 2680.3602 | e |
| 2511 | 761868.7067 | 9273609.2480 | 2680.0918 | b |
| 2512 | 761871.3143 | 9273609.3300 | 2680.0255 | r |
| 2513 | 761871.0977 | 9273609.6875 | 2680.0785 | r |
| 2514 | 761873.4175 | 9273614.1090 | 2680.4423 | b |
| 2515 | 761870.2939 | 9273614.9379 | 2680.6427 | e |
| 2516 | 761868.3565 | 9273615.8270 | 2680.8770 | b |
| 2517 | 761863.6498 | 9273613.4380 | 2681.1014 | r |
| 2518 | 761865.4569 | 9273615.3530 | 2681.0771 | r |
| 2519 | 761865.9468 | 9273616.3490 | 2681.1966 | r |
| 2520 | 761867.0162 | 9273616.3940 | 2680.9960 | r |
| 2521 | 761867.4026 | 9273617.5470 | 2681.2475 | r |
| 2522 | 761867.3477 | 9273617.8333 | 2681.3605 | r |
| 2523 | 761872.7552 | 9273620.5870 | 2680.9921 | b |
| 2524 | 761874.3827 | 9273619.7216 | 2680.9406 | e |
| 2525 | 761876.8558 | 9273617.7211 | 2680.8058 | b |
| 2526 | 761880.0171 | 9273621.6378 | 2681.0282 | b |
| 2527 | 761877.5067 | 9273623.3768 | 2681.0266 | e |
| 2528 | 761877.1336 | 9273625.6448 | 2681.0329 | b |
| 2529 | 761881.1637 | 9273623.2370 | 2681.0329 | b |
| 2530 | 761880.0821 | 9273626.6519 | 2681.2061 | e |
| 2531 | 761880.0310 | 9273629.6517 | 2681.5884 | b |
| 2532 | 761881.7009 | 9273629.0114 | 2681.4542 | e |
| 2533 | 761884.1593 | 9273627.9869 | 2681.1793 | b |
| 2534 | 761886.5146 | 9273632.1536 | 2681.3276 | b |
| 2535 | 761883.5281 | 9273632.0458 | 2681.5646 | e |
| 2536 | 761882.1706 | 9273633.0833 | 2681.7578 | b |
| 2537 | 761864.9340 | 9273633.9248 | 2684.6633 | r |
| 2538 | 761856.1251 | 9273629.4946 | 2686.0000 | r |
| 2539 | 761851.3069 | 9273621.1283 | 2684.8357 | r |
| 2540 | 761843.9793 | 9273624.6898 | 2688.0000 | r |
| 2541 | 761850.6966 | 9273636.3623 | 2689.3902 | r |
| 2542 | 761856.9863 | 9273650.4790 | 2690.0000 | r |
| 2543 | 761845.6982 | 9273648.1860 | 2694.0000 | r |
| 2544 | 761849.5296 | 9273659.2002 | 2697.1623 | r |
| 2545 | 761867.9208 | 9273660.7497 | 2690.0000 | r |
| 2546 | 761870.6224 | 9273670.0653 | 2692.0000 | r |
| 2547 | 761886.8077 | 9273641.7398 | 2681.9816 | b |
| 2548 | 761888.3682 | 9273641.9822 | 2681.9845 | e |
| 2549 | 761891.7883 | 9273643.5259 | 2681.7835 | b |
| 2550 | 761898.4815 | 9273646.1999 | 2680.6714 | r |
| 2551 | 761901.8359 | 9273650.7739 | 2680.5728 | r |
| 2552 | 761908.5446 | 9273652.5132 | 2679.3677 | r |
| 2553 | 761907.8349 | 9273656.8938 | 2680.5908 | r |
| 2554 | 761899.7094 | 9273657.0447 | 2682.3479 | r |
| 2555 | 761895.2196 | 9273653.6580 | 2682.2304 | b |
| 2556 | 761894.1410 | 9273654.1689 | 2682.3826 | e |
| 2557 | 761892.1112 | 9273654.1384 | 2682.5524 | b |
| 2558 | 761890.8252 | 9273655.8090 | 2682.8592 | r |
| 2559 | 761892.6000 | 9273655.4844 | 2682.6753 | b |
| 2560 | 761894.8148 | 9273655.5913 | 2682.5118 | e |
| 2561 | 761896.2989 | 9273655.5140 | 2682.3050 | b |
| 2562 | 761897.9311 | 9273657.7696 | 2682.6355 | b |
| 2563 | 761896.2292 | 9273658.5772 | 2682.7929 | e |
| 2564 | 761893.5893 | 9273658.3570 | 2682.9448 | b |
| 2565 | 761893.0399 | 9273660.4830 | 2683.7403 | r |
| 2566 | 761893.0157 | 9273661.2693 | 2684.0000 | r |
| 2567 | 761893.3409 | 9273663.1852 | 2684.4750 | r |
| 2568 | 761896.7468 | 9273663.4600 | 2683.6358 | b |
| 2569 | 761898.2378 | 9273662.9469 | 2683.5759 | e |
| 2570 | 761900.9598 | 9273661.1660 | 2683.1017 | b |
| 2571 | 761903.6407 | 9273661.9517 | 2682.8900 | r |
| 2572 | 761904.7881 | 9273662.5507 | 2682.9303 | r |
| 2573 | 761903.5055 | 9273663.6662 | 2683.1748 | b |
| 2574 | 761901.2088 | 9273666.9259 | 2683.7834 | e |
| 2575 | 761901.1367 | 9273667.5679 | 2683.8699 | b |
| 2576 | 761903.1265 | 9273669.3330 | 2683.9344 | b |
| 2577 | 761903.7930 | 9273669.0254 | 2683.8458 | e |
| 2578 | 761906.7177 | 9273666.5841 | 2683.3316 | b |
| 2579 | 761909.5355 | 9273667.7174 | 2683.8211 | r |
| 2580 | 761912.0413 | 9273668.4175 | 2684.0511 | r |
| 2581 | 761909.9347 | 9273669.0379 | 2684.0488 | b |
| 2582 | 761907.2287 | 9273670.7191 | 2684.0231 | e |
| 2583 | 761905.7264 | 9273671.7370 | 2684.0333 | b |
| 2584 | 761905.4762 | 9273673.2435 | 2684.6446 | r |
| 2585 | 761906.7866 | 9273673.7876 | 2684.6510 | r |
| 2586 | 761907.8763 | 9273674.0338 | 2684.6663 | r |
| 2587 | 761908.9844 | 9273673.3542 | 2684.3818 | b |
| 2588 | 761910.0709 | 9273671.4337 | 2684.1888 | e |
| 2589 | 761912.0944 | 9273669.7711 | 2684.1110 | b |
| 2590 | 761914.1017 | 9273669.8965 | 2684.0565 | b |
| 2591 | 761913.9043 | 9273671.5659 | 2684.1160 | e |
| 2592 | 761912.7062 | 9273674.0219 | 2684.0487 | b |
| 2593 | 761916.8357 | 9273673.5606 | 2684.0000 | b |
| 2594 | 761921.3166 | 9273671.7580 | 2684.0047 | b |
| 2596 | 761920.2265 | 9273669.6545 | 2684.0084 | e |
| 2597 | 761919.3598 | 9273667.9820 | 2684.0167 | b |
| 2598 | 761915.5588 | 9273669.6723 | 2684.0043 | b |
| 2599 | 761916.0696 | 9273671.2292 | 2683.3435 | e |
| 2600 | 761920.8117 | 9273672.3840 | 2681.9867 | r |
| 2601 | 761919.8477 | 9273674.2500 | 2681.8304 | r |
| 2602 | 761922.0260 | 9273674.7930 | 2681.7504 | r |
| 2603 | 761920.7930 | 9273677.7083 | 2681.0000 | r |
| 2604 | 761917.0520 | 9273681.6100 | 2685.1703 | r |
| 2605 | 761920.9107 | 9273681.9450 | 2681.9888 | r |
| 2606 | 761923.7917 | 9273680.7260 | 2681.9763 | r |
| 2607 | 761924.4193 | 9273683.8542 | 2682.4645 | r |
| 2608 | 761918.2545 | 9273685.2570 | 2684.4288 | r |
| 2609 | 761919.8341 | 9273688.7000 | 2685.5845 | r |
| 2610 | 761923.5499 | 9273689.7160 | 2682.6841 | r |
| 2611 | 761924.4495 | 9273674.4870 | 2682.9952 | r |
| 2612 | 761925.3231 | 9273672.6540 | 2684.2999 | r |
| 2613 | 761923.7799 | 9273669.6250 | 2684.9778 | b |
| 2614 | 761922.7979 | 9273667.8994 | 2684.8931 | e |
| 2615 | 761921.3584 | 9273665.9553 | 2684.6451 | b |
| 2616 | 761921.3057 | 9273663.7090 | 2682.6073 | r |
| 2617 | 761922.1133 | 9273664.4792 | 2685.0006 | b |
| 2618 | 761924.9191 | 9273665.7552 | 2685.0431 | e |
| 2619 | 761925.6498 | 9273667.3060 | 2685.0123 | b |
| 2620 | 761929.0285 | 9273661.4200 | 2685.0272 | b |
| 2621 | 761927.2056 | 9273662.0097 | 2685.0643 | e |
| 2622 | 761924.1032 | 9273660.8695 | 2685.0217 | b |
| 2623 | 761923.2631 | 9273654.7840 | 2684.1968 | r |
| 2624 | 761923.9363 | 9273654.9550 | 2684.4216 | r |
| 2625 | 761926.1051 | 9273654.6660 | 2685.0092 | b |
| 2626 | 761929.6028 | 9273655.3515 | 2685.1418 | e |
| 2627 | 761931.5615 | 9273656.1807 | 2685.0300 | b |
| 2628 | 761932.9216 | 9273654.3190 | 2685.0808 | r |
| 2629 | 761932.9753 | 9273652.7708 | 2685.1865 | b |
| 2630 | 761930.7891 | 9273651.9976 | 2685.1676 | e |
| 2631 | 761927.6501 | 9273650.7959 | 2685.0270 | b |
| 2632 | 761929.7183 | 9273642.4118 | 2684.8871 | r |
| 2633 | 761931.1536 | 9273642.8125 | 2685.1026 | b |
| 2634 | 761933.8089 | 9273643.4601 | 2685.4122 | e |
| 2635 | 761935.8283 | 9273644.0302 | 2685.6463 | b |
| 2636 | 761936.1395 | 9273642.9980 | 2685.6586 | b |
| 2637 | 761939.5389 | 9273640.3980 | 2685.9769 | r |
| 2638 | 761937.5956 | 9273637.9746 | 2685.7176 | b |
| 2639 | 761935.8206 | 9273637.7728 | 2685.5145 | e |
| 2640 | 761933.5976 | 9273637.0274 | 2685.2606 | b |
| 2641 | 761934.0387 | 9273630.9543 | 2685.6083 | r |
| 2642 | 761935.5412 | 9273631.0560 | 2685.7274 | b |
| 2643 | 761938.0961 | 9273631.3395 | 2685.7923 | e |
| 2644 | 761939.6641 | 9273632.5867 | 2685.9762 | b |
| 2645 | 761942.5879 | 9273628.8392 | 2686.2147 | r |
| 2646 | 761943.0773 | 9273627.0468 | 2686.2575 | r |
| 2647 | 761942.6029 | 9273625.0417 | 2686.1877 | b |
| 2648 | 761940.7206 | 9273623.9443 | 2686.2939 | e |
| 2649 | 761938.7402 | 9273623.2777 | 2686.2887 | b |
| 2650 | 761939.4783 | 9273619.6824 | 2686.1890 | r |
| 2651 | 761940.3828 | 9273619.9375 | 2686.6186 | b |
| 2652 | 761942.2339 | 9273620.4829 | 2686.7750 | e |
| 2653 | 761944.1946 | 9273621.2050 | 2686.7579 | b |
| 2654 | 761945.3971 | 9273618.8542 | 2687.0809 | b |
| 2655 | 761943.5422 | 9273618.0888 | 2687.0399 | e |
| 2656 | 761942.1653 | 9273617.1847 | 2687.0211 | b |
| 2657 | 761941.7188 | 9273616.2083 | 2687.0004 | r |
| 2658 | 761941.0003 | 9273615.5030 | 2686.2721 | r |
| 2659 | 761945.3074 | 9273608.4816 | 2687.7120 | r |
| 2660 | 761946.2656 | 9273608.6667 | 2688.0592 | b |
| 2661 | 761948.8143 | 9273609.7538 | 2688.2843 | e |
| 2662 | 761950.5377 | 9273610.2232 | 2688.4370 | b |
| 2663 | 761955.9715 | 9273604.8210 | 2690.0314 | r |
| 2664 | 761955.7240 | 9273602.9810 | 2689.5087 | r |
| 2665 | 761955.0037 | 9273602.9010 | 2689.4169 | b |
| 2666 | 761953.6920 | 9273602.0685 | 2689.3528 | e |
| 2667 | 761950.3097 | 9273600.6534 | 2689.0511 | b |
| 2668 | 761952.7856 | 9273597.2430 | 2689.5177 | b |
| 2669 | 761955.6149 | 9273599.0387 | 2689.7573 | e |
| 2670 | 761957.3801 | 9273599.9456 | 2689.9439 | b |
| 2671 | 761961.5903 | 9273598.2865 | 2691.3929 | r |
| 2672 | 761961.2868 | 9273596.8310 | 2690.8325 | r |
| 2673 | 761960.9180 | 9273596.2083 | 2690.6329 | r |
| 2674 | 761959.9440 | 9273596.5150 | 2690.3122 | b |
| 2675 | 761958.2892 | 9273595.0082 | 2690.1727 | e |
| 2676 | 761955.9994 | 9273593.8599 | 2690.0996 | b |
| 2677 | 761955.7956 | 9273591.8958 | 2690.0386 | r |
| 2678 | 761955.5204 | 9273591.3820 | 2689.8954 | r |
| 2679 | 761958.7272 | 9273590.8835 | 2690.3528 | b |
| 2680 | 761960.6701 | 9273592.1747 | 2690.6664 | e |
| 2681 | 761962.6362 | 9273593.6179 | 2690.9672 | b |
| 2682 | 761964.7899 | 9273594.2970 | 2692.1110 | r |
| 2683 | 761965.3062 | 9273593.5980 | 2692.0703 | r |
| 2684 | 761965.4329 | 9273591.6573 | 2691.3754 | r |
| 2685 | 761964.9201 | 9273591.1445 | 2690.9891 | b |
| 2686 | 761963.3215 | 9273589.5459 | 2690.9593 | e |
| 2687 | 761960.7216 | 9273588.6430 | 2690.7832 | b |
| 2688 | 761961.2760 | 9273587.3958 | 2690.9715 | r |
| 2689 | 761963.6844 | 9273585.5573 | 2691.0227 | b |
| 2690 | 761965.5011 | 9273587.4197 | 2691.0331 | e |
| 2691 | 761967.4464 | 9273588.3918 | 2691.3277 | b |
| 2692 | 761968.4140 | 9273588.6048 | 2691.4908 | r |
| 2693 | 761968.0732 | 9273587.7060 | 2691.4835 | b |
| 2694 | 761967.0856 | 9273585.8742 | 2691.3952 | e |
| 2695 | 761965.1667 | 9273584.0023 | 2691.1309 | b |
| 2697 | 761970.9505 | 9273578.0625 | 2692.0797 | E29 |
| 2698 | 761964.3398 | 9273583.2917 | 2691.0132 | r |
| 2699 | 761963.8424 | 9273582.8620 | 2690.9649 | r |
| 2700 | 761955.8893 | 9273577.7708 | 2687.1007 | r |
| 2701 | 761961.4252 | 9273572.9527 | 2688.2510 | r |
| 2702 | 761962.0463 | 9273570.4500 | 2688.1884 | r |
| 2703 | 761966.3921 | 9273581.2410 | 2692.0014 | r |
| 2704 | 761967.8300 | 9273581.5683 | 2691.9267 | b |
| 2705 | 761969.6193 | 9273583.4027 | 2691.8635 | e |
| 2706 | 761971.8482 | 9273583.8927 | 2691.9077 | b |
| 2707 | 761973.0553 | 9273586.4421 | 2692.6843 | r |
| 2708 | 761976.1818 | 9273589.3080 | 2695.0215 | r |
| 2709 | 761974.0368 | 9273593.0980 | 2694.2247 | r |
| 2710 | 761975.6476 | 9273583.7490 | 2693.1799 | r |
| 2711 | 761979.9050 | 9273580.4630 | 2693.6172 | r |
| 2712 | 761978.0859 | 9273579.8333 | 2692.5886 | r |
| 2713 | 761977.1925 | 9273579.8073 | 2692.3825 | b |
| 2714 | 761975.9630 | 9273577.7642 | 2692.3861 | e |
| 2715 | 761974.5458 | 9273576.3470 | 2692.4039 | b |
| 2716 | 761971.5182 | 9273575.6458 | 2692.0979 | r |
| 2717 | 761973.0975 | 9273573.7430 | 2692.2546 | r |
| 2718 | 761976.2174 | 9273572.3958 | 2692.7171 | r |
| 2719 | 761977.0293 | 9273574.6170 | 2692.7974 | b |
| 2720 | 761978.5344 | 9273576.1221 | 2692.8683 | e |
| 2721 | 761980.3927 | 9273578.1019 | 2692.9918 | b |
| 2722 | 761982.9192 | 9273578.5214 | 2693.7054 | r |
| 2723 | 761985.9209 | 9273577.1347 | 2693.8591 | r |
| 2724 | 761985.5557 | 9273576.1350 | 2693.6689 | b |
| 2725 | 761984.2474 | 9273573.5531 | 2693.4232 | e |
| 2726 | 761983.0551 | 9273571.6263 | 2693.3494 | b |
| 2727 | 761979.8925 | 9273571.3840 | 2693.0182 | c |
| 2728 | 761994.7189 | 9273566.2724 | 2694.0000 | c |
| 2729 | 761996.7324 | 9273567.6470 | 2694.5991 | b |
| 2730 | 761997.3575 | 9273570.4418 | 2694.7010 | e |
| 2731 | 761997.8651 | 9273572.8676 | 2694.7348 | b |
| 2732 | 761998.3039 | 9273573.8270 | 2694.8204 | r |
| 2733 | 762001.1649 | 9273573.6973 | 2695.0025 | r |
| 2734 | 762003.4081 | 9273579.9102 | 2696.7874 | r |
| 2735 | 762011.4506 | 9273577.7896 | 2697.7003 | r |
| 2736 | 762006.2338 | 9273572.7150 | 2695.8249 | r |
| 2737 | 762005.9500 | 9273571.2110 | 2695.7058 | b |
| 2738 | 762005.3767 | 9273568.6481 | 2695.4093 | e |
| 2739 | 762005.6446 | 9273565.5943 | 2695.1180 | b |
| 2740 | 762009.6035 | 9273564.8300 | 2695.4881 | b |
| 2741 | 762010.2154 | 9273567.5658 | 2695.6374 | e |
| 2742 | 762011.5998 | 9273570.2736 | 2695.8659 | b |
| 2743 | 762017.2422 | 9273569.2708 | 2696.3320 | b |
| 2744 | 762019.3268 | 9273570.0230 | 2696.8589 | r |
| 2745 | 762020.8408 | 9273570.4770 | 2697.1106 | r |
| 2746 | 762022.2789 | 9273568.4717 | 2696.9947 | b |
| 2747 | 762023.0853 | 9273564.6871 | 2696.8652 | e |
| 2748 | 762022.7419 | 9273562.0240 | 2696.6434 | b |
| 2749 | 762023.2124 | 9273561.2580 | 2696.6359 | r |
| 2750 | 762028.2902 | 9273560.6743 | 2697.0314 | b |
| 2751 | 762028.8970 | 9273563.3872 | 2697.1237 | e |
| 2752 | 762027.9570 | 9273567.4583 | 2697.0066 | b |
| 2753 | 762031.6094 | 9273569.8333 | 2697.7777 | c |
| 2754 | 762042.6827 | 9273565.0340 | 2697.9693 | c |
| 2755 | 762037.8553 | 9273565.3320 | 2697.8686 | r |
| 2756 | 762037.1406 | 9273564.1875 | 2697.8588 | b |
| 2757 | 762036.5506 | 9273561.6735 | 2697.8586 | e |
| 2758 | 762034.9891 | 9273559.0150 | 2697.9489 | b |
| 2759 | 762040.4922 | 9273556.3125 | 2698.1279 | r |
| 2760 | 762040.3409 | 9273555.4740 | 2698.0000 | r |
| 2761 | 762037.2752 | 9273554.0610 | 2700.0000 | r |
| 2762 | 762031.2252 | 9273550.6310 | 2695.8631 | r |
| 2763 | 762045.6419 | 9273554.9930 | 2698.0132 | b |
| 2764 | 762044.5461 | 9273558.5793 | 2698.0175 | e |
| 2765 | 762044.0065 | 9273561.3333 | 2698.0039 | b |
| 2766 | 762049.6587 | 9273560.8138 | 2698.4899 | r |
| 2767 | 762050.4038 | 9273557.4542 | 2698.0114 | b |
| 2768 | 762049.4209 | 9273555.2378 | 2698.0388 | e |
| 2769 | 762048.1557 | 9273553.5540 | 2698.0137 | b |
| 2770 | 762047.9036 | 9273552.9830 | 2698.0071 | r |
| 2771 | 762047.6608 | 9273552.2830 | 2697.9855 | r |
| 2772 | 762057.3963 | 9273562.7440 | 2698.9946 | r |
| 2773 | 762060.1112 | 9273566.804 | 2700.3097 | bm08 |
| 2774 | 762051.3113 | 9273553.7470 | 2698.0490 | a |
| 2775 | 762091.5957 | 9273527.6010 | 2704.8929 | E30 |
| 2776 | 762054.1459 | 9273549.3136 | 2698.2859 | b |
| 2777 | 762055.4471 | 9273550.6149 | 2698.3560 | e |
| 2778 | 762056.8688 | 9273552.2400 | 2698.3545 | b |
| 2779 | 762057.8210 | 9273552.8600 | 2698.4567 | r |
| 2780 | 762060.5695 | 9273556.4430 | 2699.0299 | r |
| 2781 | 762064.5532 | 9273555.3077 | 2699.5537 | r |
| 2783 | 762069.8968 | 9273554.8310 | 2700.4435 | r |
| 2784 | 762081.2051 | 9273555.0753 | 2703.2428 | r |
| 2785 | 762072.4889 | 9273550.0743 | 2700.9952 | r |
| 2786 | 762061.8216 | 9273550.1667 | 2698.9993 | r |
| 2787 | 762062.1445 | 9273547.5625 | 2699.4448 | b |
| 2788 | 762060.4282 | 9273546.5571 | 2699.3594 | e |
| 2789 | 762057.3991 | 9273546.2840 | 2699.0125 | b |
| 2790 | 762058.2144 | 9273543.1360 | 2699.4283 | r |
| 2791 | 762061.4113 | 9273539.5610 | 2700.0303 | r |
| 2792 | 762062.7375 | 9273540.1193 | 2699.9677 | b |
| 2793 | 762065.3349 | 9273541.5929 | 2699.9417 | r |
| 2794 | 762066.2296 | 9273542.2090 | 2699.9726 | b |
| 2795 | 762067.7214 | 9273542.5410 | 2699.9903 | r |
| 2796 | 762068.0638 | 9273542.8830 | 2700.0231 | r |
| 2797 | 762064.9976 | 9273537.1690 | 2700.2843 | b |
| 2798 | 762067.9781 | 9273538.1687 | 2700.1720 | e |
| 2799 | 762069.4458 | 9273538.1701 | 2700.0706 | b |
| 2800 | 762070.6192 | 9273538.0370 | 2700.0161 | r |
| 2801 | 762070.9805 | 9273538.5417 | 2700.1799 | r |
| 2802 | 762073.4999 | 9273535.4128 | 2700.8545 | r |
| 2803 | 762072.3992 | 9273534.6810 | 2700.5885 | b |
| 2804 | 762071.0432 | 9273533.9112 | 2700.5881 | e |
| 2805 | 762068.5737 | 9273533.0045 | 2700.8348 | b |
| 2806 | 762065.5458 | 9273530.5540 | 2700.4649 | c |
| 2807 | 762070.9710 | 9273522.2250 | 2700.7551 | c |
| 2808 | 762071.9364 | 9273527.6680 | 2701.1035 | b |
| 2809 | 762074.6090 | 9273528.9581 | 2701.0975 | e |
| 2810 | 762076.0066 | 9273529.9734 | 2701.0347 | b |
| 2811 | 762074.5333 | 9273524.2675 | 2701.4847 | e |
| 2812 | 762078.1948 | 9273527.1200 | 2701.8567 | b |
| 2813 | 762082.3621 | 9273526.3420 | 2703.1048 | r |
| 2814 | 762083.1510 | 9273527.9375 | 2703.4640 | r |
| 2815 | 762088.4484 | 9273546.1820 | 2704.0560 | r |
| 2816 | 762081.1434 | 9273546.9070 | 2702.6701 | r |
| 2817 | 762096.9249 | 9273521.9140 | 2705.3632 | r |
| 2818 | 762089.0307 | 9273521.5180 | 2704.0989 | r |
| 2819 | 762084.3516 | 9273519.5000 | 2702.0703 | b |
| 2820 | 762082.0128 | 9273518.6740 | 2702.1185 | e |
| 2821 | 762079.5742 | 9273517.6875 | 2702.0486 | b |
| 2822 | 762078.9180 | 9273513.8750 | 2701.8410 | r |
| 2823 | 762079.6073 | 9273513.9630 | 2702.0079 | r |
| 2824 | 762083.6003 | 9273509.0930 | 2702.1330 | c |
| 2825 | 762091.3164 | 9273495.8750 | 2702.4269 | c |
| 2826 | 762087.6391 | 9273507.9710 | 2702.4544 | b |
| 2827 | 762089.1929 | 9273508.7004 | 2702.6357 | e |
| 2828 | 762091.0186 | 9273510.6620 | 2702.8924 | b |
| 2829 | 762096.2357 | 9273503.8333 | 2702.9915 | r |
| 2830 | 762096.6243 | 9273504.0500 | 2703.1087 | r |
| 2831 | 762096.7899 | 9273501.8920 | 2702.9966 | b |
| 2832 | 762095.0145 | 9273500.6139 | 2702.9388 | e |
| 2833 | 762093.1490 | 9273499.5305 | 2702.8472 | b |
| 2834 | 762095.2698 | 9273496.4280 | 2703.0665 | b |
| 2835 | 762098.7002 | 9273495.4944 | 2703.4019 | e |
| 2836 | 762100.7956 | 9273495.9167 | 2703.6121 | b |
| 2837 | 762104.7358 | 9273492.6677 | 2703.8612 | r |
| 2838 | 762105.5912 | 9273490.9710 | 2703.9391 | r |
| 2839 | 762105.0206 | 9273489.3117 | 2703.9060 | b |
| 2840 | 762103.4358 | 9273488.4792 | 2703.7861 | e |
| 2841 | 762101.5155 | 9273486.8300 | 2703.5708 | b |
| 2842 | 762104.4570 | 9273486.2945 | 2703.8698 | e |
| 2843 | 762106.0002 | 9273486.4340 | 2703.9990 | b |
| 2844 | 762114.2520 | 9273489.5121 | 2705.5130 | r |
| 2845 | 762124.7421 | 9273488.7394 | 2708.6903 | r |
| 2846 | 762109.6172 | 9273482.7500 | 2703.9997 | r |
| 2847 | 762107.9034 | 9273479.8863 | 2704.6055 | b |
| 2848 | 762106.2838 | 9273479.5733 | 2704.4032 | e |
| 2849 | 762103.6830 | 9273479.4070 | 2704.0641 | b |
| 2850 | 762104.1453 | 9273473.0190 | 2704.3828 | b |
| 2851 | 762107.4281 | 9273473.6535 | 2704.7876 | e |
| 2852 | 762108.8873 | 9273474.2142 | 2704.9682 | b |
| 2853 | 762110.3940 | 9273472.3470 | 2705.9318 | r |
| 2854 | 762110.9315 | 9273470.3542 | 2705.7948 | r |
| 2855 | 762109.1132 | 9273470.2660 | 2704.9952 | b |
| 2856 | 762108.0784 | 9273470.2896 | 2704.9143 | e |
| 2857 | 762104.6186 | 9273469.9520 | 2704.6665 | b |
| 2858 | 762098.8956 | 9273468.3060 | 2703.1617 | r |
| 2859 | 762091.8752 | 9273469.3870 | 2701.4873 | r |
| 2860 | 762087.8237 | 9273448.1057 | 2700.0000 | r |
| 2861 | 762105.1008 | 9273462.0020 | 2705.1460 | r |
| 2862 | 762106.5658 | 9273461.0126 | 2705.3101 | b |
| 2863 | 762109.8161 | 9273461.2996 | 2705.7502 | e |
| 2864 | 762110.6436 | 9273461.1670 | 2705.8474 | b |
| 2865 | 762114.1563 | 9273456.3333 | 2705.9924 | r |
| 2866 | 762113.5555 | 9273455.3770 | 2705.9170 | r |
| 2867 | 762113.0534 | 9273454.7290 | 2705.8329 | b |
| 2868 | 762111.5747 | 9273452.2022 | 2705.5623 | e |
| 2869 | 762109.6710 | 9273450.6393 | 2705.2770 | b |
| 2870 | 762111.2422 | 9273446.3333 | 2705.2458 | b |
| 2871 | 762113.3621 | 9273446.6721 | 2705.4643 | e |
| 2872 | 762115.5044 | 9273447.1111 | 2705.6892 | b |
| 2873 | 762117.3833 | 9273446.3790 | 2705.8636 | r |
| 2874 | 762121.9275 | 9273445.6560 | 2707.4180 | r |
| 2875 | 762125.6691 | 9273440.0690 | 2707.9634 | r |
| 2876 | 762120.3295 | 9273442.5311 | 2706.5182 | r |
| 2877 | 762117.2786 | 9273443.2917 | 2705.8662 | b |
| 2878 | 762115.6174 | 9273442.1293 | 2705.6389 | e |
| 2879 | 762113.9674 | 9273439.6669 | 2705.3104 | b |
| 2880 | 762116.5054 | 9273434.0840 | 2705.3514 | b |
| 2881 | 762119.3801 | 9273435.0040 | 2705.7599 | e |
| 2882 | 762120.7806 | 9273435.0250 | 2705.9487 | b |
| 2883 | 762123.4868 | 9273429.2107 | 2705.9551 | b |
| 2884 | 762122.6678 | 9273428.7782 | 2705.9405 | e |
| 2885 | 762118.9375 | 9273428.2708 | 2705.9851 | b |
| 2886 | 762118.7253 | 9273427.6520 | 2706.0000 | r |
| 2887 | 762117.8514 | 9273426.6810 | 2705.5888 | r |
| 2888 | 762121.4867 | 9273422.7773 | 2705.8906 | b |
| 2890 | 762125.2848 | 9273423.8223 | 2705.9563 | e |
| 2891 | 762127.1914 | 9273424.3125 | 2705.9945 | b |
| 2892 | 762129.2740 | 9273424.4540 | 2706.3803 | r |
| 2893 | 762129.8335 | 9273420.3709 | 2705.9877 | b |
| 2894 | 762127.5558 | 9273419.5218 | 2706.0000 | e |
| 2895 | 762124.9548 | 9273417.8200 | 2705.8307 | b |
| 2896 | 762127.0747 | 9273412.0260 | 2706.0353 | r |
| 2897 | 762129.2895 | 9273409.9431 | 2706.0000 | b |
| 2898 | 762131.7545 | 9273411.0302 | 2705.9935 | e |
| 2899 | 762133.2640 | 9273411.4010 | 2705.9995 | b |
| 2900 | 762135.5223 | 9273407.5630 | 2705.9992 | r |
| 2902 | 762135.9883 | 9273402.1458 | 2706.3441 | b |
| 2903 | 762134.0837 | 9273401.7561 | 2706.2855 | e |
| 2904 | 762131.6308 | 9273401.1147 | 2706.1306 | b |
| 2905 | 762131.4766 | 9273399.2500 | 2706.2351 | r |
| 2906 | 762132.7215 | 9273396.9440 | 2706.6751 | b |
| 2907 | 762135.0606 | 9273396.9821 | 2706.7858 | e |
| 2908 | 762137.1924 | 9273397.0408 | 2706.8745 | b |
| 2909 | 762138.2063 | 9273396.4240 | 2706.9535 | r |
| 2910 | 762137.8778 | 9273394.1370 | 2706.9738 | b |
| 2911 | 762135.7326 | 9273393.6980 | 2706.9497 | e |
| 2912 | 762133.4087 | 9273393.2641 | 2706.9889 | b |
| 2913 | 762132.4514 | 9273392.3961 | 2707.0038 | r |
| 2914 | 762131.7305 | 9273391.9167 | 2706.8234 | r |
| 2915 | 762118.6175 | 9273384.7014 | 2703.2900 | r |
| 2916 | 762115.2266 | 9273375.0417 | 2702.7318 | r |
| 2917 | 762128.3010 | 9273374.2237 | 2706.3927 | r |
| 2918 | 762136.6593 | 9273374.4500 | 2707.9661 | b |
| 2919 | 762139.6231 | 9273374.6850 | 2707.9929 | e |
| 2920 | 762141.6778 | 9273374.6354 | 2708.0000 | b |
| 2921 | 762142.9469 | 9273372.5771 | 2708.3486 | r |
| 2922 | 762142.2422 | 9273371.4792 | 2708.4209 | b |
| 2923 | 762140.3580 | 9273371.0936 | 2708.3905 | e |
| 2924 | 762137.3327 | 9273370.3933 | 2708.1370 | b |
| 2925 | 762135.9336 | 9273368.9167 | 2708.0481 | r |
| 2926 | 762135.2607 | 9273368.8560 | 2707.9556 | r |
| 2927 | 762135.4035 | 9273361.6480 | 2708.0085 | r |
| 2928 | 762138.7318 | 9273361.9583 | 2708.2691 | b |
| 2929 | 762142.1528 | 9273362.3227 | 2708.6900 | e |
| 2930 | 762143.8352 | 9273362.1742 | 2708.8995 | b |
| 2931 | 762146.2140 | 9273359.1680 | 2709.3432 | r |
| 2932 | 762145.3567 | 9273359.1310 | 2708.9861 | r |
| 2933 | 762146.5454 | 9273357.1450 | 2709.2969 | r |
| 2934 | 762145.5215 | 9273356.3360 | 2708.9981 | b |
| 2935 | 762143.4639 | 9273355.9150 | 2708.9515 | e |
| 2936 | 762140.6257 | 9273355.8882 | 2708.7412 | b |
| 2937 | 762138.9240 | 9273355.0200 | 2708.3092 | r |
| 2938 | 762138.1535 | 9273354.6710 | 2707.9584 | r |
| 2939 | 762139.2160 | 9273350.0570 | 2708.7621 | r |
| 2940 | 762140.5844 | 9273350.0990 | 2709.0693 | r |
| 2941 | 762142.2199 | 9273349.7260 | 2709.2620 | b |
| 2942 | 762144.7697 | 9273349.8560 | 2709.5455 | e |
| 2943 | 762148.0927 | 9273349.5590 | 2709.8544 | b |
| 2944 | 762143.6301 | 9273345.7940 | 2709.4105 | E31 |
| 2945 | 762142.7874 | 9273348.2585 | 2709.2814 | b |
| 2946 | 762145.4138 | 9273347.9861 | 2709.5377 | e |
| 2947 | 762148.6550 | 9273347.7880 | 2709.8623 | b |
| 2948 | 762151.0997 | 9273346.2070 | 2710.0098 | r |
| 2949 | 762150.9514 | 9273345.3970 | 2709.9972 | r |
| 2950 | 762150.2815 | 9273345.1257 | 2709.9937 | b |
| 2951 | 762147.2288 | 9273344.4969 | 2709.7825 | e |
| 2952 | 762144.7160 | 9273344.3720 | 2709.5447 | b |
| 2953 | 762140.8477 | 9273345.9167 | 2709.1417 | c |
| 2954 | 762145.1776 | 9273336.7430 | 2709.4977 | c |
| 2955 | 762147.7481 | 9273339.0420 | 2709.9729 | b |
| 2956 | 762150.5260 | 9273340.6266 | 2709.9949 | e |
| 2957 | 762152.3920 | 9273342.8280 | 2709.9974 | b |
| 2958 | 762156.8976 | 9273342.3550 | 2710.7528 | r |
| 2959 | 762156.7696 | 9273341.8250 | 2710.5729 | r |
| 2960 | 762155.2298 | 9273341.5810 | 2709.9991 | r |
| 2961 | 762155.1909 | 9273341.0010 | 2710.0121 | b |
| 2962 | 762153.5736 | 9273338.3460 | 2710.0839 | e |
| 2963 | 762150.2827 | 9273336.5454 | 2710.0420 | b |
| 2964 | 762149.9661 | 9273333.5833 | 2710.0741 | r |
| 2968 | 762149.2987 | 9273328.0980 | 2710.1435 | c |
| 2969 | 762158.5979 | 9273321.6590 | 2711.0000 | c |
| 2970 | 762159.9728 | 9273329.6999 | 2710.8891 | r |
| 2971 | 762155.2867 | 9273332.1595 | 2710.4878 | r |
| 2972 | 762155.7258 | 9273333.0717 | 2710.4818 | b |
| 2973 | 762158.1088 | 9273336.3071 | 2710.4796 | e |
| 2974 | 762161.0273 | 9273339.0000 | 2710.9315 | b |
| 2975 | 762163.2864 | 9273340.0420 | 2710.9899 | r |
| 2976 | 762163.2202 | 9273338.5177 | 2710.9541 | e |
| 2977 | 762162.1036 | 9273335.5145 | 2710.8841 | e |
| 2978 | 762161.6055 | 9273332.1042 | 2710.9126 | b |
| 2979 | 762171.8927 | 9273332.2790 | 2710.3641 | b |
| 2980 | 762172.7553 | 9273335.1099 | 2710.2905 | e |
| 2981 | 762173.7070 | 9273337.1250 | 2710.2349 | b |
| 2982 | 762174.3347 | 9273340.1300 | 2710.8535 | r |
| 2983 | 762174.4375 | 9273340.6042 | 2711.0184 | r |
| 2984 | 762170.4246 | 9273345.9294 | 2711.7668 | r |
| 2986 | 762160.9336 | 9273348.8750 | 2711.5353 | c |
| 2987 | 762156.4892 | 9273357.8560 | 2711.2228 | c |
| 2988 | 762181.3329 | 9273339.0940 | 2709.9994 | r |
| 2989 | 762182.2754 | 9273336.5130 | 2710.0107 | b |
| 2990 | 762182.2153 | 9273334.7817 | 2710.0318 | e |
| 2991 | 762183.3116 | 9273332.1111 | 2710.0128 | b |
| 2992 | 762184.8850 | 9273331.4350 | 2710.0005 | r |
| 2993 | 762184.8673 | 9273332.0447 | 2710.0064 | b |
| 2994 | 762186.7736 | 9273334.6235 | 2710.0158 | e |
| 2995 | 762186.9058 | 9273336.6201 | 2710.0001 | b |
| 2996 | 762187.0256 | 9273337.4482 | 2709.9992 | r |
| 2997 | 762195.0456 | 9273338.2500 | 2709.9985 | r |
| 2998 | 762196.4596 | 9273336.6875 | 2709.9981 | b |
| 2999 | 762196.6543 | 9273334.2807 | 2709.9950 | e |
| 3000 | 762196.7330 | 9273331.8340 | 2709.9969 | b |
| 3001 | 762200.1806 | 9273330.7600 | 2709.9368 | r |
| 3002 | 762206.8189 | 9273331.6035 | 2710.0074 | b |
| 3003 | 762206.5576 | 9273333.9371 | 2710.0303 | l |
| 3004 | 762207.8488 | 9273336.3030 | 2710.0123 | b |
| 3005 | 762209.9092 | 9273337.7250 | 2710.0000 | r |
| 3006 | 762209.9976 | 9273337.7250 | 2710.0000 | r |
| 3007 | 762210.0467 | 9273338.1770 | 2710.0234 | r |
| 3008 | 762209.7563 | 9273336.1357 | 2710.0058 | b |
| 3009 | 762210.1356 | 9273333.8130 | 2710.0281 | e |
| 3010 | 762210.8240 | 9273331.3346 | 2710.0145 | b |
| 3011 | 762213.8204 | 9273330.4082 | 2710.0124 | r |
| 3012 | 762213.9779 | 9273329.6458 | 2710.0070 | r |
| 3013 | 762213.6111 | 9273331.0804 | 2710.0169 | b |
| 3014 | 762214.0954 | 9273333.6026 | 2710.0189 | e |
| 3015 | 762214.1739 | 9273335.7216 | 2710.0084 | b |
| 3016 | 762217.7679 | 9273335.3570 | 2710.0608 | b |
| 3017 | 762218.7354 | 9273333.2359 | 2710.0590 | e |
| 3018 | 762218.9236 | 9273330.4390 | 2710.0201 | b |
| 3019 | 762222.0604 | 9273328.4763 | 2710.0117 | r |
| 3020 | 762225.4214 | 9273329.5277 | 2710.0108 | b |
| 3021 | 762225.8457 | 9273332.4200 | 2710.0073 | e |
| 3022 | 762225.9489 | 9273334.3301 | 2710.0314 | b |
| 3023 | 762227.7473 | 9273335.7880 | 2710.0898 | r |
| 3024 | 762227.6859 | 9273335.3470 | 2710.0630 | r |
| 3025 | 762229.4598 | 9273331.8897 | 2710.4107 | a |
| 3026 | 762230.7432 | 9273333.55 | 2711.1174 | bm09 |
| 3027 | 762238.8203 | 9273332.1458 | 2711.0107 | b |
| 3028 | 762238.5863 | 9273330.5508 | 2711.0277 | e |
| 3029 | 762238.4286 | 9273327.4730 | 2711.0081 | b |
| 3030 | 762241.9229 | 9273326.1360 | 2711.0201 | r |
| 3031 | 762242.1445 | 9273325.2917 | 2711.0117 | r |
| 3032 | 762251.2762 | 9273325.9514 | 2711.2249 | b |
| 3033 | 762251.6694 | 9273328.6313 | 2711.3458 | e |
| 3034 | 762251.9095 | 9273331.1300 | 2711.4412 | b |
| 3035 | 762254.3968 | 9273341.5417 | 2712.0882 | r |
| 3036 | 762245.5699 | 9273340.9908 | 2711.4507 | r |
| 3037 | 762230.5796 | 9273333.6670 | 2710.0000 | r |
| 3038 | 762236.8934 | 9273337.7853 | 2710.9742 | r |
| 3039 | 762242.5508 | 9273333.0208 | 2710.9933 | r |
| 3040 | 762262.9883 | 9273329.4120 | 2711.8100 | b |
| 3041 | 762262.5907 | 9273327.0291 | 2711.6998 | e |
| 3042 | 762262.3669 | 9273324.9460 | 2711.6328 | b |
| 3043 | 762273.0087 | 9273323.0100 | 2712.0203 | b |
| 3044 | 762273.1330 | 9273325.4824 | 2712.0725 | e |
| 3045 | 762272.2617 | 9273328.0000 | 2712.0577 | b |
| 3046 | 762276.1250 | 9273328.6667 | 2712.4862 | r |
| 3048 | 762280.9368 | 9273327.3100 | 2712.7708 | r |
| 3049 | 762281.1431 | 9273326.6000 | 2712.7470 | b |
| 3050 | 762282.7713 | 9273324.0684 | 2712.8273 | e |
| 3051 | 762283.6618 | 9273321.0560 | 2713.0451 | b |
| 3052 | 762283.7729 | 9273316.2453 | 2712.8400 | r |
| 3053 | 762289.1641 | 9273318.0625 | 2713.7272 | r |
| 3054 | 762289.3863 | 9273318.4850 | 2713.7307 | r |
| 3055 | 762289.2792 | 9273320.5540 | 2713.6924 | b |
| 3056 | 762287.9354 | 9273323.3107 | 2713.4373 | e |
| 3057 | 762286.8197 | 9273325.6660 | 2713.2357 | b |
| 3058 | 762294.0431 | 9273327.1396 | 2713.9884 | r |
| 3059 | 762293.5013 | 9273324.8100 | 2713.9752 | b |
| 3060 | 762293.9041 | 9273321.7663 | 2714.0439 | e |
| 3061 | 762294.1484 | 9273319.7500 | 2714.1033 | b |
| 3062 | 762296.4396 | 9273317.6485 | 2714.6633 | b |
| 3063 | 762297.2440 | 9273319.6837 | 2714.5400 | e |
| 3064 | 762298.1055 | 9273324.0833 | 2714.5993 | b |
| 3065 | 762299.3949 | 9273324.9760 | 2714.8075 | r |
| 3066 | 762300.6574 | 9273323.0531 | 2714.9396 | r |
| 3067 | 762300.2306 | 9273322.5700 | 2714.8790 | b |
| 3068 | 762299.3094 | 9273317.6770 | 2715.0509 | e |
| 3069 | 762298.1367 | 9273314.3790 | 2715.2367 | b |
| 3070 | 762299.2319 | 9273311.6288 | 2715.6747 | b |
| 3071 | 762302.1537 | 9273313.0292 | 2715.7942 | e |
| 3072 | 762304.5417 | 9273315.3710 | 2715.9180 | b |
| 3073 | 762307.0380 | 9273312.7683 | 2716.5209 | r |
| 3074 | 762305.9862 | 9273310.2140 | 2716.3971 | b |
| 3075 | 762303.2975 | 9273309.1096 | 2716.3636 | e |
| 3076 | 762300.6563 | 9273308.3542 | 2716.0736 | b |
| 3077 | 762299.5319 | 9273308.1610 | 2715.9337 | r |
| 3078 | 762300.1406 | 9273303.0276 | 2716.4633 | r |
| 3079 | 762301.8750 | 9273303.2708 | 2716.6440 | b |
| 3080 | 762304.9613 | 9273303.4077 | 2716.8958 | e |
| 3081 | 762307.5208 | 9273303.5225 | 2716.9623 | b |
| 3082 | 762310.2615 | 9273304.4780 | 2718.2163 | r |
| 3083 | 762309.2292 | 9273299.1458 | 2717.2098 | b |
| 3084 | 762306.4989 | 9273298.2067 | 2717.1260 | e |
| 3085 | 762303.5908 | 9273296.3485 | 2717.2180 | b |
| 3086 | 762301.4687 | 9273293.6712 | 2717.2753 | r |
| 3087 | 762304.1289 | 9273294.7292 | 2717.3577 | b |
| 3088 | 762307.5968 | 9273295.6945 | 2717.3439 | e |
| 3089 | 762310.6961 | 9273297.1023 | 2717.9051 | b |
| 3090 | 762312.4523 | 9273294.8790 | 2717.9523 | b |
| 3091 | 762309.5020 | 9273292.8683 | 2717.6975 | e |
| 3092 | 762305.9744 | 9273291.9000 | 2717.6269 | b |
| 3093 | 762304.8177 | 9273289.9915 | 2717.6684 | r |
| 3094 | 762308.2817 | 9273288.6410 | 2717.9421 | b |
| 3095 | 762311.8967 | 9273290.5080 | 2717.8634 | e |
| 3096 | 762314.7639 | 9273292.9930 | 2717.9846 | b |
| 3097 | 762318.4318 | 9273292.7000 | 2717.9981 | r |
| 3098 | 762318.6644 | 9273293.8129 | 2719.9996 | r |
| 3099 | 762318.5930 | 9273291.2550 | 2718.0482 | b |
| 3100 | 762316.0285 | 9273288.0470 | 2718.1574 | e |
| 3101 | 762312.3596 | 9273285.9430 | 2718.0368 | b |
| 3102 | 762305.5234 | 9273278.5833 | 2718.0213 | E32 |
| 3103 | 762311.0809 | 9273281.1070 | 2718.9782 | bm10 |
| 3104 | 762305.8024 | 9273283.3621 | 2718.0258 | r |
| 3105 | 762299.3387 | 9273282.9318 | 2717.3488 | r |
| 3106 | 762301.5035 | 9273277.4248 | 2717.1839 | r |
| 3107 | 762315.4164 | 9273279.6864 | 2718.4638 | r |
| 3108 | 762318.3324 | 9273283.8220 | 2718.5106 | b |
| 3109 | 762318.8406 | 9273287.1513 | 2718.3354 | e |
| 3110 | 762320.8450 | 9273290.5172 | 2718.6775 | e |
| 3111 | 762320.9233 | 9273291.7880 | 2718.8875 | r |
| 3112 | 762321.1248 | 9273294.4907 | 2720.0197 | r |
| 3113 | 762323.7746 | 9273305.3359 | 2720.8047 | r |
| 3114 | 762329.5580 | 9273307.1898 | 2721.2134 | r |
| 3115 | 762331.4494 | 9273300.2584 | 2720.1966 | r |
| 3116 | 762326.6069 | 9273292.2530 | 2720.0160 | r |
| 3117 | 762323.5761 | 9273291.1150 | 2718.9979 | r |
| 3118 | 762324.2311 | 9273289.8912 | 2718.9927 | b |
| 3119 | 762324.2298 | 9273286.5744 | 2718.9654 | e |
| 3120 | 762324.6432 | 9273283.0426 | 2718.9742 | b |
| 3121 | 762327.6601 | 9273278.0870 | 2719.0000 | r |
| 3122 | 762329.9059 | 9273283.3900 | 2718.9467 | b |
| 3123 | 762330.5196 | 9273286.1247 | 2718.9390 | e |
| 3124 | 762333.7188 | 9273288.3750 | 2718.6910 | b |
| 3125 | 762335.5399 | 9273292.1458 | 2718.9682 | r |
| 3126 | 762339.9832 | 9273288.5625 | 2719.0000 | r |
| 3127 | 762340.8763 | 9273285.5880 | 2719.0001 | b |
| 3128 | 762347.8409 | 9273282.4120 | 2719.0009 | b |
| 3129 | 762346.3741 | 9273279.1380 | 2719.0203 | b |
| 3130 | 762339.3453 | 9273282.1740 | 2719.0092 | b |
| 3131 | 762337.2435 | 9273277.5650 | 2718.0076 | r |
| 3132 | 762334.2370 | 9273270.6027 | 2717.5590 | r |
| 3133 | 762327.3605 | 9273264.7651 | 2716.2713 | r |
| 3134 | 762320.8863 | 9273258.4500 | 2713.2187 | r |
| 3135 | 762324.6174 | 9273251.8802 | 2714.5555 | r |
| 3136 | 762328.7903 | 9273254.8710 | 2714.9794 | r |
| 3137 | 762337.0381 | 9273256.3418 | 2715.5811 | r |
| 3138 | 762345.9730 | 9273257.9107 | 2716.6758 | r |
| 3139 | 762345.6293 | 9273261.8820 | 2716.8489 | r |
| 3140 | 762345.7692 | 9273271.8884 | 2717.0381 | r |
| 3141 | 762349.5742 | 9273275.0625 | 2719.0140 | b |
| 3142 | 762352.4078 | 9273275.4878 | 2719.2747 | e |
| 3143 | 762354.7188 | 9273277.3750 | 2719.5780 | b |
| 3144 | 762357.3659 | 9273274.8958 | 2719.7127 | r |
| 3145 | 762356.5408 | 9273269.8420 | 2719.5796 | b |
| 3146 | 762355.2003 | 9273269.5113 | 2719.4939 | e |
| 3147 | 762351.0859 | 9273267.9948 | 2719.0814 | b |
| 3148 | 762348.5904 | 9273267.2230 | 2718.5435 | r |
| 3149 | 762351.1556 | 9273266.4720 | 2719.0940 | b |
| 3150 | 762355.6957 | 9273266.2961 | 2719.1197 | e |
| 3151 | 762356.9939 | 9273264.9560 | 2719.5110 | b |
| 3152 | 762359.2485 | 9273263.8180 | 2720.0563 | r |
| 3153 | 762366.2783 | 9273260.8490 | 2721.0587 | r |
| 3154 | 762366.5361 | 9273255.1960 | 2720.9240 | r |
| 3155 | 762358.4586 | 9273258.0000 | 2719.7831 | r |
| 3156 | 762357.9165 | 9273256.6229 | 2719.7062 | b |
| 3157 | 762355.6877 | 9273256.6248 | 2719.4914 | e |
| 3158 | 762351.3242 | 9273256.5506 | 2719.0727 | b |
| 3159 | 762349.9331 | 9273244.8144 | 2719.3425 | r |
| 3160 | 762351.0760 | 9273243.4350 | 2719.5272 | b |
| 3161 | 762355.6766 | 9273243.4312 | 2719.6746 | e |
| 3162 | 762358.2184 | 9273243.6209 | 2719.8913 | b |
| 3163 | 762361.3725 | 9273237.1013 | 2720.3693 | r |
| 3164 | 762359.5399 | 9273236.6540 | 2720.3365 | b |
| 3165 | 762355.6698 | 9273235.1937 | 2720.2525 | e |
| 3166 | 762352.8235 | 9273234.7230 | 2720.0457 | b |
| 3167 | 762351.3555 | 9273232.1373 | 2720.0926 | r |
| 3168 | 762347.7734 | 9273230.5833 | 2720.0136 | r |
| 3169 | 762346.6607 | 9273226.6652 | 2719.0632 | r |
| 3170 | 762349.7075 | 9273227.9300 | 2720.0520 | r |
| 3171 | 762350.2943 | 9273227.6458 | 2720.1626 | r |
| 3172 | 762353.8763 | 9273228.3750 | 2720.6330 | b |
| 3173 | 762356.6117 | 9273228.8817 | 2720.7097 | e |
| 3174 | 762361.3135 | 9273229.1966 | 2720.8833 | b |
| 3175 | 762361.8586 | 9273226.3313 | 2721.0095 | b |
| 3176 | 762357.5965 | 9273225.3411 | 2721.0337 | e |
| 3177 | 762353.8241 | 9273226.3820 | 2720.7879 | b |
| 3178 | 762352.6528 | 9273220.5370 | 2721.0041 | r |
| 3179 | 762356.3777 | 9273220.3240 | 2721.3950 | b |
| 3180 | 762359.2643 | 9273221.1531 | 2721.4346 | e |
| 3181 | 762362.4096 | 9273222.9310 | 2721.4934 | b |
| 3182 | 762362.6428 | 9273221.4510 | 2721.6788 | b |
| 3183 | 762363.8760 | 9273218.1813 | 2721.9326 | b |
| 3184 | 762361.5553 | 9273216.9709 | 2721.8423 | e |
| 3185 | 762358.3754 | 9273216.2906 | 2721.8376 | b |
| 3186 | 762356.0748 | 9273216.0000 | 2721.5776 | r |
| 3187 | 762355.8732 | 9273215.4170 | 2721.4691 | r |
| 3188 | 762353.0106 | 9273212.3010 | 2720.4904 | r |
| 3189 | 762354.1280 | 9273205.2760 | 2720.3715 | r |
| 3190 | 762360.3300 | 9273209.7117 | 2721.8712 | r |
| 3191 | 762361.7434 | 9273211.8490 | 2722.0406 | b |
| 3192 | 762363.9876 | 9273213.5204 | 2722.1458 | e |
| 3193 | 762366.3378 | 9273214.2590 | 2722.2595 | b |
| 3194 | 762370.6465 | 9273211.2320 | 2722.8289 | r |
| 3195 | 762372.3019 | 9273209.3082 | 2722.9979 | r |
| 3196 | 762372.3007 | 9273206.8007 | 2722.9788 | b |
| 3197 | 762369.7925 | 9273205.7261 | 2722.9498 | e |
| 3198 | 762367.9987 | 9273204.3125 | 2722.9004 | b |
| 3199 | 762349.7112 | 9273193.5879 | 2719.0551 | r |
| 3200 | 762346.0137 | 9273185.4910 | 2718.0802 | c |
| 3201 | 762350.2059 | 9273186.8970 | 2718.6484 | c |
| 3202 | 762391.2673 | 9273185.2050 | 2725.5283 | E33 |
| 3203 | 762369.9741 | 9273216.9740 | 2722.6730 | c |
| 3204 | 762375.0820 | 9273217.9375 | 2723.1559 | c |
| 3205 | 762375.5479 | 9273211.6720 | 2723.3332 | r |
| 3206 | 762374.0830 | 9273204.5657 | 2722.9806 | b |
| 3207 | 762371.8791 | 9273202.9243 | 2722.9851 | e |
| 3208 | 762371.2910 | 9273199.9377 | 2723.0248 | b |
| 3209 | 762374.5094 | 9273195.6215 | 2723.2850 | b |
| 3210 | 762376.3160 | 9273196.9669 | 2723.5150 | e |
| 3211 | 762379.2018 | 9273198.0833 | 2723.7383 | b |
| 3212 | 762381.5445 | 9273196.3210 | 2723.9401 | r |
| 3213 | 762380.9233 | 9273195.6998 | 2723.8558 | b |
| 3214 | 762378.5668 | 9273193.9448 | 2723.5696 | e |
| 3215 | 762376.7055 | 9273192.8964 | 2723.3625 | b |
| 3216 | 762374.0336 | 9273191.9590 | 2723.0970 | c |
| 3217 | 762379.7891 | 9273183.5625 | 2723.5110 | c |
| 3218 | 762381.6640 | 9273182.4010 | 2723.7560 | c |
| 3219 | 762389.3086 | 9273170.7292 | 2724.3964 | c |
| 3220 | 762386.6628 | 9273178.8542 | 2724.2562 | r |
| 3221 | 762379.3683 | 9273188.3550 | 2723.6024 | r |
| 3222 | 762378.9864 | 9273189.9890 | 2723.5081 | b |
| 3223 | 762380.7745 | 9273190.9805 | 2723.6272 | e |
| 3224 | 762385.3685 | 9273189.5400 | 2723.9967 | b |
| 3225 | 762387.9075 | 9273191.7486 | 2726.0000 | r |
| 3226 | 762390.3155 | 9273195.1030 | 2726.3377 | r |
| 3227 | 762394.9557 | 9273192.3542 | 2727.4708 | r |
| 3228 | 762397.3112 | 9273189.4375 | 2727.9082 | r |
| 3229 | 762392.5494 | 9273189.8240 | 2726.4778 | r |
| 3230 | 762388.1953 | 9273188.0625 | 2725.0086 | r |
| 3231 | 762388.4701 | 9273184.3403 | 2724.3263 | b |
| 3232 | 762386.3178 | 9273183.5375 | 2724.1866 | e |
| 3233 | 762385.1338 | 9273181.6250 | 2724.1654 | b |
| 3234 | 762387.7847 | 9273178.2808 | 2724.3604 | b |
| 3235 | 762389.3594 | 9273179.4536 | 2724.6192 | e |
| 3236 | 762391.1247 | 9273180.4535 | 2724.8915 | b |
| 3237 | 762393.1315 | 9273179.2500 | 2724.9881 | r |
| 3238 | 762396.1178 | 9273175.2712 | 2725.2415 | r |
| 3239 | 762394.6716 | 9273174.4300 | 2724.9571 | b |
| 3240 | 762393.9276 | 9273173.2912 | 2724.9135 | e |
| 3241 | 762391.3855 | 9273171.8826 | 2724.9514 | b |
| 3242 | 762393.2242 | 9273163.7500 | 2724.9914 | r |
| 3243 | 762395.9012 | 9273164.1600 | 2725.3958 | b |
| 3244 | 762396.3874 | 9273169.3492 | 2725.1508 | e |
| 3245 | 762397.9069 | 9273166.3155 | 2725.6587 | e |
| 3246 | 762399.3496 | 9273165.6340 | 2725.8781 | b |
| 3247 | 762401.8444 | 9273166.7940 | 2726.7771 | r |
| 3248 | 762402.3545 | 9273161.0412 | 2726.1258 | b |
| 3249 | 762400.6112 | 9273158.4818 | 2725.9740 | a |
| 3250 | 762398.1595 | 9273158.9630 | 2725.9759 | b |
| 3251 | 762398.7959 | 9273152.1180 | 2725.6699 | r |
| 3252 | 762400.5571 | 9273151.0876 | 2726.1465 | b |
| 3253 | 762402.8465 | 9273150.4430 | 2726.4720 | e |
| 3254 | 762404.7242 | 9273150.9020 | 2726.7306 | b |
| 3255 | 762412.5322 | 9273150.8961 | 2728.4165 | r |
| 3256 | 762416.5211 | 9273146.0140 | 2728.9708 | r |
| 3257 | 762408.5240 | 9273140.7730 | 2726.9689 | r |
| 3258 | 762407.5043 | 9273141.2645 | 2726.9408 | b |
| 3259 | 762405.4095 | 9273141.2258 | 2726.8200 | e |
| 3260 | 762403.3299 | 9273141.1950 | 2726.4477 | b |
| 3261 | 762399.7735 | 9273140.8061 | 2725.6392 | r |
| 3262 | 762396.1617 | 9273136.4550 | 2724.7883 | r |
| 3263 | 762404.3879 | 9273135.2850 | 2726.9404 | r |
| 3265 | 762405.4069 | 9273134.8031 | 2727.0265 | b |
| 3266 | 762407.4061 | 9273135.5411 | 2727.1030 | e |
| 3267 | 762409.8655 | 9273136.1687 | 2726.9979 | b |
| 3268 | 762411.1074 | 9273133.6390 | 2726.9987 | r |
| 3269 | 762411.8851 | 9273129.8040 | 2727.8210 | b |
| 3270 | 762409.7767 | 9273129.4064 | 2727.4849 | e |
| 3271 | 762407.4393 | 9273128.6846 | 2727.1422 | b |
| 3272 | 762407.7969 | 9273127.6250 | 2727.2595 | b |
| 3273 | 762410.7741 | 9273126.8472 | 2727.7431 | e |
| 3274 | 762413.4910 | 9273125.7577 | 2728.0000 | b |
| 3275 | 762414.1995 | 9273123.9692 | 2728.2685 | b |
| 3276 | 762412.0711 | 9273123.5193 | 2728.1551 | e |
| 3277 | 762409.4314 | 9273122.7770 | 2728.0059 | b |
| 3278 | 762405.7036 | 9273122.7770 | 2726.8590 | r |
| 3279 | 762401.5356 | 9273122.2564 | 2725.5132 | r |
| 3280 | 762401.7397 | 9273119.4419 | 2725.7792 | r |
| 3281 | 762408.0379 | 9273118.2063 | 2727.6008 | r |
| 3282 | 762411.2051 | 9273118.2902 | 2728.2038 | b |
| 3283 | 762413.9900 | 9273118.3453 | 2728.4727 | e |
| 3284 | 762416.6420 | 9273117.3126 | 2728.7742 | b |
| 3285 | 762417.0751 | 9273115.0762 | 2728.8317 | b |
| 3286 | 762414.9451 | 9273114.9360 | 2728.5832 | e |
| 3287 | 762412.1990 | 9273114.7670 | 2728.2627 | b |
| 3288 | 762413.6409 | 9273108.6412 | 2728.7232 | b |
| 3289 | 762416.1187 | 9273108.7648 | 2728.7668 | E |
| 3290 | 762418.1345 | 9273108.2400 | 2728.9765 | b |
| 3291 | 762418.4683 | 9273106.2185 | 2729.0848 | b |
| 3292 | 762416.7351 | 9273105.2225 | 2729.1302 | e |
| 3293 | 762414.2576 | 9273105.6256 | 2729.0244 | b |
| 3294 | 762409.0364 | 9273102.4202 | 2728.8448 | r |
| 3295 | 762414.1289 | 9273099.9375 | 2729.3536 | r |
| 3296 | 762415.5167 | 9273097.3559 | 2729.5735 | b |
| 3297 | 762418.1554 | 9273097.0619 | 2729.7445 | e |
| 3298 | 762420.1068 | 9273096.2957 | 2729.9069 | b |
| 3299 | 762420.2194 | 9273095.6140 | 2729.9383 | b |
| 3300 | 762420.9418 | 9273092.5000 | 2729.9957 | b |
| 3301 | 762418.9511 | 9273092.4895 | 2729.9800 | e |
| 3302 | 762416.5496 | 9273091.9872 | 2729.9908 | b |
| 3303 | 762421.5960 | 9273074.8220 | 2731.0538 | b |
| 3304 | 762424.1715 | 9273075.5477 | 2731.0047 | e |
| 3305 | 762426.0770 | 9273076.3348 | 2730.9840 | b |
| 3306 | 762428.0069 | 9273075.7405 | 2731.2698 | r |
| 3307 | 762429.1351 | 9273071.8665 | 2731.5955 | r |
| 3308 | 762428.8393 | 9273069.6476 | 2731.7109 | b |
| 3309 | 762427.0034 | 9273069.1121 | 2731.5148 | e |
| 3310 | 762424.5863 | 9273068.0455 | 2731.2096 | b |
| 3311 | 762445.6207 | 9273018.0770 | 2735.1471 | E34 |
| 3312 | 762431.0374 | 9273065.1090 | 2731.9424 | b |
| 3313 | 762429.1335 | 9273064.2712 | 2731.9155 | e |
| 3314 | 762426.6032 | 9273063.4750 | 2731.9313 | b |
| 3315 | 762420.6636 | 9273062.8888 | 2730.6985 | r |
| 3316 | 762414.2668 | 9273062.3974 | 2729.5854 | r |
| 3317 | 762404.6877 | 9273060.9043 | 2728.0000 | r |
| 3318 | 762405.8201 | 9273053.6391 | 2728.0000 | r |
| 3319 | 762417.0346 | 9273054.7806 | 2729.8698 | r |
| 3320 | 762427.9831 | 9273056.7462 | 2731.7417 | r |
| 3321 | 762429.2422 | 9273057.7292 | 2732.0050 | b |
| 3322 | 762431.7538 | 9273058.3164 | 2732.0089 | e |
| 3323 | 762434.3401 | 9273058.5198 | 2732.0017 | b |
| 3324 | 762435.2041 | 9273056.7960 | 2732.0108 | b |
| 3325 | 762433.0753 | 9273055.3132 | 2732.0143 | e |
| 3326 | 762431.0458 | 9273052.9053 | 2732.0034 | b |
| 3327 | 762432.2815 | 9273049.5923 | 2732.1826 | b |
| 3328 | 762435.6412 | 9273049.4820 | 2732.5655 | e |
| 3329 | 762438.0756 | 9273050.3783 | 2732.8352 | b |
| 3330 | 762440.5156 | 9273047.8125 | 2732.9536 | r |
| 3331 | 762441.8499 | 9273046.7933 | 2733.5841 | r |
| 3332 | 762439.9297 | 9273045.6949 | 2733.0039 | b |
| 3333 | 762437.6002 | 9273045.0300 | 2733.0143 | e |
| 3334 | 762434.2098 | 9273044.4220 | 2732.9816 | b |
| 3335 | 762434.2009 | 9273043.0400 | 2733.0184 | r |
| 3336 | 762435.6608 | 9273040.5200 | 2733.0744 | b |
| 3337 | 762439.0869 | 9273041.6513 | 2733.0744 | e |
| 3338 | 762441.3286 | 9273042.1614 | 2733.0257 | b |
| 3339 | 762442.2904 | 9273039.7320 | 2733.0991 | b |
| 3340 | 762440.8358 | 9273037.6769 | 2733.3560 | e |
| 3341 | 762437.1120 | 9273036.6250 | 2733.3531 | b |
| 3342 | 762437.5180 | 9273028.7360 | 2733.8263 | r |
| 3343 | 762438.8093 | 9273029.3460 | 2734.0313 | r |
| 3344 | 762441.3549 | 9273026.0450 | 2734.5826 | b |
| 3345 | 762445.3869 | 9273027.3342 | 2734.2826 | e |
| 3346 | 762447.5461 | 9273027.7410 | 2734.9239 | b |
| 3347 | 762450.0673 | 9273027.6630 | 2735.9302 | r |
| 3348 | 762452.3164 | 9273025.2708 | 2737.2064 | r |
| 3349 | 762450.2225 | 9273024.4130 | 2734.9013 | r |
| 3350 | 762449.1609 | 9273024.1734 | 2734.8548 | b |
| 3351 | 762447.3666 | 9273022.8351 | 2734.8490 | e |
| 3352 | 762444.4141 | 9273021.5081 | 2734.9695 | b |
| 3353 | 762443.3008 | 9273013.5208 | 2735.0726 | c |
| 3354 | 762439.7835 | 9273021.3330 | 2735.0146 | c |
| 3355 | 762415.6276 | 9273079.6250 | 2730.0899 | c |
| 3356 | 762412.6451 | 9273093.9630 | 2729.7277 | c |
| 3357 | 762443.5877 | 9273104.5080 | 2735.4521 | c |
| 3359 | 762449.5118 | 9273013.0150 | 2735.7269 | b |
| 3360 | 762451.7143 | 9273013.8072 | 2735.6052 | e |
| 3361 | 762454.1874 | 9273015.0230 | 2735.5860 | b |
| 3362 | 762455.9761 | 9273014.1731 | 2736.1345 | r |
| 3363 | 762455.2530 | 9273012.9140 | 2735.9957 | b |
| 3364 | 762453.0712 | 9273011.5434 | 2735.9768 | e |
| 3365 | 762450.1771 | 9273012.1610 | 2735.8916 | b |
| 3366 | 762450.2878 | 9273010.4780 | 2736.0057 | r |
| 3367 | 762446.0353 | 9273007.4067 | 2735.0940 | r |
| 3368 | 762448.7586 | 9273004.8348 | 2735.5579 | r |
| 3369 | 762452.8231 | 9273006.0340 | 2735.9944 | r |
| 3370 | 762453.4221 | 9273006.6330 | 2736.0034 | b |
| 3371 | 762455.7059 | 9273007.4309 | 2736.0315 | e |
| 3372 | 762458.7893 | 9273008.1350 | 2736.0181 | b |
| 3373 | 762461.4902 | 9273004.361 | 2736.7864 | bm11 |
| 3374 | 762456.8209 | 9273005.6928 | 2736.0449 | a |
| 3375 | 762455.8665 | 9273001.4684 | 2736.2484 | b |
| 3376 | 762460.4863 | 9272999.9403 | 2736.5426 | e |
| 3377 | 762463.8108 | 9272999.4800 | 2737.0343 | b |
| 3378 | 762466.2188 | 9272996.3542 | 2737.0000 | r |
| 3379 | 762465.5176 | 9272993.5930 | 2737.0164 | b |
| 3380 | 762463.0032 | 9272993.2798 | 2737.0856 | e |
| 3381 | 762459.2305 | 9272991.8125 | 2737.0355 | b |
| 3382 | 762459.6587 | 9272989.8806 | 2737.0705 | b |
| 3383 | 762463.4600 | 9272989.6130 | 2737.1287 | e |
| 3384 | 762466.3411 | 9272990.0367 | 2737.0261 | b |
| 3385 | 762468.7617 | 9272989.6250 | 2738.0161 | r |
| 3386 | 762468.1111 | 9272985.6510 | 2737.4882 | r |
| 3387 | 762467.1773 | 9272985.8103 | 2737.3913 | b |
| 3388 | 762464.0076 | 9272985.2160 | 2737.4216 | e |
| 3390 | 762459.9605 | 9272986.2360 | 2737.0826 | b |
| 3391 | 762456.4597 | 9272982.0276 | 2736.7625 | r |
| 3392 | 762450.1929 | 9272978.4187 | 2735.4619 | r |
| 3393 | 762459.9001 | 9272978.4393 | 2737.8227 | r |
| 3394 | 762460.6094 | 9272978.5000 | 2737.9328 | b |
| 3395 | 762464.8332 | 9272978.5870 | 2737.9618 | e |
| 3396 | 762467.6049 | 9272980.1573 | 2737.9357 | b |
| 3397 | 762469.5234 | 9272974.5833 | 2737.9952 | r |
| 3398 | 762468.6484 | 9272974.2210 | 2738.0271 | b |
| 3399 | 762465.4270 | 9272973.8198 | 2738.1305 | e |
| 3400 | 762461.6182 | 9272973.3700 | 2738.1404 | b |
| 3401 | 762464.2368 | 9272962.5600 | 2738.8590 | E35 |
| 3402 | 762458.6934 | 9272972.1920 | 2738.0264 | r |
| 3403 | 762453.8242 | 9272972.1582 | 2736.7508 | r |
| 3404 | 762446.8936 | 9272969.4505 | 2735.6842 | r |
| 3405 | 762450.1184 | 9272963.7191 | 2736.6497 | r |
| 3406 | 762460.9955 | 9272966.0117 | 2738.4533 | r |
| 3407 | 762463.1526 | 9272966.1667 | 2738.6136 | b |
| 3408 | 762466.4812 | 9272967.0609 | 2738.7870 | e |
| 3409 | 762470.3016 | 9272968.3366 | 2738.9819 | b |
| 3410 | 762472.7726 | 9272965.4597 | 2739.5211 | r |
| 3411 | 762472.1643 | 9272964.6310 | 2738.9983 | b |
| 3412 | 762468.2321 | 9272962.5750 | 2738.9659 | e |
| 3413 | 762465.6431 | 9272960.6580 | 2739.0257 | b |
| 3414 | 762463.8528 | 9272956.8886 | 2738.9004 | r |
| 3415 | 762459.8850 | 9272954.4240 | 2738.3397 | c |
| 3416 | 762459.7110 | 9272954.5740 | 2738.3033 | c |
| 3417 | 762454.4577 | 9272953.4990 | 2737.3022 | c |
| 3418 | 762463.2418 | 9272940.7330 | 2737.8497 | c |
| 3419 | 762468.4259 | 9272956.5309 | 2739.3160 | b |
| 3420 | 762470.8928 | 9272958.6061 | 2739.3508 | e |
| 3421 | 762474.7210 | 9272960.9470 | 2739.3274 | b |
| 3422 | 762475.9592 | 9272959.3533 | 2739.0661 | b |
| 3423 | 762472.9249 | 9272956.4939 | 2739.5684 | e |
| 3424 | 762469.2692 | 9272955.7200 | 2739.3983 | b |
| 3425 | 762468.5463 | 9272954.8900 | 2739.3597 | r |
| 3427 | 762472.4732 | 9272953.0227 | 2739.7028 | r |
| 3428 | 762473.2305 | 9272953.3750 | 2739.7540 | b |
| 3429 | 762474.8135 | 9272954.9581 | 2739.6519 | e |
| 3430 | 762477.4126 | 9272957.9530 | 2739.9895 | b |
| 3431 | 762478.7952 | 9272956.9130 | 2739.9839 | b |
| 3432 | 762477.6647 | 9272953.2051 | 2739.9624 | e |
| 3433 | 762476.2198 | 9272951.7980 | 2739.9867 | b |
| 3434 | 762478.6305 | 9272950.1677 | 2740.0317 | b |
| 3435 | 762479.5130 | 9272952.3600 | 2740.0188 | e |
| 3436 | 762480.8215 | 9272955.7900 | 2739.9890 | b |
| 3437 | 762482.4571 | 9272955.5110 | 2739.9895 | r |
| 3438 | 762483.0264 | 9272954.8122 | 2740.0009 | b |
| 3439 | 762481.5015 | 9272951.6200 | 2740.0426 | e |
| 3440 | 762480.2334 | 9272949.4000 | 2740.0512 | b |
| 3441 | 762483.0221 | 9272947.5208 | 2740.2721 | r |
| 3442 | 762485.3093 | 9272947.9508 | 2740.4085 | b |
| 3443 | 762486.1377 | 9272950.5757 | 2740.3380 | e |
| 3444 | 762487.1152 | 9272952.9990 | 2740.3131 | b |
| 3445 | 762485.7752 | 9272956.9390 | 2741.0190 | c |
| 3446 | 762501.6208 | 9272954.4050 | 2741.7319 | c |
| 3447 | 762496.6532 | 9272977.6930 | 2743.0609 | c |
| 3448 | 762491.6931 | 9272977.5910 | 2742.7907 | c |
| 3449 | 762488.3368 | 9272971.1855 | 2742.2150 | r |
| 3450 | 762491.1172 | 9272951.4583 | 2740.7079 | b |
| 3451 | 762490.1835 | 9272949.6264 | 2740.6407 | e |
| 3452 | 762486.7632 | 9272947.4540 | 2740.5176 | b |
| 3453 | 762491.2941 | 9272946.1615 | 2740.8501 | b |
| 3454 | 762495.0820 | 9272948.5610 | 2740.9885 | e |
| 3455 | 762497.4338 | 9272950.0397 | 2741.0228 | b |
| 3456 | 762499.3538 | 9272950.8732 | 2741.0047 | r |
| 3457 | 762500.0666 | 9272949.9670 | 2741.1027 | b |
| 3458 | 762499.2197 | 9272947.6290 | 2741.0753 | e |
| 3459 | 762498.1730 | 9272945.6016 | 2741.0689 | b |
| 3460 | 762500.3821 | 9272942.7130 | 2741.0303 | r |
| 3461 | 762501.5885 | 9272944.8125 | 2741.2343 | b |
| 3462 | 762503.7290 | 9272946.6133 | 2741.5291 | e |
| 3463 | 762507.1611 | 9272949.1850 | 2741.9464 | b |
| 3464 | 762515.0495 | 9272943.3958 | 2742.6428 | b |
| 3465 | 762511.4486 | 9272942.4110 | 2741.9645 | e |
| 3466 | 762506.9609 | 9272942.2500 | 2741.6857 | b |
| 3467 | 762509.5369 | 9272939.5140 | 2742.0011 | r |
| 3468 | 762510.8801 | 9272938.7541 | 2741.9964 | b |
| 3469 | 762514.5723 | 9272939.5814 | 2742.4354 | e |
| 3470 | 762517.5026 | 9272939.4167 | 2742.8693 | b |
| 3471 | 762518.6494 | 9272937.2620 | 2742.8914 | b |
| 3472 | 762517.1965 | 9272936.2862 | 2742.6931 | e |
| 3473 | 762513.5084 | 9272935.4041 | 2742.2488 | b |
| 3474 | 762511.5218 | 9272934.6083 | 2742.0209 | r |
| 3475 | 762506.7544 | 9272933.7025 | 2740.9000 | r |
| 3476 | 762505.5640 | 9272929.9440 | 2740.4888 | r |
| 3477 | 762498.8185 | 9272921.5368 | 2739.3089 | r |
| 3478 | 762508.8859 | 9272916.2661 | 2740.3542 | r |
| 3479 | 762515.5142 | 9272926.3105 | 2742.6294 | r |
| 3480 | 762516.7904 | 9272929.2917 | 2742.9997 | b |
| 3481 | 762520.1205 | 9272931.0362 | 2743.0683 | e |
| 3482 | 762531.8957 | 9272917.8750 | 2746.2344 | E36 |
| 3483 | 762521.8556 | 9272930.9503 | 2743.5726 | b |
| 3484 | 762524.8857 | 9272932.7479 | 2744.9213 | r |
| 3485 | 762528.0477 | 9272939.6592 | 2746.3188 | r |
| 3486 | 762536.3503 | 9272939.3512 | 2748.2325 | r |
| 3487 | 762535.0330 | 9272929.7468 | 2747.3844 | r |
| 3488 | 762528.9156 | 9272925.4840 | 2745.7417 | r |
| 3489 | 762525.0313 | 9272925.8750 | 2743.9881 | r |
| 3490 | 762524.2780 | 9272926.0480 | 2743.8949 | b |
| 3491 | 762523.0662 | 9272925.4132 | 2743.6812 | e |
| 3492 | 762520.3008 | 9272922.9640 | 2743.1120 | b |
| 3493 | 762523.1801 | 9272918.4568 | 2743.4336 | b |
| 3494 | 762526.2545 | 9272919.3270 | 2743.8592 | e |
| 3495 | 762527.1655 | 9272920.0020 | 2743.9723 | b |
| 3496 | 762529.7873 | 9272914.7120 | 2744.1542 | b |
| 3497 | 762527.7556 | 9272916.4617 | 2744.0140 | e |
| 3498 | 762524.7015 | 9272915.4583 | 2743.9207 | b |
| 3499 | 762519.5947 | 9272913.6230 | 2741.9640 | r |
| 3500 | 762523.5200 | 9272908.9465 | 2743.1752 | r |
| 3501 | 762525.6517 | 9272909.7630 | 2744.0946 | r |
| 3502 | 762526.5781 | 9272907.8542 | 2744.0662 | r |
| 3503 | 762528.9058 | 9272907.4547 | 2744.3129 | b |
| 3504 | 762531.7056 | 9272908.9215 | 2744.6991 | e |
| 3505 | 762533.2867 | 9272908.0795 | 2744.8605 | b |
| 3506 | 762536.1970 | 9272909.9510 | 2746.0085 | r |
| 3507 | 762538.5414 | 9272910.6190 | 2746.6359 | r |
| 3508 | 762542.3248 | 9272912.6050 | 2748.3759 | c |
| 3509 | 762537.7188 | 9272924.4167 | 2747.6563 | c |
| 3510 | 762536.2327 | 9272905.3613 | 2744.4313 | b |
| 3511 | 762534.4302 | 9272903.5892 | 2744.1618 | e |
| 3512 | 762532.1804 | 9272902.3812 | 2744.0199 | b |
| 3513 | 762535.0050 | 9272902.2598 | 2744.3896 | a |
| 3514 | 762533.9306 | 9272898.9166 | 2744.6056 | b |
| 3515 | 762536.0986 | 9272899.2493 | 2745.0102 | e |
| 3516 | 762538.1453 | 9272899.6608 | 2744.4792 | b |
| 3517 | 762538.9172 | 9272895.8224 | 2745.0067 | b |
| 3518 | 762537.1570 | 9272895.1579 | 2745.0517 | e |
| 3519 | 762534.9380 | 9272894.7381 | 2745.0150 | b |
| 3520 | 762534.4245 | 9272894.8750 | 2745.0045 | r |
| 3521 | 762528.6927 | 9272894.8920 | 2742.9792 | r |
| 3522 | 762525.1373 | 9272894.5944 | 2742.5619 | r |
| 3523 | 762523.6285 | 9272892.5730 | 2743.0554 | r |
| 3524 | 762523.6593 | 9272889.4799 | 2743.2407 | r |
| 3525 | 762526.2718 | 9272888.4040 | 2743.9498 | r |
| 3526 | 762534.5290 | 9272891.4704 | 2745.0813 | r |
| 3527 | 762535.2379 | 9272891.7840 | 2745.0901 | b |
| 3528 | 762537.6580 | 9272892.1467 | 2745.1909 | e |
| 3529 | 762539.5992 | 9272892.4310 | 2745.2071 | b |
| 3530 | 762540.4818 | 9272888.0417 | 2745.8664 | b |
| 3531 | 762538.3537 | 9272887.5051 | 2745.6602 | e |
| 3532 | 762536.1225 | 9272886.3211 | 2745.6230 | b |
| 3533 | 762536.5547 | 9272881.8958 | 2745.9851 | b |
| 3534 | 762539.1782 | 9272882.0042 | 2745.9675 | e |
| 3535 | 762541.5255 | 9272882.0643 | 2745.9966 | b |
| 3536 | 762542.1810 | 9272878.3125 | 2746.8218 | b |
| 3537 | 762539.7853 | 9272877.9534 | 2746.4840 | e |
| 3538 | 762536.8358 | 9272876.4094 | 2746.1241 | b |
| 3539 | 762536.6337 | 9272870.9780 | 2746.1753 | r |
| 3540 | 762537.8284 | 9272871.0080 | 2746.2906 | b |
| 3541 | 762540.8904 | 9272871.3606 | 2746.5904 | e |
| 3542 | 762543.4922 | 9272871.8921 | 2746.8488 | b |
| 3543 | 762545.3893 | 9272862.6060 | 2746.9190 | b |
| 3544 | 762542.9431 | 9272862.0501 | 2746.6537 | e |
| 3545 | 762540.2581 | 9272861.3730 | 2746.3625 | b |
| 3547 | 762571.3327 | 9272736.8000 | 2753.8640 | E37 |
| 3548 | 762547.4570 | 9272853.7292 | 2747.0147 | b |
| 3549 | 762544.8538 | 9272853.6427 | 2747.0433 | e |
| 3550 | 762542.2444 | 9272852.7500 | 2747.0176 | b |
| 3551 | 762543.8810 | 9272845.4180 | 2747.1528 | b |
| 3552 | 762546.6600 | 9272845.6952 | 2747.4227 | e |
| 3553 | 762549.3739 | 9272845.9581 | 2747.6863 | b |
| 3554 | 762551.0036 | 9272840.7114 | 2747.7815 | r |
| 3555 | 762550.7572 | 9272840.3700 | 2747.7538 | b |
| 3556 | 762548.0120 | 9272839.7461 | 2747.5135 | e |
| 3557 | 762545.4913 | 9272839.1033 | 2747.3259 | b |
| 3558 | 762546.7987 | 9272833.9764 | 2747.6466 | b |
| 3559 | 762549.2578 | 9272834.2644 | 2747.8094 | e |
| 3560 | 762552.1312 | 9272834.0014 | 2747.9734 | b |
| 3561 | 762553.0288 | 9272829.8414 | 2748.0000 | b |
| 3562 | 762550.2876 | 9272829.7330 | 2747.9816 | e |
| 3563 | 762548.0714 | 9272829.1384 | 2747.9913 | b |
| 3564 | 762549.5135 | 9272823.7644 | 2748.0756 | b |
| 3565 | 762551.5394 | 9272824.2248 | 2748.0892 | e |
| 3567 | 762554.1406 | 9272824.6880 | 2748.0095 | b |
| 3568 | 762554.7922 | 9272821.7365 | 2748.2343 | b |
| 3569 | 762552.1531 | 9272821.5247 | 2748.1026 | e |
| 3570 | 762550.3347 | 9272820.7040 | 2748.1393 | b |
| 3571 | 762551.3032 | 9272816.3979 | 2748.3081 | b |
| 3572 | 762553.2192 | 9272816.8333 | 2748.4650 | e |
| 3573 | 762555.8651 | 9272816.8770 | 2748.6939 | b |
| 3574 | 762557.6682 | 9272812.4963 | 2748.9597 | r |
| 3575 | 762557.0763 | 9272810.4156 | 2748.8432 | b |
| 3576 | 762554.7955 | 9272809.8973 | 2748.4958 | e |
| 3577 | 762552.6952 | 9272810.2090 | 2748.2483 | b |
| 3578 | 762549.1738 | 9272813.6530 | 2748.1697 | c |
| 3579 | 762550.5404 | 9272803.2292 | 2747.2374 | c |
| 3580 | 762553.3620 | 9272807.2500 | 2748.3858 | b |
| 3581 | 762555.5871 | 9272806.4143 | 2748.8998 | e |
| 3582 | 762558.1423 | 9272804.7294 | 2749.0017 | b |
| 3583 | 762558.5755 | 9272802.4167 | 2749.0165 | b |
| 3584 | 762557.1648 | 9272799.4718 | 2749.0828 | e |
| 3585 | 762555.5335 | 9272797.8404 | 2749.0219 | b |
| 3586 | 762554.3414 | 9272796.9140 | 2748.6922 | r |
| 3587 | 762552.4301 | 9272796.5064 | 2747.8724 | r |
| 3588 | 762555.9095 | 9272796.2120 | 2749.1392 | b |
| 3589 | 762557.8705 | 9272796.3668 | 2749.3935 | e |
| 3590 | 762559.8315 | 9272796.3966 | 2749.6429 | b |
| 3591 | 762560.6622 | 9272792.4140 | 2749.8234 | b |
| 3592 | 762559.1194 | 9272790.8712 | 2749.6355 | e |
| 3593 | 762557.2219 | 9272788.7526 | 2749.6535 | b |
| 3594 | 762557.9213 | 9272784.7770 | 2750.0033 | b |
| 3595 | 762560.7312 | 9272783.7790 | 2750.1148 | e |
| 3596 | 762562.8986 | 9272782.6953 | 2750.3306 | b |
| 3597 | 762569.6922 | 9272781.1320 | 2753.0020 | c |
| 3598 | 762564.5091 | 9272777.7500 | 2750.9387 | r |
| 3599 | 762564.2188 | 9272776.9583 | 2750.8889 | b |
| 3600 | 762562.4693 | 9272776.1313 | 2750.6519 | e |
| 3601 | 762559.7051 | 9272774.9813 | 2750.2798 | b |
| 3602 | 762560.0120 | 9272773.2960 | 2750.2921 | b |
| 3603 | 762563.3276 | 9272772.3543 | 2750.7909 | e |
| 3604 | 762565.9071 | 9272770.5402 | 2751.0791 | b |
| 3605 | 762567.5611 | 9272770.6525 | 2751.8024 | r |
| 3606 | 762568.3257 | 9272768.8396 | 2752.3445 | r |
| 3607 | 762566.4462 | 9272768.4910 | 2751.6321 | b |
| 3608 | 762564.3157 | 9272768.0068 | 2751.3844 | e |
| 3609 | 762561.1641 | 9272767.3918 | 2751.0294 | b |
| 3610 | 762561.9180 | 9272763.5280 | 2751.1125 | b |
| 3611 | 762565.3425 | 9272763.4887 | 2751.5926 | e |
| 3612 | 762567.5760 | 9272763.2289 | 2751.8360 | b |
| 3613 | 762569.4169 | 9272761.5260 | 2751.9602 | r |
| 3614 | 762573.9177 | 9272762.4970 | 2754.4955 | r |
| 3615 | 762576.6445 | 9272765.2500 | 2755.3287 | losa |
| 3616 | 762594.5831 | 9272765.9170 | 2755.9999 | losa |
| 3617 | 762597.8135 | 9272754.0223 | 2759.3131 | r |
| 3618 | 762595.8984 | 9272738.8958 | 2755.9997 | l |
| 3619 | 762577.8290 | 9272738.3140 | 2755.6889 | l |
| 3620 | 762571.4609 | 9272734.0000 | 2753.9937 | b |
| 3621 | 762569.3708 | 9272734.9495 | 2753.7900 | e |
| 3622 | 762566.6484 | 9272737.0208 | 2753.4041 | b |
| 3623 | 762564.9271 | 9272732.8053 | 2753.8806 | r |
| 3624 | 762564.2185 | 9272730.0433 | 2754.0059 | r |
| 3625 | 762563.8298 | 9272728.1815 | 2754.0153 | r |
| 3626 | 762566.3723 | 9272728.1460 | 2754.0126 | b |
| 3627 | 762569.6956 | 9272728.3085 | 2754.0456 | e |
| 3628 | 762572.3778 | 9272728.1350 | 2754.0460 | b |
| 3629 | 762572.7308 | 9272723.7287 | 2754.2066 | r |
| 3630 | 762571.7943 | 9272722.0000 | 2754.4251 | b |
| 3631 | 762568.7708 | 9272720.0262 | 2754.4905 | e |
| 3632 | 762564.3224 | 9272717.6780 | 2754.3104 | b |
| 3633 | 762561.3915 | 9272715.2790 | 2754.7073 | r |
| 3634 | 762562.4190 | 9272714.7945 | 2754.7805 | b |
| 3635 | 762565.8091 | 9272714.3232 | 2754.7155 | e |
| 3636 | 762570.1047 | 9272715.0140 | 2754.9246 | b |
| 3637 | 762575.8958 | 9272715.1250 | 2755.7568 | c |
| 3638 | 762570.6215 | 9272707.6860 | 2755.8090 | c |
| 3640 | 762568.5393 | 9272710.6650 | 2755.2217 | b |
| 3641 | 762563.3590 | 9272711.5969 | 2755.1332 | e |
| 3642 | 762560.3762 | 9272711.9847 | 2755.0740 | b |
| 3643 | 762557.5915 | 9272710.6821 | 2755.1310 | r |
| 3644 | 762558.2688 | 9272709.3430 | 2755.2969 | b |
| 3645 | 762559.4327 | 9272708.7609 | 2755.3971 | e |
| 3646 | 762561.2995 | 9272705.8542 | 2755.7590 | b |
| 3647 | 762562.8865 | 9272702.3101 | 2756.0024 | c |
| 3648 | 762556.5905 | 9272705.4025 | 2755.7448 | b |
| 3649 | 762555.6930 | 9272707.1692 | 2755.4403 | e |
| 3650 | 762555.4226 | 9272708.1670 | 2755.2657 | b |
| 3651 | 762552.9035 | 9272710.7659 | 2754.7868 | r |
| 3652 | 762551.1367 | 9272709.3333 | 2755.1275 | r |
| 3653 | 762550.4682 | 9272708.1930 | 2755.3385 | b |
| 3654 | 762550.2737 | 9272706.2787 | 2755.6843 | e |
| 3655 | 762550.7787 | 9272704.6625 | 2755.9792 | b |
| 3656 | 762547.0388 | 9272703.6786 | 2756.2921 | r |
| 3657 | 762546.4909 | 9272704.5833 | 2755.9746 | b |
| 3658 | 762546.9625 | 9272706.4607 | 2755.7891 | e |
| 3659 | 762548.0348 | 9272708.4030 | 2755.5035 | b |
| 3660 | 762544.8196 | 9272710.8762 | 2755.0210 | r |
| 3661 | 762541.8984 | 9272711.9655 | 2754.9001 | r |
| 3662 | 762538.2644 | 9272711.1320 | 2756.0072 | r |
| 3663 | 762537.4004 | 9272710.2440 | 2756.0637 | b |
| 3664 | 762536.2984 | 9272707.6327 | 2756.4991 | e |
| 3665 | 762536.0148 | 9272706.3920 | 2756.7057 | b |
| 3666 | 762534.2391 | 9272703.2314 | 2757.6030 | r |
| 3667 | 762531.5143 | 9272706.0000 | 2756.7367 | b |
| 3668 | 762532.1233 | 9272708.0916 | 2756.4081 | e |
| 3669 | 762532.5169 | 9272710.0720 | 2756.0954 | b |
| 3670 | 762530.0781 | 9272713.4230 | 2756.0184 | r |
| 3671 | 762527.3307 | 9272711.4800 | 2756.2212 | b |
| 3672 | 762526.3778 | 9272708.5304 | 2756.5476 | e |
| 3673 | 762523.7590 | 9272705.3840 | 2756.7794 | b |
| 3674 | 762518.7983 | 9272704.9193 | 2756.7524 | b |
| 3675 | 762519.7886 | 9272707.8446 | 2756.4384 | e |
| 3676 | 762519.5531 | 9272710.3600 | 2756.1531 | b |
| 3677 | 762523.3105 | 9272718.9930 | 2754.4200 | c |
| 3678 | 762525.0720 | 9272716.6460 | 2755.4570 | c |
| 3679 | 762511.1830 | 9272707.4750 | 2756.3600 | b |
| 3680 | 762512.7461 | 9272705.5285 | 2756.6190 | e |
| 3681 | 762514.7846 | 9272703.7460 | 2756.8586 | b |
| 3682 | 762508.1036 | 9272701.0200 | 2756.8893 | b |
| 3683 | 762505.7263 | 9272702.6595 | 2756.6032 | e |
| 3684 | 762504.2224 | 9272705.2160 | 2756.2532 | b |
| 3685 | 762466.3984 | 9272677.9150 | 2758.1773 | E38 |
| 3686 | 762500.8924 | 9272698.3494 | 2756.7830 | b |
| 3687 | 762497.9005 | 9272699.4611 | 2756.5401 | e |
| 3688 | 762494.7129 | 9272701.2192 | 2756.2019 | b |
| 3689 | 762490.2493 | 9272698.6773 | 2757.0004 | b |
| 3690 | 762492.3805 | 9272696.5787 | 2757.0215 | e |
| 3691 | 762494.2086 | 9272694.2871 | 2756.9956 | b |
| 3692 | 762489.0039 | 9272691.1570 | 2757.2637 | b |
| 3693 | 762486.3302 | 9272692.1142 | 2757.4754 | e |
| 3694 | 762483.2263 | 9272692.3309 | 2757.1656 | b |
| 3695 | 762481.5476 | 9272692.3104 | 2756.7815 | r |
| 3696 | 762482.0757 | 9272691.4900 | 2757.0376 | b |
| 3697 | 762483.5900 | 9272689.9757 | 2757.2472 | e |
| 3698 | 762484.9297 | 9272688.4583 | 2757.4298 | b |
| 3699 | 762478.0919 | 9272683.1970 | 2757.9946 | b |
| 3700 | 762476.0449 | 9272684.0871 | 2757.9758 | e |
| 3701 | 762472.6497 | 9272683.5800 | 2758.0459 | b |
| 3702 | 762469.3874 | 9272681.1900 | 2758.0776 | b |
| 3703 | 762470.8437 | 9272679.8839 | 2758.2023 | e |
| 3704 | 762473.8096 | 9272678.9255 | 2758.0109 | b |
| 3705 | 762471.0418 | 9272674.5780 | 2758.4348 | b |
| 3706 | 762470.5148 | 9272673.1798 | 2758.0630 | r |
| 3707 | 762466.7322 | 9272674.1837 | 2758.4681 | e |
| 3708 | 762464.2334 | 9272674.9010 | 2758.7488 | b |
| 3709 | 762466.4040 | 9272687.3100 | 2755.7399 | r |
| 3710 | 762469.2955 | 9272690.5146 | 2755.5445 | r |
| 3711 | 762460.9570 | 9272691.9375 | 2754.9965 | c |
| 3712 | 762481.3969 | 9272703.0805 | 2754.6221 | r |
| 3713 | 762486.0391 | 9272706.6380 | 2754.8250 | r |
| 3714 | 762488.1928 | 9272712.7070 | 2753.9490 | c |
| 3715 | 762491.9968 | 9272703.1280 | 2755.5583 | c |
| 3716 | 762497.4219 | 9272705.3958 | 2755.8294 | c |
| 3717 | 762511.2482 | 9272709.8530 | 2756.1700 | c |
| 3718 | 762516.4855 | 9272712.1040 | 2756.1176 | c |
| 3719 | 762476.4809 | 9272670.1511 | 2761.6169 | c |
| 3720 | 762469.2266 | 9272670.4167 | 2758.8792 | b |
| 3721 | 762465.4473 | 9272670.7274 | 2758.5843 | e |
| 3722 | 762463.3056 | 9272670.9550 | 2758.4552 | b |
| 3723 | 762462.0769 | 9272668.3866 | 2758.1905 | r |
| 3724 | 762461.9128 | 9272666.5311 | 2758.1723 | r |
| 3725 | 762462.7454 | 9272667.1054 | 2484.5889 | b |
| 3726 | 762464.8084 | 9272666.9564 | 2758.5093 | e |
| 3727 | 762468.2490 | 9272665.3180 | 2758.9224 | b |
| 3728 | 762468.4814 | 9272662.0826 | 2758.9817 | r |
| 3729 | 762467.1050 | 9272659.3090 | 2758.9624 | b |
| 3730 | 762464.7670 | 9272659.3050 | 2758.7284 | e |
| 3731 | 762462.4891 | 9272659.1093 | 2758.5345 | b |
| 3732 | 762461.4506 | 9272656.1513 | 2758.7750 | r |
| 3733 | 762462.6296 | 9272655.7010 | 2758.9258 | b |
| 3734 | 762464.7742 | 9272655.0643 | 2758.9992 | e |
| 3735 | 762466.8721 | 9272654.8647 | 2759.0085 | b |
| 3736 | 762468.2685 | 9272654.9637 | 2759.0017 | r |
| 3737 | 762468.8464 | 9272651.9130 | 2760.4478 | r |
| 3738 | 762466.9796 | 9272651.2760 | 2759.3775 | b |
| 3739 | 762464.7807 | 9272651.2723 | 2759.2983 | e |
| 3740 | 762462.7210 | 9272650.5828 | 2759.2269 | b |
| 3741 | 762462.4544 | 9272646.3333 | 2759.2989 | b |
| 3742 | 762464.7889 | 9272646.4654 | 2759.3086 | e |
| 3743 | 762467.1035 | 9272646.2652 | 2759.2454 | b |
| 3746 | 762467.1915 | 9272643.0730 | 2759.9138 | b |
| 3747 | 762464.9307 | 9272642.5926 | 2759.5896 | e |
| 3748 | 762462.4025 | 9272642.7883 | 2759.2381 | b |
| 3749 | 762462.5459 | 9272641.3880 | 2759.2371 | b |
| 3750 | 762465.0636 | 9272641.3256 | 2759.5891 | e |
| 3751 | 762467.2413 | 9272641.3711 | 2759.8977 | b |
| 3752 | 762467.5071 | 9272638.1164 | 2759.8951 | b |
| 3753 | 762465.6893 | 9272637.7081 | 2759.6299 | e |
| 3755 | 762463.1137 | 9272637.1461 | 2759.2545 | b |
| 3756 | 762464.0062 | 9272633.8730 | 2759.7698 | b |
| 3757 | 762466.6060 | 9272634.3670 | 2759.9310 | e |
| 3758 | 762468.5501 | 9272634.7896 | 2759.9984 | b |
| 3759 | 762503.0208 | 9272569.3300 | 2768.3429 | E39 |
| 3760 | 762465.9224 | 9272628.3340 | 2760.1515 | b |
| 3761 | 762468.9439 | 9272628.7131 | 2760.6186 | e |
| 3762 | 762470.8190 | 9272628.8542 | 2760.8889 | b |
| 3763 | 762472.7758 | 9272628.2410 | 2762.0052 | r |
| 3764 | 762476.0859 | 9272629.5625 | 2764.0214 | r |
| 3765 | 762480.9729 | 9272624.8310 | 2765.0000 | c |
| 3766 | 762485.2337 | 9272623.1636 | 2764.6658 | c |
| 3767 | 762475.0256 | 9272623.0882 | 2761.5422 | r |
| 3768 | 762474.7839 | 9272619.5417 | 2761.4714 | b |
| 3769 | 762473.2944 | 9272619.4327 | 2761.1072 | e |
| 3770 | 762469.8780 | 9272619.0470 | 2760.9699 | b |
| 3771 | 762472.3678 | 9272612.4100 | 2761.0571 | b |
| 3772 | 762476.6399 | 9272612.2961 | 2761.6677 | e |
| 3773 | 762479.1117 | 9272610.5360 | 2761.9964 | b |
| 3774 | 762480.9381 | 9272606.7826 | 2762.7309 | b |
| 3775 | 762479.3431 | 9272606.5299 | 2762.4957 | e |
| 3776 | 762476.4910 | 9272605.3819 | 2762.0315 | b |
| 3777 | 762477.7324 | 9272603.2660 | 2762.2224 | b |
| 3778 | 762481.1226 | 9272602.7338 | 2762.6119 | e |
| 3779 | 762483.3297 | 9272602.0490 | 2762.8733 | b |
| 3780 | 762484.7403 | 9272601.1866 | 2762.9985 | r |
| 3781 | 762486.3789 | 9272599.2708 | 2763.6111 | r |
| 3782 | 762484.9937 | 9272598.8229 | 2763.0075 | b |
| 3783 | 762483.0193 | 9272598.6877 | 2763.0274 | e |
| 3784 | 762480.5868 | 9272597.8810 | 2763.0082 | b |
| 3785 | 762482.1855 | 9272591.5028 | 2763.1452 | r |
| 3786 | 762484.4016 | 9272589.6049 | 2763.5411 | b |
| 3787 | 762486.7591 | 9272590.7101 | 2763.7294 | e |
| 3788 | 762488.8567 | 9272591.4335 | 2763.9562 | b |
| 3789 | 762492.4792 | 9272587.7083 | 2764.0342 | r |
| 3790 | 762494.9214 | 9272587.8970 | 2766.6841 | r |
| 3791 | 762498.0401 | 9272589.1835 | 2767.7253 | r |
| 3792 | 762504.9324 | 9272591.1389 | 2769.0382 | r |
| 3793 | 762512.2006 | 9272593.8494 | 2771.2453 | r |
| 3794 | 762519.5427 | 9272594.5432 | 2773.4414 | r |
| 3795 | 762523.1245 | 9272581.7892 | 2772.9016 | r |
| 3796 | 762508.6405 | 9272582.1750 | 2769.2111 | r |
| 3797 | 762499.1444 | 9272583.3266 | 2767.3069 | r |
| 3798 | 762495.0769 | 9272584.7463 | 2764.9352 | r |
| 3799 | 762492.9266 | 9272584.1559 | 2764.4591 | b |
| 3800 | 762490.3893 | 9272582.9664 | 2764.4091 | e |
| 3801 | 762487.9855 | 9272582.5930 | 2764.1623 | b |
| 3802 | 762490.2734 | 9272578.3333 | 2764.6879 | b |
| 3803 | 762492.5032 | 9272578.4572 | 2764.9275 | e |
| 3804 | 762495.6982 | 9272579.1410 | 2765.1595 | b |
| 3805 | 762497.5664 | 9272572.3125 | 2765.8976 | b |
| 3806 | 762494.5339 | 9272573.0242 | 2765.4276 | e |
| 3807 | 762492.2792 | 9272572.9080 | 2765.0969 | b |
| 3808 | 762492.5007 | 9272569.8097 | 2765.2322 | b |
| 3809 | 762494.9187 | 9272569.8933 | 2765.5790 | e |
| 3811 | 762498.3769 | 9272568.2899 | 2765.9961 | r |
| 3812 | 762497.2508 | 9272569.4160 | 2765.9080 | b |
| 3813 | 762497.3723 | 9272568.0790 | 2765.9755 | b |
| 3814 | 762494.8381 | 9272567.4614 | 2765.6721 | e |
| 3816 | 762492.1162 | 9272566.7227 | 2765.2705 | b |
| 3817 | 762491.2233 | 9272563.9611 | 2765.3035 | b |
| 3818 | 762490.1696 | 9272562.5550 | 2765.5796 | b |
| 3819 | 762493.8912 | 9272563.2471 | 2766.0037 | e |
| 3820 | 762496.1225 | 9272562.5530 | 2766.2124 | b |
| 3821 | 762496.3781 | 9272561.3420 | 2766.0000 | r |
| 3822 | 762493.9479 | 9272555.5150 | 2767.5499 | r |
| 3823 | 762492.2246 | 9272556.3010 | 2766.8351 | b |
| 3824 | 762491.5028 | 9272558.7070 | 2766.4012 | e |
| 3825 | 762488.8546 | 9272559.5415 | 2766.0999 | b |
| 3826 | 762484.6107 | 9272558.4040 | 2767.0000 | r |
| 3827 | 762483.9014 | 9272556.2940 | 2765.9324 | r |
| 3828 | 762485.5957 | 9272555.9080 | 2766.0878 | b |
| 3829 | 762488.2060 | 9272554.6562 | 2766.5220 | e |
| 3830 | 762489.6614 | 9272553.2009 | 2766.8224 | b |
| 3831 | 762489.5835 | 9272551.2755 | 2767.0723 | r |
| 3832 | 762489.5835 | 9272551.2755 | 2767.0723 | r |
| 3833 | 762488.5238 | 9272549.5049 | 2767.6500 | r |
| 3834 | 762486.0807 | 9272549.1480 | 2766.9137 | b |
| 3835 | 762484.2862 | 9272549.9058 | 2766.6560 | e |
| 3836 | 762481.2185 | 9272551.1219 | 2766.2284 | b |
| 3837 | 762477.9688 | 9272547.4167 | 2766.8968 | b |
| 3838 | 762480.3179 | 9272545.0968 | 2766.9217 | e |
| 3839 | 762481.6703 | 9272543.7444 | 2766.9862 | b |
| 3840 | 762479.1519 | 9272540.8820 | 2766.9926 | b |
| 3841 | 762476.9686 | 9272541.0378 | 2766.9399 | e |
| 3842 | 762473.2975 | 9272540.6928 | 2767.0001 | b |
| 3843 | 762472.2370 | 9272538.9792 | 2767.0000 | b |
| 3844 | 762474.0413 | 9272537.4903 | 2767.0001 | e |
| 3845 | 762475.2748 | 9272536.2569 | 2767.0000 | b |
| 3846 | 762473.8457 | 9272532.8061 | 2767.0644 | r |
| 3848 | 762472.0042 | 9272532.4260 | 2767.0001 | b |
| 3849 | 762470.2894 | 9272532.9433 | 2767.0003 | e |
| 3850 | 762467.1527 | 9272532.7059 | 2767.0001 | b |
| 3851 | 762464.7109 | 9272529.9583 | 2767.0001 | b |
| 3852 | 762466.7273 | 9272528.6265 | 2767.0003 | e |
| 3853 | 762468.1023 | 9272527.6774 | 2767.0002 | b |
| 3854 | 762467.3838 | 9272526.6490 | 2767.0002 | b |
| 3855 | 762465.3792 | 9272526.9928 | 2767.0002 | e |
| 3856 | 762462.2199 | 9272527.0642 | 2767.0001 | b |
| 3857 | 762460.1372 | 9272524.8540 | 2767.0000 | E40 |
| 3858 | 762459.7055 | 9272523.7335 | 2766.9630 | b |
| 3859 | 762461.9344 | 9272522.1716 | 2766.9088 | e |
| 3860 | 762464.5485 | 9272522.1946 | 2766.9219 | b |
| 3861 | 762462.9024 | 9272519.9310 | 2766.7925 | b |
| 3862 | 762460.9711 | 9272520.1904 | 2766.7983 | e |
| 3863 | 762457.9737 | 9272521.1390 | 2766.7619 | b |
| 3864 | 762456.6370 | 9272518.0341 | 2766.5643 | b |
| 3865 | 762460.0243 | 9272517.5430 | 2766.6512 | e |
| 3866 | 762461.5703 | 9272517.3133 | 2766.6466 | b |
| 3867 | 762461.0990 | 9272515.1040 | 2766.5277 | b |
| 3868 | 762459.4345 | 9272514.9635 | 2766.5095 | e |
| 3869 | 762456.3260 | 9272514.6680 | 2766.4292 | b |
| 3870 | 762454.7815 | 9272511.0307 | 2766.1992 | r |
| 3871 | 762456.4694 | 9272510.8391 | 2766.2767 | b |
| 3872 | 762459.1137 | 9272511.1355 | 2766.3298 | e |
| 3873 | 762461.1967 | 9272511.0204 | 2766.4009 | b |
| 3874 | 762462.5497 | 9272505.7329 | 2766.3202 | b |
| 3875 | 762459.8208 | 9272505.4762 | 2766.2049 | e |
| 3876 | 762457.5834 | 9272504.5320 | 2766.0912 | b |
| 3877 | 762459.4219 | 9272499.8542 | 2766.0423 | b |
| 3878 | 762461.9988 | 9272499.9826 | 2766.1483 | e |
| 3879 | 762465.5300 | 9272499.9285 | 2766.2874 | b |
| 3880 | 762467.3190 | 9272497.2500 | 2766.2730 | b |
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| 3882 | 762462.4452 | 9272495.5500 | 2766.0480 | b |
| 3883 | 762463.8941 | 9272490.9789 | 2765.9922 | r |
| 3884 | 762466.3472 | 9272490.6194 | 2766.0348 | b |
| 3885 | 762468.5150 | 9272491.6383 | 2766.1394 | e |
| 3886 | 762470.6363 | 9272492.6450 | 2766.2421 | b |
| 3887 | 762472.7930 | 9272490.3333 | 2766.2446 | b |
| 3888 | 762470.7118 | 9272489.0637 | 2766.1346 | e |
| 3889 | 762469.0134 | 9272487.3652 | 2766.0250 | b |
| 3890 | 762470.3477 | 9272485.7708 | 2766.0226 | b |
| 3891 | 762474.6162 | 9272484.4877 | 2766.1329 | e |
| 3892 | 762477.6561 | 9272484.6899 | 2766.2469 | b |
| 3893 | 762479.5289 | 9272481.9380 | 2766.0238 | b |
| 3894 | 762477.6059 | 9272480.9837 | 2766.0042 | e |
| 3895 | 762475.7188 | 9272479.3125 | 2766.0056 | b |
| 3896 | 762479.8751 | 9272473.9642 | 2766.0012 | b |
| 3897 | 762482.7943 | 9272474.6990 | 2766.0068 | e |
| 3898 | 762484.2356 | 9272475.3542 | 2766.0040 | b |
| 3899 | 762485.7759 | 9272473.3610 | 2766.0003 | b |
| 3900 | 762484.6329 | 9272472.2180 | 2766.0068 | e |
| 3901 | 762482.6043 | 9272470.1401 | 2766.0012 | b |
| 3902 | 762487.8133 | 9272467.4240 | 2766.0086 | a |
| 3903 | 762490.8864 | 9272466.2743 | 2766.0005 | b |
| 3904 | 762489.2891 | 9272465.2358 | 2766.0088 | e |
| 3905 | 762486.9168 | 9272463.5997 | 2766.0000 | b |
| 3906 | 762499.8378 | 9272444.9790 | 2766.0277 | b |
| 3907 | 762501.6053 | 9272446.2907 | 2766.1101 | e |
| 3908 | 762503.0484 | 9272447.9230 | 2766.1952 | b |
| 3909 | 762506.9961 | 9272444.2917 | 2766.4920 | r |
| 3910 | 762508.0521 | 9272440.8598 | 2766.6105 | b |
| 3911 | 762505.7696 | 9272439.8850 | 2766.4121 | e |
| 3912 | 762503.7679 | 9272439.2509 | 2766.2099 | b |
| 3913 | 762504.1680 | 9272438.5833 | 2766.2623 | b |
| 3914 | 762506.4832 | 9272438.7873 | 2766.4611 | e |
| 3915 | 762509.5368 | 9272438.6092 | 2766.7231 | b |
| 3916 | 762513.8339 | 9272435.8620 | 2767.0016 | r |
| 3917 | 762513.3915 | 9272434.5810 | 2766.9922 | r |
| 3918 | 762526.1759 | 9272445.3094 | 2767.4751 | r |
| 3919 | 762533.9963 | 9272445.4132 | 2769.2029 | r |
| 3920 | 762534.4064 | 9272432.0198 | 2767.9914 | r |
| 3921 | 762515.1541 | 9272430.0920 | 2766.9994 | b |
| 3922 | 762512.9204 | 9272428.8854 | 2767.0073 | e |
| 3923 | 762512.6724 | 9272426.0557 | 2767.1661 | b |
| 3924 | 762513.6884 | 9272424.4520 | 2767.3633 | b |
| 3925 | 762515.1745 | 9272425.4181 | 2767.2371 | e |
| 3926 | 762517.5124 | 9272426.8710 | 2767.0034 | b |
| 3928 | 762519.6838 | 9272422.3890 | 2767.4161 | b |
| 3929 | 762517.6814 | 9272421.5619 | 2767.5933 | e |
| 3930 | 762516.2245 | 9272420.1070 | 2767.8213 | b |
| 3931 | 762516.0404 | 9272418.2806 | 2768.0009 | r |
| 3932 | 762514.8366 | 9272418.1530 | 2767.9875 | r |
| 3933 | 762496.7870 | 9272418.5205 | 2766.7091 | r |
| 3934 | 762502.0536 | 9272411.3965 | 2767.0319 | r |
| 3935 | 762520.9394 | 9272410.4421 | 2768.0601 | b |
| 3936 | 762524.0629 | 9272411.3725 | 2768.0670 | e |
| 3937 | 762525.1291 | 9272411.2008 | 2768.1155 | b |
| 3938 | 762526.3438 | 9272409.0625 | 2768.3341 | b |
| 3939 | 762525.2480 | 9272408.6489 | 2768.3339 | e |
| 3940 | 762522.1614 | 9272407.5230 | 2768.2742 | b |
| 3941 | 762523.5614 | 9272403.5868 | 2768.5808 | b |
| 3942 | 762526.6555 | 9272403.6436 | 2768.7527 | e |
| 3943 | 762528.6660 | 9272402.9330 | 2768.9058 | b |
| 3944 | 762524.8945 | 9272398.2917 | 2768.9952 | b |
| 3945 | 762527.3391 | 9272398.5911 | 2768.9791 | e |
| 3946 | 762529.2389 | 9272398.7938 | 2768.9975 | b |
| 3947 | 762529.6363 | 9272394.6340 | 2769.1956 | b |
| 3948 | 762527.8505 | 9272394.4153 | 2769.0614 | e |
| 3949 | 762525.5204 | 9272394.8588 | 2768.9993 | b |
| 3950 | 762519.3527 | 9272389.4731 | 2768.5713 | r |
| 3951 | 762512.6566 | 9272379.4402 | 2768.4854 | r |
| 3952 | 762497.5230 | 9272371.6814 | 2767.7014 | r |
| 3953 | 762514.7993 | 9272367.6682 | 2768.9569 | r |
| 3954 | 762525.3763 | 9272376.6667 | 2769.1303 | r |
| 3955 | 762526.2891 | 9272376.7200 | 2769.2138 | r |
| 3956 | 762526.4974 | 9272388.7150 | 2769.2964 | b |
| 3957 | 762528.7370 | 9272387.1767 | 2769.6565 | e |
| 3958 | 762530.8547 | 9272385.0416 | 2769.7078 | b |
| 3959 | 762527.1462 | 9272381.8660 | 2769.3984 | b |
| 3960 | 762529.6213 | 9272379.9563 | 2769.4482 | e |
| 3961 | 762531.5407 | 9272378.1338 | 2769.6684 | b |
| 3963 | 762532.0827 | 9272370.9930 | 2769.8848 | b |
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| 3965 | 762527.6906 | 9272370.2334 | 2769.5757 | b |
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| 3967 | 762531.4718 | 9272364.8593 | 2769.9903 | e |
| 3968 | 762532.8900 | 9272364.5024 | 2770.0068 | b |
| 3969 | 762535.0134 | 9272364.9960 | 2770.3707 | r |
| 3970 | 762541.8938 | 9272364.6005 | 2771.4082 | r |
| 3971 | 762552.9636 | 9272366.3710 | 2772.8281 | r |
| 3972 | 762555.4855 | 9272356.7549 | 2773.0042 | r |
| 3973 | 762576.3814 | 9272368.9222 | 2776.4320 | r |
| 3974 | 762533.0547 | 9272361.7708 | 2770.0260 | b |
| 3975 | 762532.1046 | 9272359.6796 | 2770.0129 | e |
| 3976 | 762529.0204 | 9272357.2942 | 2770.0039 | b |
| 3977 | 762532.4819 | 9272356.5993 | 2770.0099 | e |
| 3978 | 762529.7101 | 9272352.4680 | 2770.0015 | b |
| 3979 | 762532.9693 | 9272352.6192 | 2770.0089 | e |
| 3981 | 762534.5434 | 9272351.9268 | 2770.0004 | b |
| 3982 | 762534.8248 | 9272350.0420 | 2770.0280 | b |
| 3983 | 762533.2947 | 9272349.9625 | 2770.0033 | e |
| 3984 | 762530.2485 | 9272349.4238 | 2769.9998 | b |
| 3985 | 762530.8237 | 9272346.1710 | 2769.9803 | b |
| 3986 | 762533.7157 | 9272346.5252 | 2769.9640 | e |
| 3988 | 762535.5393 | 9272346.5385 | 2769.9950 | b |
| 3989 | 762534.4243 | 9272340.7394 | 2769.7895 | e |
| 3990 | 762537.5416 | 9272335.7840 | 2769.8135 | b |
| 3991 | 762534.9626 | 9272336.3436 | 2769.6119 | e |
| 3992 | 762532.6164 | 9272336.4840 | 2769.4142 | b |
| 3993 | 762533.4258 | 9272331.7292 | 2769.3979 | b |
| 3994 | 762535.4551 | 9272332.3227 | 2769.5728 | e |
| 3995 | 762538.1973 | 9272331.1979 | 2484.5889 | b |
| 3997 | 762538.7266 | 9272326.6003 | 2769.6530 | b |
| 3998 | 762536.2206 | 9272326.0717 | 2769.4684 | e |
| 3999 | 762533.8237 | 9272326.0389 | 2769.2853 | b |
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| 4001 | 762536.6741 | 9272321.3744 | 2769.3635 | e |
| 4002 | 762539.3320 | 9272321.7708 | 2769.5408 | b |
| 4003 | 762541.5952 | 9272319.6618 | 2769.6633 | r |
| 4004 | 762539.2508 | 9272317.8279 | 2769.5198 | b |
| 4005 | 762536.6711 | 9272317.9437 | 2769.3343 | e |
| 4006 | 762533.9521 | 9272317.6427 | 2769.1429 | b |
| 4007 | 762533.3970 | 9272311.8340 | 2769.1317 | b |
| 4008 | 762535.8931 | 9272311.7516 | 2769.3292 | e |
| 4009 | 762538.4237 | 9272311.3904 | 2769.5307 | b |
| 4010 | 762534.2529 | 9272302.0700 | 2769.4596 | b |
| 4011 | 762532.9557 | 9272302.9973 | 2769.2934 | e |
| 4012 | 762530.8689 | 9272304.2140 | 2769.0326 | e |
| 4013 | 762527.0661 | 9272300.6020 | 2768.9298 | r |
| 4014 | 762527.3895 | 9272300.2520 | 2768.9690 | r |
| 4015 | 762528.1910 | 9272299.2680 | 2769.0020 | b |
| 4016 | 762530.1086 | 9272297.9830 | 2769.1275 | e |
| 4017 | 762531.7071 | 9272297.2071 | 2769.2599 | b |
| 4018 | 762529.7427 | 9272294.4190 | 2769.0021 | b |
| 4019 | 762527.8439 | 9272294.9354 | 2769.0121 | e |
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| 4023 | 762539.4663 | 9272294.7410 | 2769.9253 | c |
| 4024 | 762525.1289 | 9272289.1458 | 2769.0152 | b |
| 4025 | 762523.1093 | 9272290.0981 | 2768.9535 | e |
| 4026 | 762520.8750 | 9272291.1875 | 2768.5855 | b |
| 4027 | 762518.5712 | 9272286.7170 | 2769.0029 | a |
| 4028 | 762519.4281 | 9272284.157 | 2769.1694 | bm12 |
| 4029 | 762515.9313 | 9272281.8370 | 2768.9976 | b |
| 4030 | 762514.0936 | 9272283.6747 | 2768.9767 | e |
| 4031 | 762512.1393 | 9272285.5886 | 2768.9949 | b |
| 4032 | 762510.3692 | 9272284.8650 | 2769.0000 | r |
| 4033 | 762510.0938 | 9272285.5833 | 2768.9297 | r |
| 4034 | 762506.0672 | 9272281.0177 | 2768.9953 | b |
| 4035 | 762507.3671 | 9272279.1045 | 2768.9704 | e |
| 4036 | 762508.8008 | 9272276.8780 | 2768.9823 | b |
| 4037 | 762505.7605 | 9272274.8445 | 2768.9944 | b |
| 4038 | 762504.2877 | 9272277.0123 | 2768.9715 | e |
| 4039 | 762502.9883 | 9272278.8125 | 2768.9343 | b |
| 4040 | 762498.6589 | 9272277.5625 | 2768.7544 | r |
| 4041 | 762499.0217 | 9272276.9060 | 2768.8233 | r |
| 4042 | 762497.3129 | 9272275.1430 | 2768.9292 | b |
| 4043 | 762499.0216 | 9272273.4343 | 2768.9762 | e |
| 4044 | 762500.8660 | 9272271.5708 | 2768.9952 | b |
| 4045 | 762499.4505 | 9272270.6250 | 2768.9950 | b |
| 4046 | 762499.1483 | 9272269.8000 | 2768.9938 | r |
| 4048 | 762495.9777 | 9272271.3661 | 2768.9830 | e |
| 4049 | 762493.8571 | 9272272.5847 | 2768.9986 | b |
| 4050 | 762490.3661 | 9272271.0910 | 2769.0002 | r |
| 4051 | 762490.1215 | 9272271.4260 | 2768.9620 | r |
| 4052 | 762488.2558 | 9272287.4236 | 2767.9828 | r |
| 4053 | 762473.8566 | 9272287.6570 | 2767.9887 | r |
| 4054 | 762471.0562 | 9272276.9108 | 2768.2132 | r |
| 4055 | 762485.5927 | 9272267.0180 | 2769.0040 | b |
| 4056 | 762487.8464 | 9272265.8414 | 2769.0181 | e |
| 4057 | 762490.4808 | 9272264.8370 | 2769.0002 | b |
| 4058 | 762489.4158 | 9272263.3890 | 2768.9943 | r |
| 4059 | 762486.4595 | 9272259.8490 | 2769.3124 | r |
| 4060 | 762480.3970 | 9272258.4550 | 2769.0252 | b |
| 4061 | 762479.0126 | 9272259.8394 | 2769.0241 | e |
| 4062 | 762476.9679 | 9272261.1380 | 2769.0027 | b |
| 4063 | 762468.5189 | 9272257.2180 | 2769.3234 | r |
| 4064 | 762469.0370 | 9272256.8890 | 2769.3339 | r |
| 4065 | 762469.0625 | 9272255.4167 | 2769.4864 | b |
| 4066 | 762470.1492 | 9272253.8173 | 2769.6719 | e |
| 4067 | 762471.8535 | 9272252.2810 | 2769.8806 | b |
| 4068 | 762469.0021 | 9272249.2820 | 2769.8710 | r |
| 4069 | 762464.0579 | 9272247.1548 | 2769.9653 | b |
| 4070 | 762462.5551 | 9272248.6576 | 2769.9271 | e |
| 4071 | 762461.1750 | 9272249.8376 | 2769.9869 | b |
| 4072 | 762460.2658 | 9272250.9820 | 2770.1708 | r |
| 4073 | 762456.3712 | 9272256.0103 | 2771.0062 | r |
| 4074 | 762456.6677 | 9272263.4910 | 2770.8125 | r |
| 4075 | 762445.2675 | 9272264.8970 | 2772.4109 | r |
| 4076 | 762439.4703 | 9272262.9668 | 2773.0000 | r |
| 4077 | 762439.4977 | 9272257.1915 | 2773.0000 | r |
| 4078 | 762433.9769 | 9272257.1416 | 2772.9375 | r |
| 4079 | 762432.7109 | 9272254.0706 | 2773.0000 | r |
| 4080 | 762433.8339 | 9272249.7242 | 2772.4106 | r |
| 4081 | 762447.5836 | 9272252.9307 | 2772.2184 | r |
| 4082 | 762458.1139 | 9272247.6830 | 2769.9966 | b |
| 4083 | 762459.9386 | 9272246.8798 | 2769.9573 | e |
| 4084 | 762461.6341 | 9272245.5610 | 2769.9859 | b |
| 4085 | 762459.3247 | 9272242.1090 | 2770.9895 | r |
| 4086 | 762455.7275 | 9272241.7008 | 2770.1520 | b |
| 4087 | 762454.3474 | 9272243.0809 | 2770.4568 | e |
| 4088 | 762453.0285 | 9272244.2220 | 2770.7584 | b |
| 4089 | 762450.3007 | 9272242.8670 | 2770.9717 | b |
| 4090 | 762451.5487 | 9272241.2044 | 2770.8908 | e |
| 4091 | 762452.7936 | 9272239.9595 | 2770.9573 | b |
| 4092 | 762451.5898 | 9272239.2770 | 2770.9423 | b |
| 4093 | 762449.9980 | 9272240.3232 | 2770.9199 | e |
| 4094 | 762447.3603 | 9272241.0533 | 2770.9875 | b |
| 4095 | 762446.1989 | 9272240.2000 | 2770.9889 | b |
| 4096 | 762444.4301 | 9272240.9090 | 2771.2634 | r |
| 4097 | 762442.9748 | 9272239.3730 | 2771.1469 | r |
| 4098 | 762444.9658 | 9272239.3102 | 2770.9906 | b |
| 4099 | 762446.1410 | 9272238.1350 | 2770.9633 | e |
| 4100 | 762447.3312 | 9272236.9448 | 2770.9471 | b |
| 4101 | 762442.6576 | 9272237.9410 | 2770.9984 | b |
| 4102 | 762443.7881 | 9272236.8105 | 2770.9780 | e |
| 4103 | 762444.9965 | 9272235.6021 | 2770.9721 | b |
| 4104 | 762443.4651 | 9272234.6958 | 2770.9869 | b |
| 4105 | 762440.7749 | 9272237.0060 | 2771.0433 | b |
| 4106 | 762440.4314 | 9272234.9207 | 2771.3122 | e |
| 4107 | 762441.5234 | 9272233.5000 | 2771.3268 | b |
| 4108 | 762433.6086 | 9272228.6960 | 2771.1649 | b |
| 4109 | 762431.8129 | 9272230.0687 | 2771.0788 | e |
| 4110 | 762430.1459 | 9272231.3030 | 2771.0218 | b |
| 4111 | 762427.6311 | 9272229.6592 | 2771.0110 | b |
| 4112 | 762429.2888 | 9272228.3300 | 2771.0246 | e |
| 4113 | 762430.0414 | 9272226.4609 | 2771.0066 | b |
| 4114 | 762426.9313 | 9272223.6240 | 2770.9878 | b |
| 4115 | 762425.1821 | 9272224.8573 | 2770.9919 | e |
| 4116 | 762422.1445 | 9272224.9583 | 2770.7489 | b |
| 4117 | 762417.9421 | 9272221.0335 | 2770.4286 | b |
| 4118 | 762419.3937 | 9272219.5819 | 2770.6848 | e |
| 4119 | 762421.0898 | 9272218.0208 | 2770.9559 | b |
| 4120 | 762416.1786 | 9272214.7656 | 2770.8334 | b |
| 4121 | 762415.4188 | 9272216.1266 | 2770.5403 | e |
| 4122 | 762413.3945 | 9272217.5208 | 2770.1029 | b |
| 4123 | 762412.0472 | 9272216.5548 | 2770.0821 | b |
| 4124 | 762413.7656 | 9272214.8364 | 2770.5385 | e |
| 4125 | 762414.7731 | 9272213.8289 | 2770.8079 | b |
| 4126 | 762412.5000 | 9272212.3125 | 2770.8907 | b |
| 4127 | 762409.1822 | 9272211.4633 | 2770.0888 | e |
| 4128 | 762404.7478 | 9272211.4110 | 2769.7275 | b |
| 4129 | 762399.9856 | 9272207.5320 | 2769.1703 | b |
| 4130 | 762401.9972 | 9272206.1876 | 2769.6473 | e |
| 4132 | 762403.1551 | 9272205.2140 | 2769.9430 | b |
| 4133 | 762400.5182 | 9272202.4167 | 2769.8765 | r |
| 4134 | 762395.1188 | 9272199.0959 | 2769.7322 | b |
| 4135 | 762393.8544 | 9272200.2087 | 2769.4419 | e |
| 4136 | 762392.2217 | 9272201.4642 | 2769.0989 | b |
| 4137 | 762390.7617 | 9272200.3333 | 2769.0881 | b |
| 4138 | 762392.1430 | 9272198.9521 | 2769.4278 | e |
| 4139 | 762393.0771 | 9272197.4280 | 2769.7697 | b |
| 4140 | 762387.0220 | 9272191.7035 | 2769.7439 | b |
| 4141 | 762384.6467 | 9272193.4478 | 2769.3296 | e |
| 4142 | 762381.5689 | 9272193.5130 | 2769.1876 | b |
| 4143 | 762379.0794 | 9272193.7083 | 2769.0271 | r |
| 4144 | 762375.4004 | 9272194.2680 | 2766.8834 | r |
| 4145 | 762374.9576 | 9272190.8830 | 2768.5432 | r |
| 4146 | 762375.3828 | 9272189.7120 | 2769.0542 | b |
| 4147 | 762377.1509 | 9272187.9439 | 2769.4372 | e |
| 4148 | 762379.3562 | 9272186.0806 | 2769.8939 | b |
| 4149 | 762377.0874 | 9272183.2050 | 2769.9460 | r |
| 4150 | 762375.5858 | 9272183.6852 | 2769.8009 | b |
| 4151 | 762373.1005 | 9272184.9699 | 2769.4941 | e |
| 4152 | 762370.3504 | 9272186.1490 | 2769.1858 | b |
| 4153 | 762365.3164 | 9272182.5833 | 2769.3762 | b |
| 4154 | 762367.1907 | 9272180.6306 | 2769.6811 | e |
| 4155 | 762369.2162 | 9272178.8590 | 2769.9807 | b |
| 4156 | 762366.6781 | 9272177.1330 | 2769.9309 | b |
| 4157 | 762363.8285 | 9272178.1619 | 2769.6656 | e |
| 4158 | 762360.7957 | 9272179.7028 | 2769.3580 | b |
| 4159 | 762355.3008 | 9272179.6250 | 2769.0572 | r |
| 4160 | 762355.6111 | 9272175.7090 | 2769.3807 | b |
| 4161 | 762357.3743 | 9272173.4135 | 2769.6276 | e |
| 4162 | 762358.9221 | 9272171.8657 | 2769.8197 | b |
| 4168 | 762419.9041 | 9272209.9480 | 2774.1668 | r |
| 4169 | 762424.3596 | 9272208.4361 | 2775.6238 | r |
| 4170 | 762428.2989 | 9272213.3600 | 2774.5656 | r |
| 4171 | 762437.7171 | 9272218.5630 | 2774.7400 | r |
| 4172 | 762445.3183 | 9272218.2135 | 2775.1747 | r |
| 4173 | 762454.0372 | 9272210.7447 | 2777.4451 | r |
| 4174 | 762467.1464 | 9272210.3807 | 2778.0000 | r |
| 4175 | 762482.8763 | 9272215.6468 | 2777.1115 | r |
| 4176 | 762508.2076 | 9272219.9386 | 2774.8824 | r |
| 4177 | 762531.7856 | 9272239.0511 | 2774.5659 | r |
| 4178 | 762526.5793 | 9272254.2959 | 2770.9601 | r |
| 4179 | 762504.0273 | 9272235.7159 | 2771.5058 | r |
| 4180 | 762482.0787 | 9272231.8408 | 2771.0966 | r |
| 4181 | 762463.7876 | 9272223.6702 | 2773.4511 | r |
| 4182 | 762344.2385 | 9272160.6620 | 2769.0327 | E42 |
| 4183 | 762357.9574 | 9272170.8820 | 2769.8509 | b |
| 4184 | 762355.5050 | 9272171.8613 | 2769.6620 | e |
| 4185 | 762353.0832 | 9272173.5242 | 2769.3758 | b |
| 4186 | 762350.7457 | 9272170.9118 | 2769.3428 | b |
| 4187 | 762352.9932 | 9272169.3437 | 2769.6462 | e |
| 4188 | 762354.8658 | 9272167.5304 | 2769.9262 | b |
| 4189 | 762352.3516 | 9272164.7500 | 2769.8200 | b |
| 4190 | 762350.2388 | 9272165.7816 | 2769.5245 | e |
| 4191 | 762348.0013 | 9272166.6200 | 2769.3281 | b |
| 4192 | 762346.6625 | 9272163.7585 | 2769.1827 | b |
| 4194 | 762348.5976 | 9272163.0297 | 2769.4787 | e |
| 4195 | 762351.0367 | 9272162.6580 | 2769.8111 | b |
| 4196 | 762350.4260 | 9272159.3220 | 2769.0000 | r |
| 4197 | 762349.5081 | 9272159.1360 | 2769.0425 | b |
| 4198 | 762347.0721 | 9272159.7075 | 2769.1101 | e |
| 4199 | 762344.6674 | 9272159.2463 | 2769.0798 | b |
| 4200 | 762344.0443 | 9272157.7708 | 2769.0608 | b |
| 4201 | 762343.1905 | 9272155.7970 | 2769.0497 | b |
| 4202 | 762345.6850 | 9272155.2222 | 2769.0558 | e |
| 4203 | 762347.9042 | 9272154.8135 | 2769.0000 | b |
| 4205 | 762348.5580 | 9272154.3548 | 2768.9999 | r |
| 4206 | 762347.2007 | 9272150.4070 | 2768.9995 | r |
| 4207 | 762346.9494 | 9272150.3030 | 2768.9995 | b |
| 4208 | 762344.9591 | 9272150.4538 | 2768.9995 | e |
| 4209 | 762342.5537 | 9272150.5620 | 2768.9802 | b |
| 4210 | 762341.2292 | 9272145.2500 | 2768.3891 | r |
| 4211 | 762341.1819 | 9272144.9470 | 2768.3818 | r |
| 4212 | 762342.2124 | 9272144.3350 | 2768.4568 | b |
| 4213 | 762345.0674 | 9272144.4662 | 2768.6857 | e |
| 4214 | 762347.2606 | 9272144.7296 | 2768.8645 | b |
| 4215 | 762350.4958 | 9272148.6998 | 2769.6742 | c |
| 4216 | 762351.7804 | 9272139.8650 | 2769.3957 | c |
| 4217 | 762349.7093 | 9272140.5060 | 2769.0203 | r |
| 4218 | 762348.3531 | 9272138.5630 | 2768.8625 | b |
| 4219 | 762346.3687 | 9272138.2333 | 2768.6894 | e |
| 4220 | 762344.2305 | 9272138.2500 | 2768.5140 | b |
| 4221 | 762342.3143 | 9272134.9281 | 2768.1524 | r |
| 4222 | 762333.0179 | 9272135.3703 | 2766.8181 | r |
| 4223 | 762346.3136 | 9272128.8220 | 2768.0637 | r |
| 4224 | 762347.3103 | 9272128.1980 | 2768.0270 | b |
| 4225 | 762349.1296 | 9272128.3943 | 2767.9859 | e |
| 4226 | 762351.3824 | 9272128.7600 | 2767.9967 | b |
| 4227 | 762352.8106 | 9272127.9598 | 2768.1624 | r |
| 4228 | 762352.6021 | 9272124.7503 | 2767.8399 | b |
| 4229 | 762350.4886 | 9272124.3947 | 2767.7925 | e |
| 4230 | 762348.4871 | 9272123.7020 | 2767.7405 | e |
| 4231 | 762350.4544 | 9272119.4792 | 2767.3254 | b |
| 4232 | 762352.1246 | 9272120.1674 | 2767.5035 | e |
| 4233 | 762354.3629 | 9272120.9470 | 2767.7339 | b |
| 4234 | 762355.1716 | 9272119.3596 | 2767.7665 | b |
| 4235 | 762352.8859 | 9272118.3676 | 2767.5024 | e |
| 4236 | 762351.1943 | 9272117.9945 | 2767.3179 | b |
| 4237 | 762360.1536 | 9272096.1875 | 2766.9047 | E43 |
| 4238 | 762356.1644 | 9272116.9710 | 2767.8624 | b |
| 4239 | 762354.4429 | 9272114.8823 | 2767.5706 | e |
| 4240 | 762353.5438 | 9272112.6704 | 2767.3113 | b |
| 4241 | 762354.4180 | 9272110.3958 | 2767.2554 | b |
| 4242 | 762356.4560 | 9272110.4043 | 2767.4667 | e |
| 4243 | 762359.0814 | 9272110.3200 | 2767.7363 | b |
| 4244 | 762360.4126 | 9272109.4580 | 2767.8271 | r |
| 4246 | 762361.6638 | 9272104.0208 | 2767.7500 | b |
| 4247 | 762359.7187 | 9272103.1464 | 2767.4183 | e |
| 4248 | 762357.6903 | 9272102.5350 | 2767.0410 | b |
| 4249 | 762356.1773 | 9272100.7810 | 2767.0437 | c |
| 4250 | 762357.4503 | 9272100.5700 | 2766.9514 | r |
| 4251 | 762359.7814 | 9272098.6923 | 2767.0456 | b |
| 4252 | 762361.4870 | 9272099.2130 | 2766.9700 | e |
| 4253 | 762363.3586 | 9272099.4544 | 2766.9721 | b |
| 4255 | 762364.5859 | 9272099.5625 | 2766.9949 | r |
| 4256 | 762367.9401 | 9272099.4375 | 2769.1624 | r |
| 4257 | 762366.2212 | 9272097.6630 | 2768.1565 | r |
| 4258 | 762366.9780 | 9272095.3850 | 2768.1671 | r |
| 4260 | 762365.8415 | 9272094.6960 | 2766.9665 | b |
| 4261 | 762364.1992 | 9272093.2056 | 2766.5741 | e |
| 4262 | 762362.7344 | 9272091.7408 | 2766.2120 | b |
| 4263 | 762361.5175 | 9272091.7980 | 2766.0225 | r |
| 4264 | 762359.4409 | 9272092.9007 | 2765.6898 | r |
| 4265 | 762356.4052 | 9272095.0171 | 2765.4302 | r |
| 4266 | 762364.7143 | 9272088.2150 | 2766.2472 | b |
| 4267 | 762366.4380 | 9272089.4620 | 2766.6073 | e |
| 4268 | 762368.0912 | 9272090.7260 | 2766.9456 | b |
| 4269 | 762370.2813 | 9272089.2500 | 2766.9840 | r |
| 4270 | 762371.1414 | 9272088.1220 | 2766.9737 | r |
| 4271 | 762371.3742 | 9272087.2300 | 2766.9390 | b |
| 4272 | 762368.7384 | 9272086.7195 | 2766.4533 | e |
| 4273 | 762366.8305 | 9272085.9200 | 2766.3548 | b |
| 4274 | 762368.9589 | 9272084.0050 | 2766.4152 | b |
| 4275 | 762371.0591 | 9272084.6075 | 2766.6464 | e |
| 4276 | 762373.3049 | 9272085.5894 | 2766.8465 | b |
| 4277 | 762375.5141 | 9272083.8278 | 2766.8325 | b |
| 4278 | 762374.5863 | 9272082.2359 | 2766.6024 | e |
| 4279 | 762373.8436 | 9272080.7049 | 2766.3959 | b |
| 4280 | 762376.0141 | 9272081.4037 | 2766.6693 | a |
| 4281 | 762377.7094 | 9272078.1977 | 2766.3280 | b |
| 4282 | 762379.5479 | 9272079.3441 | 2766.6184 | e |
| 4283 | 762381.3200 | 9272080.1774 | 2766.8390 | b |
| 4284 | 762385.3194 | 9272077.8910 | 2766.7772 | b |
| 4286 | 762383.6166 | 9272076.9727 | 2766.5816 | e |
| 4287 | 762382.2180 | 9272075.3430 | 2766.3432 | b |
| 4288 | 762385.2240 | 9272071.9270 | 2766.0801 | r |
| 4289 | 762387.6630 | 9272071.8870 | 2766.0302 | b |
| 4290 | 762390.4906 | 9272072.9663 | 2766.1505 | e |
| 4291 | 762393.1021 | 9272073.5810 | 2766.5680 | b |
| 4292 | 762397.6265 | 9272072.4810 | 2766.9281 | r |
| 4293 | 762397.6641 | 9272073.5417 | 2767.0634 | r |
| 4294 | 762398.9489 | 9272071.5650 | 2766.9805 | r |
| 4295 | 762397.5484 | 9272071.5393 | 2766.8932 | b |
| 4296 | 762396.3796 | 9272069.5339 | 2766.6829 | e |
| 4297 | 762393.3078 | 9272068.3540 | 2766.2434 | b |
| 4298 | 762402.4609 | 9272063.7083 | 2766.8856 | E44 |
| 4299 | 762400.0111 | 9272063.794 | 2767.6008 | bm13 |
| 4300 | 762397.9193 | 9272064.8125 | 2766.8662 | r |
| 4301 | 762399.6694 | 9272065.4110 | 2766.9918 | b |
| 4302 | 762400.7000 | 9272067.0919 | 2766.9723 | e |
| 4303 | 762401.8925 | 9272069.9980 | 2766.9789 | b |
| 4304 | 762402.8119 | 9272074.7538 | 2767.5831 | r |
| 4305 | 762404.5305 | 9272078.5123 | 2768.5605 | r |
| 4306 | 762405.2697 | 9272085.7250 | 2771.0361 | c |
| 4307 | 762415.4193 | 9272081.3958 | 2770.6081 | c |
| 4309 | 762408.0169 | 9272068.0625 | 2766.8783 | b |
| 4310 | 762407.5646 | 9272064.4972 | 2766.4217 | e |
| 4311 | 762407.9163 | 9272062.0670 | 2766.1575 | b |
| 4312 | 762408.8994 | 9272060.2720 | 2765.9038 | r |
| 4313 | 762411.6542 | 9272061.6220 | 2766.2003 | b |
| 4314 | 762411.9179 | 9272063.6466 | 2766.4514 | e |
| 4315 | 762412.6683 | 9272066.8631 | 2766.8626 | b |
| 4316 | 762415.8552 | 9272066.7165 | 2766.8161 | b |
| 4317 | 762415.9801 | 9272063.3564 | 2766.4651 | e |
| 4318 | 762416.9239 | 9272061.6571 | 2766.2877 | b |
| 4319 | 762419.4060 | 9272060.8000 | 2766.2023 | r |
| 4320 | 762426.8871 | 9272062.7160 | 2766.3878 | b |
| 4321 | 762425.8491 | 9272064.3955 | 2766.5933 | e |
| 4322 | 762424.3987 | 9272066.6670 | 2766.8674 | b |
| 4323 | 762422.3763 | 9272069.4375 | 2767.1175 | c |
| 4324 | 762430.7366 | 9272070.4570 | 2767.5918 | c |
| 4325 | 762430.8336 | 9272068.4620 | 2766.9287 | r |
| 4326 | 762434.8676 | 9272067.3596 | 2766.7430 | b |
| 4327 | 762435.5726 | 9272065.9063 | 2766.5404 | e |
| 4328 | 762436.8315 | 9272064.0070 | 2766.2492 | b |
| 4329 | 762439.8895 | 9272061.6510 | 2765.9974 | c |
| 4330 | 762439.8973 | 9272058.7560 | 2765.8822 | c |
| 4331 | 762440.4673 | 9272055.6980 | 2764.9984 | c |
| 4332 | 762443.6268 | 9272069.9560 | 2766.9860 | r |
| 4333 | 762447.7253 | 9272069.3520 | 2766.9820 | b |
| 4334 | 762449.6401 | 9272068.0920 | 2766.9994 | e |
| 4335 | 762451.4724 | 9272066.5160 | 2767.0015 | b |
| 4336 | 762455.9581 | 9272069.0737 | 2767.0022 | a |
| 4337 | 762458.6971 | 9272067.7010 | 2766.9131 | b |
| 4338 | 762458.2754 | 9272069.4338 | 2767.1195 | e |
| 4339 | 762458.0483 | 9272071.3307 | 2767.2832 | b |
| 4340 | 762460.3837 | 9272071.6271 | 2767.4379 | b |
| 4341 | 762460.6667 | 9272069.8053 | 2767.2232 | e |
| 4342 | 762460.9331 | 9272068.0913 | 2766.9320 | b |

**ANEXO C.**

**PLANO DE UBICACIÓN.**

**ANEXO D.**

**PLANOS PLANTA Y PERFIL.**

**ANEXO E.**

**PLANOS SECCIONES TIPICAS.**

**ANEXO F.**

**PLANOS SECCIONES TRANSVERSALES.**